




338 West First Street  
Port Angeles, WA 98362

**CONTRACT PROVISIONS  
WITH SAMPLE CONTRACT FORMS**  
for

**MULTI-TENANT INDUSTRIAL BUILDING  
FACILITY IMPROVEMENTS – PHASE 2**

Contract No. 33-7-09-C1

**Approved for Bidding:**

  
\_\_\_\_\_  
Karen Goschen  
Executive Director


8-11-17  
Date

Technical Specifications developed  
by Carletti Architects under  
Consultant Agreement with Port of  
Port Angeles

**Reviewed By:**

  
\_\_\_\_\_  
Chris Hartman, P.E.  
Director of Engineering

8/11/17  
Date

  
\_\_\_\_\_  
Chris Rasmussen  
Facilities Manager

8/14/17  
Date

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## **DIVISION 0 - BIDDING AND CONTRACT DOCUMENTS**

### **Section 00 11 13 - Advertisement for Bids**

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The PORT OF PORT OF ANGELES is currently accepting sealed bids for construction of the following:

**Contract No. 33-7-09-C1**  
**Multi-Tenant Industrial Building Facility Improvements – Phase 2**

The work required for this project includes:

Project will upgrade an existing 25,000 S.F. Pre-Engineered Steel Building with HVAC, lighting, access control and flooring improvements. The Port will supply two (2) 20-ton packaged heat pump units for the Contractor to install. Other materials and equipment will be supplied by the Contractor.

Estimated Construction cost is \$600,000

Bids will be received at the Port Administration Office, 338 West First Street, Port Angeles, Washington until **2:00 p.m. on Wednesday, September 6, 2017**, at which time they will be publicly opened and read aloud.

A pre-bid conference and site visit has been set for August 28, 2017 at 10:00 a.m. Potential bidders are strongly encouraged to attend. The site visit will convene at the project site located at 2007 S 'O' Street, Port Angeles, WA 98363. Chris Hartman is the Project Manager for this project, telephone number (360) 417-3422 for a brief meeting prior to

Each bid must be accompanied by a Certified Check or Bid Bond in an amount equal to five (5) percent of the Bid.

Disadvantaged, Minority, and Women's Business Enterprises are encouraged to respond. The Port of Port Angeles does not discriminate on the grounds of race, color, religion, national origin, sex, age or handicap in consideration for a project award.

The Port of Port Angeles reserves the right to reject any and all bids, waive technicalities or irregularities and to accept any bid if such action is believed to be for the best interest of the Port.

Plans, specifications, addenda, reference documents, and plan holders list for this project are available on-line through Builders Exchange of Washington, Inc. at <http://www.bxwa.com>.

**DIVISION 0 – BIDDING AND CONTRACT REQUIREMENTS**

**Section 00 21 13 – Instructions to Bidders**

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## **DIVISION 0 – BIDDING AND CONTRACT REQUIREMENTS**

### **Section 00 21 13 – Instructions to Bidders**

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#### **PART 1. BIDDING REQUIREMENTS**

##### **1.01 RECIPROCITY PREFERENCE FOR RESIDENT CONTRACTORS**

- A. In accordance with RCW 39.04.380, the State of Washington is enforcing a Reciprocal Preference for Resident Contractors. Any public works bid received from a nonresident contractor from a state that provides an in-state percentage bidding preference, a comparable percentage disadvantage must be applied to the bid of that nonresident contractors.

A nonresident contractor from a state that provides a percentage bid preference means a contractor that:

1. is from a state that provides a percentage bid preference to its resident contractors bidding on public works contracts.
2. at the time of bidding on a public works project, does not have a physical office located in Washington.

The state of residence for a nonresident contractor is the state in which the contractor was incorporated or, if not a corporation, the state where the contractor's business entity was formed.

All nonresident contractors will be evaluated for out of state bidder preference. If the state of the nonresident contractor provides an in-state contractor preference, a comparable percentage disadvantage will be applied to their bid prior to contract award.

This section does not apply to Small Works Roster contracts, Limited Public Works contracts, or any other procurement exempt from competitive bidding in accordance with RCS 39.04.280.

##### **1.02 EXAMINATION OF CONTRACT DOCUMENTS AND REGULATIONS**

- A. The bidder shall examine the Contract Documents and any other data made available to the bidder relating to the Work, and shall comply with all instructions and provisions. The bidder shall promptly notify the Port of ambiguities, inconsistencies, or errors, if any, which it may discover upon examination of the Contract Documents and any other data made available to the bidder relating to the Work. The submission of a Bid shall constitute an acknowledgement upon which the Port may rely that the bidder has thoroughly examined and is familiar with the Contract Documents and has reviewed all applicable federal, state and local statutes, regulations, ordinances and environmental documents relating to the work and all permits which have been applied for and/or issued pertaining to the Work. The failure or neglect of a bidder to examine any of the Contract Documents, statutes, regulations, ordinances, environmental documents or permits shall not relieve the bidder from any obligations with respect to the Contract Documents or the Work.

## **DIVISION 0 – BIDDING AND CONTRACT REQUIREMENTS**

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- B. The bidder shall verify that all documents provided by the Port, and upon which the bidder is basing its bid, are full and complete with no missing pages, sheets or unintentional blank spaces. Submittal of a bid indicates the bidder has verified it has obtained all Port-supplied Contract Documents. No claim for additional work due to missing bid information will be considered.
- C. If the bidder elects to review or download Contract Documents electronically from websites it is the bidder's responsibility to ensure that all documents are complete and that all addenda have been reviewed prior to submission of Bid.

#### **1.03 INSPECTION OF WORK SITE**

- A. Bidder shall inspect and compare the work site and Contract Documents to evaluate the location of the Work, the actual physical conditions of the site, and surface and subsurface conditions ordinarily encountered and generally recognized as inherent in the Work. Bidder shall obtain written permission from the Port prior to entering the work site or conducting physical testing of the work site, except for attendance during a scheduled prebid examination.
- B. If the bidder finds facts or conditions which appear to conflict with the Contract Documents or with any other data made available to the bidder relating to the Work, the bidder shall promptly notify the Port in writing.

#### **1.04 CLARIFICATION OF CONTRACT DOCUMENTS**

- A. Requests for interpretation or reports of ambiguities shall be made in writing and delivered to the Port at least seven (7) calendar days before the Bid submittal deadline. Clarifications, interpretations, or supplemental instructions which change the scope of work and or schedule described in the contract documents, will be issued only in the form of written addenda. All addenda shall become part of the Contract Documents and any subsequently awarded Contract.
- B. Copies of addenda will be mailed, delivered, faxed, or electronically transmitted to all planholders of record at the respective address furnished for such purposes.
- C. Each bidder shall acknowledge the receipt of all addenda issued on its Bid. If such acknowledgement is not made, the Port reserves the right to show constructive notice through delivery records or the bidder's use of information contained in the addenda.
- D. Bidders shall not rely upon any oral statements or conversations, whether at the pre-bid conference or otherwise, that they may have with Port employees, agents or representatives regarding the Contract Documents. No oral clarification or interpretations will be made to any bidder as to the meaning of the Contract Documents.



## **DIVISION 0 – BIDDING AND CONTRACT REQUIREMENTS**

### **Section 00 21 13 – Instructions to Bidders**

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#### 1.05 PRE-BID CONFERENCE

- A. Prospective bidders and primary subcontractors are strongly encouraged to attend a pre-bid conference and site visit as stipulated in the advertisement for bid. Attendees should review the information and safety precautions set forth in the Contract Documents to determine for themselves appropriate protective clothing or equipment. Attendees further agree to indemnify and hold the Port harmless from any and all claims of personal injury arising from their participation in the site visit.

#### 1.06 SUBSTITUTION REQUESTS

- A. Products, equipment, materials or methods described in the Contract Documents are to establish a standard of quality, function, appearance and dimension. A proposed substitution shall have equal attributes in all respects.
- B. During the bidding period written requests by prime bidders for substitutions may be considered if received by the Port at least fourteen (14) days prior to the bid submittal deadline. The Port may, in its sole discretion, defer the consideration of a proposed substitution until after Contract award.
- C. Each substitution request shall, in accordance with the applicable provisions of Section 01 33 00, describe the proposed substitution in its entirety including the name of the material or equipment, drawings, catalog cuts, performance or test data and all other information required for an evaluation. The submittal shall also include a statement noting all changes required in adjoining, dependent or other interrelated work necessitated by the incorporation of the proposed substitution. The bidder shall bear the burden of proof to show that the proposed substitution meets or exceeds the required function and is equal or superior to the specification.
- D. The Port may require that samples be submitted or demonstration made prior to approval. The Port's decision of approval or disapproval of a proposed substitution shall be final.
- E. Approval of substitutions will be made by addenda.

## **DIVISION 0 – BIDDING AND CONTRACT REQUIREMENTS**

### **Section 00 21 13 – Instructions to Bidders**

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#### **PART 2. PREPARATION AND SUBMITTAL OF BIDS**

##### **2.01 FORM OF BID**

- A. Bids shall be submitted on the forms provided by the Port in Section 00 41 13, 00 43 13 and 00 43 14
- B. All blanks on the bid forms shall be filled in by ink or typed.
- C. Alterations, erasures, or interlineations within the blanks, if any, shall be in ink and initialed by the signer of the Bid.
- D. The bidder shall make no deletions, additional conditions or stipulations on the bid form or qualify its Bid in any manner.

##### **2.02 BID PRICE**

- A. All prices on the bid form shall be in U.S. dollars.
- B. For lump sum bids the total Contract Sum shall be submitted.
- C. For unit price bids a price shall be submitted for each item of the Work, an extension thereof, and, if requested, the total Contract Sum.
- D. The price on the bid form for that element of Work shall include everything necessary for the prosecution and completion of the Work in accordance with the Contract Documents including, but not limited to, furnishing all required materials, equipment, tools, transportation of Port furnished materials, plant and other facilities and all management, superintendence, labor and services, and field design, except as may be otherwise provided in the Contract Documents.
- E. Estimated quantities, if any, set forth on the bid form are estimates only, being given only as a basis for the comparison of Bids, and the Port does not warrant, expressly or by implication, that the actual amount of work will correspond to the estimated quantities. The Port reserves the right to increase or decrease the amount of any class or portion of the Work and to make changes in the Work as the Port may deem necessary or appropriate. The basis of payment for unit price bid items for which estimated quantities were set forth on the bid form shall be the actual number of unit items provided or performed under this Contract. In the event of a 20% quantity increase or decrease, the unit price may be adjusted as provided in the General Conditions.

##### **2.03 TAXES**

- A. The Work to be performed under this Contract constitutes a "retail sale" as such term is defined in RCW 82.04.050. The prices on the bid form shall not include state or local retail sales taxes. The Port will pay state and local retail sales tax on each progress payment and final payment to the Contractor for transmittal by the Contractor to the Washington State Department of Revenue or to the applicable local government. The

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Contractor will pay retail sales tax on all consumables used during the performance of the work and on all items which are not incorporated into the final work, which tax shall be included in the prices on the bid form.

- B. No increase will be made in the amount to be paid by the Port under this Contract because of any misunderstanding by or lack of knowledge of the Contractor as to liability for, or the amount of, any taxes for which the Contractor is liable or responsible by law or under this Contract.
- C. Sales tax shall be shown as a separate item on the bid form. In any case where it is not included as a separate item, the Port will add the sales tax to the total of the bid prices shown.

#### **2.04 BIDDER'S NAME AND SIGNATURE**

- A. The bid form shall include the legal name and contractor registration number of the bidder and shall indicate whether bidder is a sole proprietor, a partnership, a corporation, joint venture, or other legal entity. The bid form shall be signed by a person legally authorized to bind the bidder to a contract and shall indicate the bidder's address. A bid form signed by an agent shall have a current power of attorney attached certifying agent's authority to bind the bidder. Upon request of the Port the bidder shall provide corporate or partnership documentation evidencing the bidder's legal status and showing the authority of the person signing the bid form to execute contracts on behalf of the bidder.
- B. The bid form shall not become a part of the Contract Documents except by inclusion into the Agreement.

#### **2.05 PROPOSED SUBCONTRACTORS**

- A. The Port of Port Angeles encourages and supports the use of M/WBE subcontractors and suppliers on all Work.
- B. In accordance with RCW 39.30.060, when the Work is estimated to cost \$1,000,000 or more, the bidder shall list on the bid form the name of each subcontractor to whom the bidder proposes to directly subcontract heating, ventilation and air conditioning, plumbing as described in chapter 18.106 R.C.W, and electrical as described in chapter 19.28 R.C.W., or name itself for the work. The bidder shall not list more than one subcontractor for each category of work identified unless subcontractors vary with bid alternates, in which case the bidder must indicate which subcontractor will be used for which alternate. Failure of the bidder to list on the bid form the names of such subcontractors or to name itself to perform such work, or the naming of two or more subcontractors to perform the same work shall render the bidder's Bid nonresponsive and, therefore, void. The requirement of this section to name the bidder's proposed heating, ventilation and air conditioning, plumbing, and electrical subcontractors applies only to proposed heating, ventilation and air

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conditioning, plumbing, and electrical subcontractors who will contract directly with the general contractor submitting the Bid to the public entity. For purposes of this paragraph, a subcontractor is defined as one who contracts directly with the Contractor to furnish materials and labor, or labor only for the performance of the Work.

- C. After bid opening the Port may require the apparent low bidder to identify any proposed subcontractors and major suppliers together with a statement of experience with references for each. Such information shall be submitted within 24 hours of request.

#### **2.06 BID GUARANTEE**

- A. The bid shall be accompanied by a Bid Guarantee in an amount at least 5% of the total Contract Sum.
- B. The Bid Guarantee shall be in one of the following forms and made payable to the Port of Port Angeles: a bid bond, either the form provided, or a form acceptable to the Port which contains provisions substantially similar to those provided, duly completed by a guarantee company authorized to do business in the state of Washington; a U.S. postal money order; or a certified check or cashier's check drawn upon a banking institution. The surety signing the bid bond must appear on the U.S. Treasury Department's most current list (Circular 570 as amended), and the surety's name must appear in the current Authorized Insurance Company List in the State of Washington published by the Office of the Insurance Commissioner. Attorneys-in-fact who sign bid bonds must file with each bond a certified and effectively dated copy of their Power of Attorney.

#### **2.07 ALTERNATIVE BIDS**

- A. Before the bid submittal deadline any bidder may submit an Alternative Bid based on plans and specifications provided by the bidder which it considers to be in the interest of the Port. For purposes of this subparagraph, Alternative Bid means a statement and price submitted by a bidder which accompanies a conforming Bid and proposes a different design, procedure, method, product or material than that specified, to be provided by the bidder who assumes all responsibility therefore, and is intended to accomplish the same end result as that required by the Contract Documents. An Alternative Bid shall be accompanied by sufficient information to indicate the differences in approach to that specified. The information submitted with the Alternative Bid shall describe the various attributes in detail to allow the Port to evaluate the alternative in all respects. The Port may consider such Alternative Bids during the Bid evaluation process and shall be the sole judge as to whether or not such Alternative Bids are in its best interest of the Port.

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- B. Any bidder may submit, as a separate proposal, a bid clearly designated as "Bid Based on Actual Damages." The liquidated damages provisions shall not apply to such "Bid Based on Actual Damages," but all other provisions of the Contract Documents shall apply thereto, and, if such Bid is accepted, the bidder shall be liable for all actual damages resulting from bidder's failure to complete the Work in accordance with the Contract Documents, and the Port of Port Angeles shall have the right to recover such actual damages from the bidder or bidder's surety.

#### **2.08 BID SUBMITTAL**

- A. The Bid, the Bid Guaranty, and all other documents required to be submitted with the Bid shall be enclosed in a sealed envelope marked "bid submittal by" followed by the name and address of the bidder, the Port-designated project name, and the date and time for the opening of Bids.
- B. If the Bid is mailed, it shall be addressed to the Port of Port Angeles, P.O. Box 1350, Port Angeles, WA 98362. The Bid shall be enclosed within another envelope with the notation "BID ENCLOSED" on the face.
- C. If the Bid is delivered, it shall be delivered to the Port Administration Building reception counter, Port of Port Angeles, 338 West First Street, Port Angeles, WA 98362.
- D. No Bid shall be considered which has not been received at the Port's main office reception desk before the Bid submittal deadline specified in the Advertisement for Bids. Bidder shall assume full responsibility for timely delivery of its Bid at the specified location.
- E. Oral, telephonic, telefaxed, electronic, or telegraphic Bids are invalid and will not receive consideration.

#### **2.09 WITHDRAWAL OR MODIFICATION OF BID**

- A. A bidder may withdraw or modify its Bid before the Bid submittal deadline by submitting written notice to the Port signed by the bidder. After Bid opening no bidder may withdraw or modify its Bid unless Contract award is delayed beyond the time specified.

#### **2.10 BID OPENING**

- A. Unless stated otherwise in the Advertisement for Bids, all Bids which have been properly identified and received will be publicly opened and the prices read aloud. No evaluation of the Bids will be made at that time except for the announcement of the apparent low bidder.

#### **2.11 BID VALIDITY**

- A. All Bids submitted shall be valid and binding on the bidder for a period of sixty (60) days following the Bid submittal deadline and for any extension of time granted by the bidder.

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### Section 00 21 13 – Instructions to Bidders

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#### PART 3. BID EVALUATION

##### 3.01 EVALUATION STANDARD

- A. Bids will be evaluated by the Port to determine which Bid is the lowest, responsive Bid by a responsible bidder. The Port, at its sole discretion, will base the evaluation on the Base Bid or on the Base Bid plus selected Additive Bid(s).

##### 3.02 VERIFICATION OF BID PRICES

- A. Prices set forth in the Bid will be reviewed by the Port for mathematical accuracy. The Port reserves the right to correct mathematical errors or complete mathematical calculations that are obvious on the face of the Bid. In the event of a discrepancy between a unit price and the extended amount for a bid item, the unit price will control. The prices, corrected for mathematical errors, shall be used as the amount of the bid items for evaluation and award purposes.
- B. Reciprocal Preference for Resident Contractors. For a public works bid received from a nonresident contractor from a state that provides an in-state percentage bidding preference, a Comparable Percentage Disadvantage (CPD) will be applied to the bid of that nonresident contractor. The CPD is the in-state contractor percent advantage provided by the contractor's home state.

For the purpose of determining the successful bidder, the Port will multiply the nonresident contractor bid amount by the CPD. The "bid amount" shall be the total of the base bid and all accepted alternate or additive bid items. The CPD shall be added to the nonresident contractor bid amount which equates to the Nonresident Disadvantage Total (NDT). The NDT shall be compared to the Washington contractor bid amounts. The bidder with the lowest total shall be the successful bidder. See example below:

EXAMPLE: Alaska Nonresident Contractor Bid Amount	\$100,000
<u>Multiplied by the Alaska CPD</u>	<u>X 0.05</u>
Alaska CPD Total	\$ 5,000
Alaska Nonresident Contractor Bid Amount	\$100,000
<u>Alaska CPD Total</u>	<u>\$ 5,000</u>
Nonresident Disadvantage Total	\$105,000*

- \* Note - If the NDT is lower than all other Washington contractor bid amounts, the Alaska nonresident contractor is the successful bidder and will be awarded a contract for the bid amount of \$100,000.  
If the NDT is higher than a Washington contractor bid amount, the successful Washington bidder will be awarded a contract for the bid amount.

## **DIVISION 0 – BIDDING AND CONTRACT REQUIREMENTS**

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#### **3.03 CLAIM OF ERROR**

- A. A bidder claiming error in its Bid must submit supporting evidence including cost breakdown sheets within 24 hours of Bid opening and provide any other supporting documentation requested by the Port. In the event the bidder demonstrates an error in the Bid to the Port's satisfaction, the Port may allow the bidder to withdraw its Bid.

#### **3.04 RESPONSIVE BIDS**

- A. The Port, in its sole discretion, reserves the right to determine Bid irregularities which render a Bid non-responsive, and to waive informalities and immaterial irregularities in the Bid. A Bid shall be considered irregular and may be rejected by the Port as non-responsive for reasons including, but not limited to:
1. If the bid form furnished or authorized is not used or is altered;
  2. If the bid form or any required supplemental documents are incomplete, contain any additions, deletions, conditions, or otherwise fail to conform to the Port's requirements;
  3. If the bidder adds any provisions reserving the right to reject or accept the award, or enter into the contract;
  4. If the Bid or Bid Guaranty is not properly executed, or shows an incorrect amount;
  5. If the Bid fails to include a price for every bid item;
  6. If the Port reasonably deems the Bid Guaranty inadequate; or
  7. If the Port deems any of the bid prices to be excessively unbalanced either above or below the amount of a reasonable bid price for the item of Work to be performed, to the potential detriment of the Port.

#### **3.05 BIDDER QUALIFICATIONS**

- A. It is the intent of the Port to award a contract to the low responsible bidder. Before award, the bidder must meet the following bidder responsibility criteria to be considered a responsible bidder. The bidder may be required by the Port to submit documentation demonstrating compliance with the criteria. The bidder must:
1. At the time of bid submittal, have a current certificate of registration in compliance with chapter 18.27 RCW.
  2. Have a current Washington Unified Business Identifier (UBI) Number.
  3. If applicable:

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- a. Have industrial insurance (workers' compensation) coverage for the bidder's employees working in Washington, as required by Title 51 RCW;
    - b. Have a Washington Employment Security Number as required Title 50 RCW.
    - c. Have a Washington Department of Revenue state excise tax registration number, as required by Title 82 RCW.
  4. Not be disqualified from bidding on any public works contract under RCW 39.06.010 or 39.12.065(3).
  5. For public works projects subject to the apprenticeship utilization requirements of RCW 39.04.320, not have been found out of compliance by the Washington state apprenticeship and training council for working apprentices out of ratio, without appropriate supervision, or outside their approved work processes as outlined in their standards of apprenticeship under chapter 49.04 RCW for the one-year period immediately preceding the first date of advertising for the project.
- B. The Port reserves the right to investigate the qualifications of any bidder, including but not limited to, contacting any reference or any financial institution to verify that the bidder is qualified to successfully complete the Work.
- C. In order to verify that the bidder has adequately incorporated all elements of the Work and the requirements of the Contract Documents in its bid prices, the bidder will make available upon request, for the Port's review a complete itemization of its Bid, and clearly define all phases of its work.
- D. Prior to award, if requested by the Port, the bidder and selected proposed subcontractors or suppliers shall attend a bid evaluation conference and shall bring to the conference any documents requested by the Port to evaluate the Bid and the bidder's qualifications.
- 3.06 SUPPLEMENTAL BIDDER RESPONSIBILITY CRITERIA**
- A. In addition to the bidder responsibility criteria above, the Port may adopt relevant supplemental criteria for determining bidder responsibility applicable to a particular project which the bidder must meet (RCW 39.04.350 (2)). Adopted criteria shall be stated in Specification Section 00 73 00 - Supplementary Conditions.
- B. As evidence that the bidder meets the bidder responsibility criteria stated in Section 00 73 00, the apparent low bidder must submit the requested documentation to the Port within 48 hours of the bid submittal deadline. In the interests of meeting the project's schedule, the Port may request that the next lowest bidder(s) also submit the documentation.



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- C. In the event bidder fails to supply the supplemental information requested concerning responsibility within the time and manner specified, the Port may base its determination of responsibility on any available information related to the supplemental criteria, or may find the bidder not responsible. The Port reserves the right to request such documentation from other bidders also.
- D. The Port may conduct reference checks for the bidder whose bid is under consideration for award. In the event that information obtained from the reference checks:
1. Reveals that the bidder does not meet the Supplemental Bidder Responsibility Criteria; or
  2. Indicates concerns about the bidder's performance on projects identified as meeting the Supplemental Bidder Responsibility Criteria, which may include, but not be limited to the quality of construction, the bidder's management of subcontractors, timeliness of required submittals, and safety record on the project; or
  3. Indicates other concerns about the bidder's ability to successfully perform the work,

the Port may determine that the bidder is not a responsible bidder. Prior to making such a determination that a bidder is not responsible based on information received through reference checks, the Port will discuss with the bidder the information obtained from the references, and provide the bidder with the opportunity to offer explanations that may help inform whether the Port declares the bidder not responsible.

In conducting reference checks, the Port may include itself as a reference if the bidder has performed work for the Port, even if the bidder did not identify the Port as a reference.

- E. The Port shall consider an overall accounting for determining bidder responsibility. If the Port determines the bidder does not meet the bidder responsibility criteria and is therefore not a responsible bidder, the Port shall notify the bidder in writing with the reasons for its determination. If the bidder disagrees with this determination, it may appeal the determination within 3 business days of receipt of the Port's determination by presenting additional information to the Port. The Port will consider the additional information before issuing its final determination. If the final determination affirms that the bidder is not responsible, the Port will not execute a contract with any other bidder until two 2 business days after the bidder determined to be not responsible has received the final determination.

## **DIVISION 0 – BIDDING AND CONTRACT REQUIREMENTS**

### **Section 00 21 13 – Instructions to Bidders**

---

- F. The Port may award the contract to the next lowest bidder who meets the Supplemental Bidder Responsibility Criteria and whose reference checks validate the ability of the bidder to successfully perform the work. The Port will use the same process in checking references for any bidders other than the low bidder.
- G. Any bidder, within five (5) business days before the bid submittal deadline, may request that the Port modify the Supplemental Criteria. The Port will evaluate the request submitted by any potential bidder and respond before the submittal deadline. If the evaluation results in a change of the criteria, the Port will issue an addendum to the bidding documents identifying the new criteria.

#### **3.07 COLLUSION**

- A. If the Port determines that collusion has occurred among the bidders, none of the Bids of the participants in such collusion will be considered. The Port's determination of collusion shall be conclusive.

#### **3.08 RETURN OF BID GUARANTY**

- A. As soon as the bid prices have been compared, the Port will return the Bid Guaranty accompanying any Bids which, in the Port's judgment, would not be considered for award. All other Bid Guaranties will be held until the Contract and bonds have been executed, after which all remaining Bid Guaranties, except which as have been forfeited, will be returned.

#### **3.09 SINGLE BID RECEIVED**

- A. If the Port receives a single responsive, responsible Bid, the Port shall have the right, in its sole discretion, to conduct a price or cost analysis on such Bid. The bidder shall promptly provide all cost or pricing data, documentation and explanation requested by the Port to assist in such analysis. By conducting such analysis, the Port shall not be obligated to accept the single Bid; the Port reserves the right to reject such Bid or any portion thereof.

#### **3.10 RIGHTS OF THE PORT**

- A. The Port reserves the right to accept the Bid of the lowest responsive, responsible bidder, an "Alternative Bid" based upon plans and specifications prepared by the Bidder, to reject any or all Bids, republish the Advertisement for Bids, revise or cancel the work to be performed, or to do the work otherwise, if in the judgment of the Port, the best interests of the Port is served thereby.

## **DIVISION 0 – BIDDING AND CONTRACT REQUIREMENTS**

### **Section 00 21 13 – Instructions to Bidders**

---

#### **PART 4. AWARD OF CONTRACT**

##### **4.01 NOTICE OF AWARD**

- A. The acceptance of a Bid will be evidenced by a written notice of award delivered to the bidder whose Bid is accepted.
- B. Within ten days after issuance of the notice of award the Agreement form set forth in Section 00 52 13 shall be executed in duplicate and returned, together with the performance and payment bonds, and certificates of insurance with endorsements as required by the Contract Documents.
- C. The bidder shall not commence physical modification of the work site until the Port has issued its notice of award, notice to proceed, and the Port has received the executed Agreement form and bonds and certificates of insurance meeting the requirements of the Contract Documents.

##### **4.02 PERFORMANCE AND PAYMENT BONDS**

- A. The bidder awarded this Contract shall furnish performance and payment bonds on forms set forth in Section 00 61 13.13 and Section 00 61 13.16, or similar form acceptable to the Port in the amount of 100% of the total Contract Sum as security for the faithful performance and completion of the Work. Such bonds shall be executed and sealed by a duly licensed surety registered with the Washington State Insurance Commissioner, and the surety's name shall appear in the current Authorized Insurance Company List in the State of Washington published by the Office of the Insurance Commissioner. Attorneys-in-fact who sign bonds must file with each bond a certified and effectively dated copy of their Power of Attorney.
- B. The scope of the performance and payment bonds shall not affect or alter the liabilities of the Contractor to the Port under the terms of the Contract Documents.
- C. The Port may require the surety to appear and qualify itself upon the bond. If at any time the Port determines, in its sole judgment, that the surety is insufficient, the Port may require the Contractor to furnish additional surety in form and arrangement satisfactory to the Port and in an amount not exceeding that originally required. Payments will not be made on the Contract until sufficient surety as required is furnished.
- D. The person signing the performance bond on behalf of the Contractor shall also sign the Agreement form and bonds.

##### **4.03 EXTENSION OF TIME**

- A. If the Agreement form is not executed or not submitted to the Port within the time required and, in the Port's discretion, circumstances warrant an extension of time, it may extend the time for execution of the Agreement form or for furnishing bonds and insurance certificates for a period not to exceed ten (10) additional days.

## **DIVISION 0 – BIDDING AND CONTRACT REQUIREMENTS**

### **Section 00 21 13 – Instructions to Bidders**

---

#### **4.04 FAILURE TO EXECUTE CONTRACT**

- A. If the bidder awarded the Contract fails to execute the Agreement form and furnish the required bonds and insurance certificates within ten (10) days from delivery of the notice to award, or declares in writing its intent not to execute the Contract, its Bid Guaranty shall be forfeited to the Port and the Port may issue notice of award to the second lowest responsible Bidder, and in like manner until the Agreement form and bonds are executed by a responsible bidder to whom award is made, or further Bids are rejected. Forfeiture of the Bid Guaranty shall not limit the Port's right to recover damages from the bidder caused by the bidder's failure to execute the Contract.

#### **4.05 CANCELLATION OF AWARD**

- A. The Port reserves the right to cancel the award of any Contract at any time before the execution of said Contract by all parties without liability to the Port.

END OF SECTION

**Division 0 – BIDDING AND CONTRACT DOCUMENTS**  
**Section 00 31 26 – Existing Hazardous Material Information**

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PART 1 - GENERAL

1.01 SUMMARY

- A. This Section provides the notification required for disclosure of asbestos, lead-containing or other hazardous materials.

1.02 HAZARDOUS MATERIALS NOTICE

- A. The Port is reasonably certain that asbestos and lead will not be disturbed by the project. If the Contractor encounters material suspected of containing lead or asbestos which will interfere with the execution of the work, the Contractor shall stop work and notify the Engineer.

1.03 NOTIFICATION AND SUSPENSION

- A. In the event the Contractor detects the presence of potentially contaminated materials not previously identified in this specification, the Contractor shall immediately notify the Port. Following such notification by the Contractor, the Port shall in turn notify the various governmental and regulatory agencies concerned with the presence of potentially contaminated materials, if warranted. Depending upon the type of contaminated materials identified, the Port may suspend work in the vicinity of the discovery under the provisions of General Conditions 00 72 00, paragraph 10.03.

- 1. Following completion of any further testing necessary to determine the nature of the materials involved, the Port will determine how the material shall be managed. Although the actual procedures used in resuming the work shall depend upon the nature and extent of the potentially contaminated material, the following alternate methods of operation are foreseen as possible:
  - a. Contractor to resume work as before the suspension.
  - b. Contractor to move its operations to another portion of the work until measures to eliminate any hazardous conditions can be developed and approved by the appropriate regulatory agencies.
  - c. The Port to direct the Contractor to dispose or treat the material in an approved manner.
  - d. The Port to terminate or modify the Contract.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION – NOT USED

END OF SECTION

**DIVISION 0 - BIDDING AND CONTRACT DOCUMENTS**  
**Section 00 41 13 - Bid Form**

**BID OPENING DATE: 2:00 P.M., SEPTEMBER 6, 2017**

<b><u>BID OPENING LOCATION:</u></b>	Port of Port Angeles. 338 West 1st Street, Port Angeles, WA 98362 (Phone 360-457-8527 for directions if needed)
<b><u>MAIL BIDS TO:</u></b>	Port of Port Angeles. P.O. Box 1350 Port Angeles, WA 98362
<b><u>ATTN: BID PROPOSAL – PORT OF PORT ANGELES – MULTI-TENANT INDUSTRIAL BUILDING FACILITY IMPROVEMENTS – PHASE 2</u></b>	

**\*\* PLEASE PRINT CLEARLY BELOW \*\***

Printed Name of Person Signing Bid Proposal	Firm Name (Printed legibly)
Title (Estimator, Vice-President, Owner, etc...)	Physical Street Address <b>(No P.O. Boxes)</b>
Contractor Registration No. & Expiration Date	City State Zip+4
Taxpayer Identification Number	( ) Area Code Phone Number
Washington UBI Number	( ) Area Code Fax Number
PO Box for US Mail Delivery (if any)	E-Mail Address

<p><b><u>TOTAL BASE BID</u></b>          (Does not include Washington State Sales Tax)</p> <p>\$ _____          Print legibly (numbers only)</p>
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**DIVISION 0 - BIDDING AND CONTRACT DOCUMENTS**

**Section 00 41 13 - Bid Form**

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This project shall be completed in accordance with the plans and specifications within **63 calendar days** from the Notice to Proceed. Liquidated damages will be assessed against progress payments at **\$1,000.00** for each calendar day past the substantial completion date.

**ADDENDA**

Receipt of the following addenda are acknowledged:

Addenda No. \_\_\_\_\_ Date: \_\_\_\_\_

Addenda No. \_\_\_\_\_ Date: \_\_\_\_\_

Addenda No. \_\_\_\_\_ Date: \_\_\_\_\_

Addenda No. \_\_\_\_\_ Date: \_\_\_\_\_

In accordance with Section 00 21 13, Paragraph 2.05, the bidder shall list below the name of each subcontractor to whom the bidder proposes to subcontract portions of the heating, ventilation and air conditioning, plumbing or electrical or name itself for the work.

<b>Description of Work to be Performed</b>	<b>Name of Firm</b>
Heating, Ventilation and Air Conditioning	
Plumbing	
Electrical	

**BID AWARD**

If awarded the contract for foregoing work, the undersigned bidder hereby agrees within ten (10) calendar days of Owner's delivery of the formal construction contract to bidder, to execute and return to Owner the construction contract and to provide to Owner the performance and payment bond and evidence of all required insurance. If the bidder, in the event of acceptance of its bid by Owner, fails to execute the construction contract, fails to furnish the payment or performance bond or to provide proof of all required insurance within the time specified herein, Owner may reject the bid. In such case, the bid guarantee of the bidder may be retained by the Owner as liquidated damages, and not as a penalty.

**DIVISION 0 - BIDDING AND CONTRACT DOCUMENTS**

**Section 00 41 13 - Bid Form**

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The undersigned bidder further agrees that should this Bid be accepted, it will complete all of the work covered by these Contract Documents within **63 calendar days** after the notice to proceed has been issued by the Owner. Furthermore, once started, the undersigned bidder will proceed on an uninterrupted basis with the Work, except as otherwise authorized by the Owner.

The above Bid will be honored by the undersigned bidder for sixty (60) days after the formal bid opening date.

Respectfully submitted,

\_\_\_\_\_  
Legal Name of Bidder (print)

By: \_\_\_\_\_  
Name (signature)

Title: \_\_\_\_\_

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

Phone No.: \_\_\_\_\_

Contractor Lic.#: \_\_\_\_\_

Federal I.D.#: \_\_\_\_\_

**BID SECURITY**

Each bidder shall furnish with its bid a surety company bid bond, with included bid bond form, a certified check, cashier's check, or postal money order payable to the order of Port of Port Angeles, in an amount of not less than five percent (5%) of the aggregate Base Bid, additive alternates and Washington State Sales Tax. No bid shall be the considered unless accompanied by such bid security. The bid security shall pledge that the bidder will execute the construction contract in accordance with the terms of its bid and the Bid Documents and will furnish the required bonds covering the faithful performance of the contract and payment of all obligations arising there under.



**DIVISION 0 - BIDDING AND CONTRACT DOCUMENTS**

**Section 00 41 13 - Bid Form**

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**NON-COLLUSIVE AFFIDAVIT**

STATE OF WASHINGTON )

COUNTY OF \_\_\_\_\_)ss.

\_\_\_\_\_, being first  
duly sworn, deposes and says:

that he/she is the \_\_\_\_\_ of the firm \_\_\_\_\_

---

the party making the foregoing proposal or bid; that such proposal or bid is genuine and not collusive or sham; that said bidder has not colluded, conspired, or agreed, directly or indirectly, with any bidder or person, to put in a sham bid or to refrain from bidding; and has not in any manner, directly or indirectly, sought by agreement or collusion, communication or conference with any person to fix the bid price of any other person; or fix any overhead, profit or cost of said bid price or of that or any other bidder; or to secure any advantage against Port of Port Angeles or any person interested in the proposed contract; and that all statements in said proposal or bid are true.

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

Title: \_\_\_\_\_

Subscribed and sworn to before me the \_\_\_\_\_ day of \_\_\_\_\_  
\_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
NOTARY PUBLIC in and for the State of  
Washington

Residing at \_\_\_\_\_

My commission expires: \_\_\_\_\_

Print Name: \_\_\_\_\_

**DIVISION 0 - BIDDING AND CONTRACT DOCUMENTS**  
**Section 00 41 13 - Bid Form**

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**BIDDER'S QUALIFICATIONS**

Each bidder submitting a proposal for this Project shall submit, as part of its bid, the following information:

1. Number of years engaged in business under the present firm name:  
\_\_\_\_\_
2. Total value of contracts in force: \_\_\_\_\_
3. General description of work for which Bidder is qualified: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
4. Recent significant public works projects completed by Bidder including owner's name, approximate cost, and completion date:
  1. \_\_\_\_\_
  2. \_\_\_\_\_
  3. \_\_\_\_\_
  4. \_\_\_\_\_
5. Major equipment owned by the Bidder:
  1. \_\_\_\_\_
  2. \_\_\_\_\_
  3. \_\_\_\_\_
  4. \_\_\_\_\_
  5. \_\_\_\_\_
6. Bank Reference: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
7. Bonding Reference: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**DIVISION 0 - BIDDING AND CONTRACT DOCUMENTS**  
**Section 00 41 13 - Bid Form**

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8. Bonding Capacity: \_\_\_\_\_

9. By signing below, the bidder is certifies the following:

- a) Bidder is not disqualified from bidding under RCW 39.06.010, Contractor Registration, or RCW 39.12.065(3) Prevailing Wage Rates.
- b) Bid bond is executed by a licensed surety registered in Washington State and is authorized by the Federal Department of the Treasury.
- c) Insurer has an A.M. Best rating of A- and financial size category of VI (6) or better.
- d) Bidder has an active Contractor's registration
- e) Workers' Comp premium status = current account

By: \_\_\_\_\_ Title: \_\_\_\_\_ Date: \_\_\_\_\_  
Signature

**DIVISION 0 - BIDDING AND CONTRACT DOCUMENTS**

**Section 00 43 13 - Bid Guarantee**

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**FORM OF BID BOND**

Herewith find deposit in the form of \_\_\_\_\_ (state whether money order, cashier's check or bid bond), for the amount of \$\_\_\_\_\_, which amount is not less than five percent (5%) of the total bid.

\_\_\_\_\_  
Signature

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**BID BOND**

KNOW ALL MEN BY THESE PRESENT:

That we, \_\_\_\_\_, as Principal,  
and \_\_\_\_\_, as Surety, are held and firmly bound unto the PORT OF PORT ANGELES as Obligee, in the penal sum of \_\_\_\_\_ Dollars, for the payment of which the Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigned, jointly and severally, by these present.

The condition of this obligation is such that if the Obligee shall make any award to the Principal for \_\_\_\_\_

according to the terms of the proposal or bid made by the Principal therefore, and the Principal shall duly make and enter into a contract with the Obligee in accordance with the terms of said proposal or bid and award and shall give bond for the faithful performance thereof, with Surety or Sureties approved by the Obligee; or, if the principal shall, in case of failure to do so, pay and forfeit to the Obligee the penal amount of the deposit specified in the call for bids, then this obligation shall be null and void; otherwise it shall be and remain in full force and effect and the Surety shall forthwith pay and forfeit to the Obligee, as penalty and liquidated damages, the amount of this bond.

SIGNED, SEALED AND DATED THIS \_\_\_\_\_ day of \_\_\_\_\_, 201\_\_

BY \_\_\_\_\_  
Principal

BY \_\_\_\_\_  
Surety

\_\_\_\_\_  
Agent and Address

Note: Bidder may submit surety's bid bond form, provided it is similar in substance, made out in the name of the Port of Port Angeles, and that the agent's name and address appear as specified. **Bonds containing riders limiting responsibility for toxic waste or limiting the term of responsibility will be rejected.**

**DIVISION 0 – BIDDING AND CONTRACT DOCUMENTS**  
**Section 00 43 14 – Certificate of Compliance with Wage Payment Statutes**

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Certification of Compliance with Wage Payment Statutes

The bidder hereby certifies that, within the three-year period immediately preceding the bid submittal date **September 6, 2017**, the bidder is not a “willful” violator, as defined in RCW 49.48.082, of any provision of chapters 49.46, 49.48, or 49.52 RCW, as determined by a final and binding citation and notice of assessment issued by the Department of Labor and Industries or through a civil judgment entered by a court of limited or general jurisdiction.

I certify under penalty of perjury under the laws of the State of Washington that the foregoing is true and correct.

\_\_\_\_\_  
Bidder’s Business Name

\_\_\_\_\_  
Signature of Authorized Official\*

\_\_\_\_\_  
Printed Name

\_\_\_\_\_  
Title

\_\_\_\_\_  
Date

\_\_\_\_\_  
City

\_\_\_\_\_  
State

*Check One:*

Sole Proprietorship  Partnership  Joint Venture  Corporation

State of Incorporation, or if not a corporation, State where business entity was formed:

\_\_\_\_\_  
If a co-partnership, give firm name under which business is transacted:

\_\_\_\_\_  
*\* If a corporation, proposal must be executed in the corporate name by the president or vice-president (or any other corporate officer accompanied by evidence of authority to sign). If a co-partnership, proposal must be executed by a partner.*

**DIVISION 0 – BIDDING AND CONTRACT DOCUMENTS**  
**Section 00 52 13 –Agreement Form**

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**PORT OF PORT ANGELES**

**AGREEMENT**

The PORT OF PORT ANGELES ("Port") and the undersigned Contractor ("Contractor") agree as follows:

**Article I**  
**The Work**

Contractor, for the consideration specified in the Contract Documents, shall in strict accordance therewith perform all of the work required by Contract Documents for the following project:

**Multi-Tenant Industrial Building Facility Improvements – Phase 2**

The Port agrees to pay the Contractor for the Work as provided in the Contract Documents.

**Article II**  
**The Contract Documents**

The Contract Documents consist of the Agreement, Conditions of the Contract (General, Special, Supplementary and Other Conditions), Drawings, Specifications, Addenda and other documents listed below issued prior to execution of this Agreement and all Modifications and Change Orders issued subsequent thereto. These form the Contract and all are as fully a part of the contract as if attached to this Agreement or repeated herein. An enumeration of the Contract Document is set forth below.

1. This Agreement
2. The Project Manual Dated August 11, 2017 including Specifications.
3. Drawing sheets dated August 14, 2017

1	A-0.0	Cover Sheet
2	C-1.0	Existing Civil Plan Utilities
3	A-1.0	Site Plan
4	A-2.0	Overall Floor Plan
5	A-2.1	Demolition Floor Plan
6	A-2.2	Proposed Floor Plan
7	A-2.3	Schedules
8	A-4.0	Building Sections
9	A-5.0	Wall Sections
10	A-6.0	Details
11	M-1.0	Mechanical Cover Sheet
12	M-1.1	Schedules
13	M-1.2	Energy Code / Heating & Cooling Load Calcs

**DIVISION 0 – BIDDING AND CONTRACT DOCUMENTS**

**Section 00 52 13 –Agreement Form**

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14	M-2.0	First Floor Plan Plumbing
15	M-3.0	First Floor Plan HVAC
16	M-4.0	Details
17	E-1.0	Notes, Cable Codes & Index
18	E-1.1	Electrical Overall Floor Plan
19	E-2.0	Electrical Demolition Plan
20	E-2.1	Electrical Power Plan North
21	E-3.1	Electrical Lighting Plan North
22	E-4.1	Electrical Ancillaries Plan North
23	E-6.1	Power System Riser Diagram
24	E-6.2	Panel Schedules

- 4. Addenda No. 1 – xxxxxxxx  
Addenda No. 2 – xxxxxxxx

**Article III  
The Contract Timeframe**

The Work to be performed under this Contract shall be commenced not later than ten (10) calendar days following issuance of the "Notice to Proceed" and completed not later than **sixty-three (63) calendar days** following issuance of the "Notice to Proceed".

**Article IV  
Contract Amount**

The Port shall pay the Contractor for the performance of the Work, subject to additions and deductions by Change Order, in current funds, the Contract sum of \_\_\_\_\_ Dollars and \_\_\_\_\_ Cents (\$\_\_\_\_\_).

Payment shall be in the form of a check and will be mailed to the following address:

**Company Name**  
**Street**  
**City, State, Zip**  
**Attn:**

**DIVISION 0 – BIDDING AND CONTRACT DOCUMENTS**  
**Section 00 52 13 –Agreement Form**

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**PORT OF PORT ANGELES**

**CONTRACTOR**

BY: \_\_\_\_\_  
Karen Goschen  
Executive Director

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

ITS: \_\_\_\_\_

DATE: \_\_\_\_\_

DATE: \_\_\_\_\_



**DIVISION 0 – BIDDING AND CONTRACT DOCUMENTS**

**Section 00 56 00 –Retention Form**

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Progress Payment Retention: In accordance with RCW 60.28.010, the undersigned elects that, during the life of the contract, the money withheld from the progress payments be retained in one of the following, as indicated. Failure to indicate shall be construed as approval of Item(a).

(a) A fund with the Port

\_\_\_\_\_  
(Initials)

(b) An interest bearing account with the

\_\_\_\_\_ Branch of

\_\_\_\_\_  
(Name Bank, Mutual Savings Bank or S&L Assoc.)

\_\_\_\_\_  
(Initials)

(c) Placed on deposit with a bank or trust company to be converted into bonds and securities chosen by the Contractor and approved by the Port of Port Angeles, with said approval granted for bonds and securities listed below. Selected bonds and securities to be held in escrow until authorized release of retained funds.

\_\_\_\_\_  
(Initials)

\_\_\_\_\_  
Name of Financial Institution and Branch

\_\_\_\_\_  
Type of Security (see authorized list below)

- (1) Bills, certificates, notes or bonds of the United States;
- (2) Other obligations of the United States or its agencies;
- (3) Obligations of any corporation wholly-owned by the government of the United States;
- (4) Indebtedness of the Federal National Mortgage Association;
- (5) Time deposits in commercial banks doing business in the State of Washington;
- (6) Repurchase agreements secured by U.S. government obligations;
- (7) Bankers Acceptance purchased on the secondary market.

*This form will be executed with the successful bidder*

**DIVISION 0 - BIDDING AND CONTRACT DOCUMENTS**  
**Section 00 61 13.13 Performance Bond**

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*PERFORMANCE BOND*

**CONTRACTOR:**

*(Name, legal status and address)*

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**SURETY:**

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

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**OWNER:**

Port of Port Angeles  
338 West First Street  
Port Angeles WA 98362

**CONSTRUCTION CONTRACT:**

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

Amount: \$ \_\_\_\_\_

Description: \_\_\_\_\_

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**BOND:**

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

*(Not earlier than Construction Contract Date)*

Amount: \$ \_\_\_\_\_

Modifications to this Bond:  None  See Section 13

**CONTRACTOR AS PRINCIPAL**

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

**SURETY:**

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

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

Name & Title: \_\_\_\_\_

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

Name & Title: \_\_\_\_\_

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

*(FOR INFORMATION ONLY – Name, address and telephone)*

**AGENT or BROKER:**

**OWNER'S REPRESENTATIVE:**

*(Architect, Engineer or other party)*

## **DIVISION 0 - BIDDING AND CONTRACT DOCUMENTS**

### **Section 00 61 13.13 Performance Bond**

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

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

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

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

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

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

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

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

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

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

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

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

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

- .1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

## **DIVISION 0 - BIDDING AND CONTRACT DOCUMENTS**

### **Section 00 61 13.13 Performance Bond**

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

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

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

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

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

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

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

#### **§ 14 Definitions**

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

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

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

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

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

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

§ 16 Modifications to this bond are as follows:

**DIVISION 0 - BIDDING AND CONTRACT DOCUMENTS**  
**Section 00 61 13.13 Performance Bond**

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

**CONTRACTOR AS PRINCIPAL**

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

**SURETY:**

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

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

Name & Title: \_\_\_\_\_

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

Name & Title: \_\_\_\_\_

**DIVISION 0 - BIDDING AND CONTRACT DOCUMENTS**  
**Section 00 61 13.16 Payment Bond**

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**PAYMENT BOND**

**CONTRACTOR:**

*(Name, legal status and address)*

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

**SURETY:**

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

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

**OWNER:**

Port of Port Angeles  
338 West First Street  
Port Angeles WA 98362

**CONSTRUCTION CONTRACT:**

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

Amount: \$ \_\_\_\_\_

Description: \_\_\_\_\_

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

**BOND:**

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

*(Not earlier than Construction Contract Date)*

Amount: \$ \_\_\_\_\_

Modifications to this Bond:  None  See Section 18

**CONTRACTOR AS PRINCIPAL**

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

**SURETY:**

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

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

Name & Title: \_\_\_\_\_

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

Name & Title: \_\_\_\_\_

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

*(FOR INFORMATION ONLY – Name, address and telephone)*

**AGENT or BROKER:**

**OWNER'S REPRESENTATIVE:**

*(Architect, Engineer or other party)*

## **DIVISION 0 - BIDDING AND CONTRACT DOCUMENTS**

### **Section 00 61 13.16 Payment Bond**

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

## **DIVISION 0 - BIDDING AND CONTRACT DOCUMENTS**

### **Section 00 61 13.16 Payment Bond**

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

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

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

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

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

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

#### § 16 Definitions

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

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

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

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

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



**DIVISION 0 - BIDDING AND CONTRACT DOCUMENTS**  
**Section 00 61 13.16 Payment Bond**

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

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

§ 18 Modifications to this bond are as follows:

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

**CONTRACTOR AS PRINCIPAL**  
Company: \_\_\_\_\_  
*(Corporate Seal)*

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

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

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

Name & Title: \_\_\_\_\_

Name & Title: \_\_\_\_\_

ARTICLE G-00

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ABBREVIATIONS AND DEFINITIONS OF TERMS

Whenever, in the Contract Documents, or elsewhere in the Project Manual, the following abbreviations, words, and defined terms are used, the meaning will be as follows, which meaning shall be applicable to both the singular and plural forms thereof:

G-01.01 Abbreviations.

AAN	American Association of Nurserymen
AAR	Association of American Railroads
AASHTO	American Association of State Highway & Transportation Officials
ACI	American Concrete Institute
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISE	Association of Iron and Steel Engineers
ANSI	American National Standards Institute
ARA	American Railway Association
AREA	American Railway Engineering Association
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigeration & Air Conditioning Engineers
ASLA	American Society of Landscape Architects
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWPA	American Wood Preservers' Association
AWS	American Welding Society
AWWA	American Water Works Association
AGC	Associated General Contractors of America
CPM	Critical Path Method of Project Scheduling
CRSI	Concrete Reinforcing Steel Institute
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
IEEE	Institute of Electrical and Electronic Engineers
NBFU	National Board of Fire Underwriters
NEC	National Electrical Code
NEMA	National Electrical Manufacturers' Association
NFPA	National Fire Protection Association
NIOSH	National Institute of Occupational Safety and Health
OFCCP	Office of Federal Contract Compliance Programs
OSHA	Occupational Safety and Health Act
PCA	Portland Cement Association
POPA	Port of Port Angeles
PSCAA	Puget Sound Clean Air Agency
SAE	Society of Automotive Engineers
SMACNA	Sheet Metal & Air Conditioning Contractors' National Association, Inc.
UBC	Uniform Building Code
UL	Underwriter's Laboratory
WISHA	Washington Industrial Safety & Health Act
WSDOT	Washington State Department of Transportation

G-01.02 Definitions

Addendum

A written or graphic document issued by the Port prior to the opening of bids that clarifies, corrects, or changes a document

	contained or referenced within the Contract Documents. Addenda will be distributed to planholders of record.
Agreement	A written form executed by the Port and the Contractor that binds the Contractor to perform the Work in accordance with the Contract.
Bid	The offer of a bidder, on the prescribed bid form, properly executed, setting forth the price or prices for the Work to be performed.
Change Order	A written document issued by the Port on or after the date of the execution of the Agreement that authorizes and directs an addition, deletion, or other revision in the Work, or an adjustment in the Contract Time or Contract Sum.
Contract	The Contract is the legal relationship between the Port and the Contractor, and describes the rights, duties and obligations of each as set forth in the Contract Documents.
Contract Bonds	The approved form of security in the form of a Performance Bond and a Payment Bond, furnished by the Contractor and its surety as required by the Contract Documents.
Contract Documents	The Contract Documents consist of the advertisement for bids, instructions to bidders, Agreement, the Plans, Drawings, Specifications, General Conditions, Supplementary Conditions, Addenda, Change Orders, form of bond, insurance certificates, the bid form and any other form indicated by the Port as being part of the Contract Documents. Words and abbreviations which have well-known technical or trade meanings are used in the Contract Documents in accordance with such recognized meanings.
Contract Sum	The Contract Sum stated in the Agreement Form as amended by Change Order is the total amount payable by the Port to the Contractor for performance of the Work in accordance with the Contract Documents. The Contract Sum does not include state or local sales tax on the transaction between the Port and the Contractor.
Contract Time	Contract Time is the period of time provided in the Contract Documents for the performance of the Work by the Contractor. Contract Time may be changed only by Change Order.
Contractor	The Contractor is the individual, partnership, firm, corporation, joint venture, or other business entity identified as such in the Agreement which has agreed to perform the Work in accordance with the Contract Documents.
Day	The term day shall mean a calendar day unless otherwise specifically designated.
Drawings	The graphic presentation of the Work, or parts thereof, which indicates the size, form, location, and arrangement of the various elements of the Work.
Engineer	The Director of Engineering of the Port of Port Angeles's Engineering Department and such agents, as are authorized in writing to act on the Director of Engineering's behalf.
Acceptance	The official act of the Port of Port Angeles Commission as described in Article G-08.
Final Completion	Occurs when the Engineer determines that all requirements of Article G-08.09 have been completed.
Final Payment	Is the payment to be made to the Contractor in accordance with Article G-08.12.
Force Account Work	Is Work performed on a reimbursable basis as set forth in Article G-08.06.

Hazardous Materials	The term "Hazardous Materials" means any hazardous or toxic substances, materials and wastes listed in the United States Department of Transportation Hazardous Materials Table (49 CFR 172.101) or listed by the Environmental Protection Agency as hazardous substances (40 CFR Part 302) and any amendments thereto, and any substances, materials or wastes that are or become regulated under federal, state or local law. Hazardous Materials (or substances) shall also include, but not be limited to: regulated substances, petroleum products, pollutants, and any and all other environmental contamination as defined by, and in any and all federal, state and/or local laws, rules, regulations, ordinances or statutes now existing or hereinafter enacted relating to air, soil, water, environmental or health and safety conditions.
Inspector	The Engineer's authorized representative assigned to make inspections of the Contractor's performance of the Work.
Liquidated Damages	The amount of money set forth in the Contract Documents, if any, for failure of Contractor to comply with certain provisions of the Contract Document.
Plans	The concept or mental formulation for the Work. The plans may be represented graphically by drawings, by the written words within the Contract Documents, or both.
Port	The Port of Port Angeles. The term Port also includes all of the Port's commissioners, officers, employees and other authorized representatives.
Product Data	The illustrations, standard schedules, performance charts, brochures, diagrams, and other information furnished by the Contractor to illustrate a material, product, or system for some portion of the Work.
Project	The particular work described in the Contract Documents.
Project Manager	The authorized representative of the Director of Engineering, who is located on or near the project site and assigned immediate charge of the on-site engineering and administration of the construction project.
Provide	The all-inclusive actions required to furnish, install, connect, adjust, test, and make ready for use or occupancy.
Punch List	Shall have the meaning set forth in Section G-.08.08.
Samples	Physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.
Schedule of Prices	Means the unit prices set forth in the Contract Documents.
Shop Drawings	Same as "Working Drawings" as defined in these General Conditions.
Specifications	Those portions of the Contract Documents consisting of the written technical descriptions of materials, equipment, construction systems, standards, workmanship and other requirements which govern the quality and performance of the Work.
Subcontractor	A Subcontractor is a business entity that has an agreement with the Contractor to perform a portion of the Work. The term "Subcontractor" means and includes the Subcontractor and its authorized representatives.
Sub-subcontractor	A Sub-subcontractor is a business entity that has an agreement with a Subcontractor to perform a portion of the Work. The term Sub-subcontractor means and includes the Sub-subcontractors at all tiers.
Substantial Completion	Substantial Completion occurs when the Work as a whole or a designated portion thereof is sufficiently complete, in

	accordance with the Contract Documents, so that the Port can use or occupy the Work or a designated portion thereof for the use for which the Port intended and the requirements set forth in G-8.08 have been satisfied.
Supplementary Conditions	That portion of the Contract Documents that amends or supplements these General Conditions.
Supplier	A vendor, supplier, distributor, or materialman which supplies material or equipment used in the performance of the Work.
Unit Price Work	Work to be paid for on the basis of unit prices stated in the Schedule of Prices or a Change Order, if any. Such Work to be measured for payment as described within the Contract Documents.
Work	All services, labor, materials, equipment, and incidentals necessary for the complete and successful completion of the work and service required by or reasonably inferable from the Contract Documents, including all materials and equipment to be incorporated in the construction, all as set forth in the Contract Documents.
Working Drawings	Shop drawings, erection plans, falsework plans, framework plans, cofferdam plans, stress diagrams, bending diagrams for reinforcing steel, or other diagrams, plans, or data used to illustrate some portion of the Work which the Contractor is required to submit to the Engineer for approval.
WSDOT Standard Specifications	Refers to the “Standard Specifications for Road, Bridge, and Municipal Construction”, most recent publication, by the Washington Department of Transportation.

#### G-01.03 Titles or Headings

The titles or headings of the sections, divisions, parts, articles, paragraphs, or subparagraphs, of the specifications are intended only for convenience of reference and shall not be considered as having any bearing on the interpretation of the text.

### ARTICLE G-02

#### INTENT, CORRELATION, AND EXECUTION OF CONTRACT DOCUMENTS

##### G-02.01 Intent of the Contract Documents

- A. The intent of the Contract Documents is to prescribe a complete Work. The Contractor shall furnish all labor, materials, equipment, and incidentals necessary and appropriate to complete all parts of the Work. Compensation for the cost of furnishing the foregoing and for full performance of the Work in full conformance with the Contract Documents is included in the Contract Sum.
- B. The Contract Documents which set forth the rights and responsibilities of the Port and the Contractor shall be construed in accordance with the laws of the state of Washington. Exclusive jurisdiction and venue for any action between the Port and the Contractor, arising out of or in connection with the Project, shall be the Superior Court in Clallam County, Washington.
- C. The Contract represents the entire and integrated agreement between the Port and the Contractor. It supersedes all prior discussions, negotiations, representations or agreements pertaining to the Work, whether written or oral.

##### G-02.02 Correlation of the Contract Documents

- A. Each Contract Document is an essential part of the Contract between the Port and the Contractor, and a requirement present in one Contract Document is binding as though it was present in all. The Contract Documents are intended to be complementary and prescribe and provide for all Work required by the Contract Documents. Anything mentioned in the Specifications and not shown in the Drawings, or shown in the Drawings and not mentioned in the Specifications, shall be of like effect as if shown or mentioned in both. Any Work, materials or equipment that has not been specifically included in the Contract Documents but which is reasonably required to produce the intended result shall be provided by the Contractor as though it had been specifically included.
- B. Conditions or Work not covered by the specifications may be described in other Contract Documents and shall be performed by the Contractor in accordance therewith and in accordance with the Specifications insofar as applicable. Work required by the Contract Documents for which a

separate price is not provided in the Contract Documents shall nevertheless be considered as a part of the Work and all costs of the same are deemed to be included in the Contract Sum.

- C. The drawings listed in the Supplementary Conditions indicate only such details as are necessary to give a comprehensive idea of the Work. The Engineer may furnish to the Contractor such additional drawings and clarifications, consistent with the purpose and intent of the Contract Documents, as the Engineer may deem necessary to detail and illustrate the Work. The Contractor shall conform its Work to such drawings and explanations. The furnishing of such additional drawings or clarifications shall not entitle the Contractor to an increase in the Contract Time or Contract Sum.
- D. If there are discrepancies between the various Contract Documents, Specifications shall govern over conditions and Drawings, Drawings shall govern over conditions, larger scale drawings shall govern over smaller scale drawings, Supplementary Conditions shall govern over General Conditions, computed dimensions shall govern over scaled dimensions, and specific descriptions shall govern over general ones.
- E. In the event of a conflict between the Contract Documents and applicable laws, codes, ordinances, regulations or orders of governmental authorities having jurisdiction over the Work or any portion thereof, or in the event of any conflict between such applicable laws, codes, ordinances, regulations, or orders, the most stringent requirements of any of the above shall govern and be considered as a part of this Contract in order to afford the Port the maximum benefits thereof.
- F. The organization of the Specifications and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of the Work to be performed by any trade. The Port assumes no responsibility to act as arbiter in the division and proper coordination of Work between particular Subcontractors or workers.

#### G-02.03 Ownership of the Contract Documents

The Contract Documents furnished to the Contractor shall remain Port property and the Port shall retain all intellectual property rights, including copyrights in same. They are to be used only with respect to this Project and are not to be used on any other project.

#### G-02.04 No Warranties by the Port

- A. Any "bid quantities" set forth in the bid form are estimates only, being given only as a basis for the comparison of bids by the Port. The Port does not warrant, expressly or by implication, that the actual amount of Work will correspond to those estimates. The right to increase or decrease the amount of any class or portion of the Work, or to make other changes in the Work, is reserved by the Port in Article G-09. The basis of payment will be the actual quantities performed in accordance with the Contract Documents.
- B. No information derived from inspection of records or reports of investigation concerning the Work or conditions (including soil or sub-surface conditions) at the site(s) of the Work made or provided by the Port will in any way relieve the Contractor from its responsibility for properly performing its obligations under the Contract Documents. Such records and reports are provided solely for the convenience of the Contractor with no warranties whatsoever, express or implied, by the Port. Such records and reports are not part of the Contract Documents. The Contractor shall make its own conclusions and interpretations from the data supplied, information available from other sources, and the Contractor's own observations.

### ARTICLE G-03

#### PORT OF PORT ANGELES

#### G-03.01 Authority of the Engineer

- A. The Engineer will be the Port's representative and shall administer the Contract Documents, except that Final Acceptance as provided for in Article G-08 shall be accomplished by the Port of Port Angeles Commission, unless the authority to grant Final Acceptance of the Work has been delegated to a Port official in which case Final Acceptance shall be accomplished by such official. The Engineer has the authority to enforce all obligations imposed on the Contractor by the Contract Documents.
- B. The Work shall be performed in accordance with the Contract Documents. The Engineer has the authority but not the obligation to reject Work that is defective or does not otherwise conform to the Contract Documents.
- C. The Engineer is not responsible for and will not have control or charge of the means, methods, techniques, sequences, or procedures of construction, or for safety precautions or programs



incidental thereto, these being the sole responsibility of the Contractor. The Engineer will not be responsible for or have any control or charge of the acts or omissions of the Contractor, Subcontractors, Sub-subcontractors, suppliers, or any of their agents or employees, or any other persons performing a portion of the Work.

**G-03.02 Administration of the Contract**

- A. Nothing in this Article or elsewhere in the Contract Documents shall be construed as requiring the Engineer, Inspector, consultant, or other representative of the Port to direct or advise the Contractor as to the method or manner of performing the Work. No approval or advice given by the Port as to the method or manner of performing the Work or procuring materials to be furnished shall constitute a representation or warranty by the Port that the result of such method or manner will conform to the Contract Documents or achieve the desired results. Such approval or advice shall neither relieve the Contractor of any of its obligations under the Contract nor create any liability to the Port on account of approval or advice.
- B. The Engineer or Inspectors may call to the attention of the Contractor defective Work or Work that does not conform otherwise to the Contract Documents. However, the failure of the Engineer or inspectors to so inform the Contractor shall not constitute approval or acceptance of such defective or non-conforming Work.
- C. The presence of the Engineer or Inspector during the progress of any construction does not relieve the Contractor from responsibility for defects in the Work, nor does it bind the Port in determining Final Completion of the Work.
- D. Work done or material furnished which at any time is found not to conform to the requirements of the Contract Documents shall be at the Contractor's risk and expense and shall furnish no basis for an increase in the Contract Sum or Contract Time, even though the Engineer or inspector fails to reject such Work or material.

**G-03.03 Information Provided by the Port**

- A. The Port will furnish the Contractor, without charge, up to three (3) additional copies of Drawings and Specifications, and one (1) electronic copy in .pdf format.

**G-03.04 Review of Working Drawings, Product Data, Samples and Other Submittals.**

- A. Review by the Engineer of the Contractor's working drawings, product data, or samples shall not relieve the Contractor of full responsibility for the accuracy of dimensions and details. Such review shall likewise not constitute acceptance by the Engineer of the correctness or adequacy of such submittals, nor shall it constitute a representation or warranty by the Engineer that the drawings will satisfy the requirements of the Contract. The Engineer's review of a submittal shall not relieve the Contractor from responsibility for errors or omissions in the submittals.
- B. The Engineer will not review submittals that depend for their review on other submittals not yet submitted, that are not required by the Contract Documents, or that are not submitted by the Contractor.

**G-03.05 Port's Right to Carry Out Other Work**

The Port reserves the right at all times to perform or cause to be performed other and additional work on or near the site of the Project. Should such other or additional work or Port operations be either underway or subsequently undertaken at or near the Project, the Contractor shall coordinate its activities with those of all other work forces and conduct its activities to avoid or minimize any conflict between the operations of the Contractor and those persons performing the other or additional work or operations.

**G-03.06 Officers and Employees of the Port Have No Personal Liability.**

Neither the Commissioners, Engineer, Inspector, nor any other officer, employee or agent of the Port, acting within the scope of their employment, shall be personally liable to Contractor for any of their acts or omissions arising out of the Project.

**G-03.07 Service of Notices on the Contractor**

Any written notice required under the Contract Documents to be given to the Contractor may, at the option of the Port, be served on the Contractor by personal service, electronic or facsimile transmission, or private courier delivery of the notice to the last address provided in writing to the Engineer. For the purpose of measuring time in determining the parties' rights and obligations with respect to notice given pursuant to the Contract Documents (other than that given by the personal service) is conclusively presumed to be received by the Contractor on the next business day following the Port's electronic or facsimile transmittal or delivering it to the private courier.

ARTICLE G-04

CONTRACTOR'S RESPONSIBILITIES

G-04.01 Examination of the Site of Work and Contract Documents

- A. By executing the Contract, the Contractor represents that it has carefully examined and investigated the site(s) of the Work, including material site(s), and the Contract Documents. The submission of its Bid shall be conclusive evidence that the Contractor represents and acknowledges that it has made such examinations and investigations and is satisfied as to the conditions to be encountered in the performance of the Work, including the character, quantity, quality, and scope of the Work, safety precautions to be undertaken, the quantities and qualities of materials to be supplied, the character of soils and subsurface materials, and equipment and labor to be used, the requirements of all Contract Documents and how all such requirements correlate to the conditions at the site(s) of the Work.
- B. The Contractor shall determine from careful examination of the Contract Documents and the site of the Work, the methods, materials, labor, and equipment required to perform the Work in full, and the Contractor shall reflect the same in its Bid.

G-04.02 Error, Inconsistency, Omission or Variance in the Contract Documents

The Contractor shall carefully study and compare the Contract Documents and shall promptly report to the Engineer any error, inconsistency, omission, or variance from applicable laws, statutes, codes, ordinances, or regulations which is discovered. If the Contractor promptly reports such discovery prior to commencement of any portion of the Work affected by any such error, inconsistency, omission, or variance, the Contractor shall not be liable to the Port for damage resulting from such error, inconsistency, omission, or variance. If, however, the Contractor fails either to carefully study and compare the Contract Documents, or to promptly report the discovery of any error, inconsistency omission, or variance known or believed by the Contractor to exist, the Contractor shall assume full responsibility therefore and shall bear all costs, liabilities and damages attributable to such error, inconsistency, omission, or variance.

G-04.03 Supervision and Construction Procedures

- A. The Contractor shall supervise and direct the Work using its best efforts, skills and attention. The Contractor shall be solely responsible for, and shall have full control and charge of construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract, including the Work of Subcontractors, Sub-subcontractors, Suppliers, and all other persons performing a portion of the Work. The Contractor is for all purposes an independent contractor and not an agent or employee of the Port.
- B. The Contractor may not assign any portion of this Contract without the Port's prior written consent.
- C. The Contractor shall be fully responsible to the Port for the acts or omissions of its employees, agents, Subcontractors, Sub-subcontractors, Suppliers, and their agents and employees, and all other persons who are to perform any of the Work.
- D. The Contractor shall keep a competent resident superintendent at the site of the Work continuously during its progress. Within ten (10) days after receipt of the Notice of Award, the Contractor shall designate in writing who such superintendent shall be. The superintendent shall not be replaced without prior written notice to the Port. The superintendent shall be experienced, capable of understanding and familiar with the Work, and able to properly supervise performance of the Work. The superintendent shall be the Contractor's representative and shall have authority to act on behalf of and bind the Contractor with respect to this Contract, except that the Contractor may indicate, in writing, limits on the authority of the superintendent. Communications or notices directed or given to the superintendent shall be as binding as if given to the Contractor.
- E. All Work shall be performed under the continuous supervision of competent and skilled personnel experienced in the tasks being performed. All workers shall have sufficient skill and experience to perform properly the work assigned to them. Workers engaged in special work or skilled work shall have sufficient experience in such work and in the operation of the equipment required to perform the work satisfactorily.
- F. The Contractor shall at all times enforce strict discipline and good order among all workers on the Project. Incompetent, careless, or negligent workers shall be immediately removed from the performance of the Work by the Contractor.
- G. The Contractor shall, at all times, employ sufficient labor and equipment for prosecuting the work to full completion in the manner and time required by the contract, plans and specifications.
- H. Any person employed by the Contractor or by any subcontractor who violates any operational regulations and, in the opinion of the Engineer, does not perform his work in a proper and skillful

manner or is intemperate or disorderly shall, at the written request of the Engineer, be removed forthwith by the Contractor or subcontractor employing such person, and shall not be employed again in any portion of the work without approval of the Engineer.

- I. Should the Contractor fail to remove such persons or person, or fail to furnish suitable and sufficient personnel for the proper prosecution of the work, the Engineer may suspend the work by written notice until compliance with such orders.
- J. All equipment that is proposed to be used on the work shall be of sufficient size and in such mechanical condition as to meet requirements of the work and to produce a satisfactory quality of work. Equipment used on any portion of the work shall be such that no injury to previously completed work, adjacent property, or existing airport facilities will result from its use.
- K. When the methods and equipment to be used by the Contractor in accomplishing the work are not prescribed in the contract, the Contractor is free to use any methods or equipment that will accomplish the work in conformity with the requirements of the contract, plans, and specifications.
- L. When the contract specifies the use of certain methods and equipment, such methods and equipment shall be used unless others are authorized by the Engineer. If the Contractor desires to use a method or type of equipment other than specified in the contract, he may request authority from the Engineer to do so. The request shall be in writing and shall include a full description of the methods and equipment proposed and of the reasons for desiring to make the change. If approval is given, it will be on the condition that the Contractor will be fully responsible for producing work in conformity with contract requirements. If, after trial use of the substituted methods or equipment, the Engineer determines that the work produced does not meet contract requirements, the Contractor shall discontinue the use of the substitute method or equipment and shall complete the remaining work with the specified methods and equipment. The Contractor shall remove any deficient work and replace it with work of specified quality, or take such other corrective action as the Engineer may direct. No change will be made in basis of payment for the contract items involved nor in contract time as a result of authorizing a change in methods or equipment under this subsection.

#### G-04.04 Contractor to Provide all Labor, Materials, and Equipment

In accordance with the Contract Documents, the Contractor shall provide and pay for all labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for the proper execution of the Work to completion, whether the same are temporary or permanent and whether or not incorporated or to be incorporated into the Work.

#### G-04.05 Prevailing Wage Rates to be Paid

- A. The wage rates to be paid all laborers, workers, and mechanics who perform any part of this Contract shall be not less than the prevailing wage rates as required by Chapter 39.12 R.C.W. This requirement applies to laborers, workers, and mechanics whether they are employed by the Contractor, Subcontractors, Sub-subcontractors, or any other person who performs a portion of the Work contemplated by the Contract Documents.
- B. The prevailing wage rates as provided to the Port by the Industrial Statistician of the Washington State Department of Labor and Industries is available for download at URL <http://www.lni.wa.gov/TradesLicensing/PrevWage/WageRates/>. It is the Contractor's sole responsibility to determine the most current wage rates it will actually have to pay. These rates shall remain in effect for the duration throughout Contractor's performance of the Work.
- C. Pursuant to Chapter 39.04 RCW: The Contractor or subcontractor directly contracting for "Off-Site, Prefabricated, Non-Standard, Project Specific Items" shall identify and report information required on the affidavit of wages paid form filed with the Department of Labor and Industries. The Contractor shall include language in its subcontracts requiring subcontractors and lower-tier subcontractors to comply with the reporting requirements for "Off-Site, Prefabricated, Non-Standard, Project Specific Item" on the affidavit of wages paid.
- D. The Contractor or subcontractor shall comply with the reporting requirements and instructions on the affidavit of wages paid form, and shall report the following information on the affidavit of wages paid form submitted to the Department of Labor and Industries in order to comply with the reporting requirements for use of "Off-Site, Prefabricated, Non-Standard, Project Specific" items:
  - a) The estimated cost of the public works project;
  - b) The name of the awarding agency and the project title;
  - c) The contract value of the off-site, prefabricated, nonstandard, project specific items produced outside of Washington State, including labor and materials; and
  - d) The name, address, and federal employer identification number of the contractor that produced the off-site, prefabricated, nonstandard, project specific items.

- E. In case any dispute arises as to what are the prevailing rates of wages for work of a similar nature and such dispute cannot be resolved by the parties in interest, including labor and management representatives, the matter shall be referred for arbitration to the Director of the Department of Labor and Industries and the Director's decision therein shall be final and conclusive and binding on all parties involved in the dispute, as provided for by R.C.W. 39.12.060.
- F. The Contractor shall, pursuant to R.C.W. 39.12.040, file with the Port, a "Statement of Intent to Pay Prevailing Wages" and an "Affidavit of Wages Paid" for itself and all Subcontractors and Sub-subcontractors in performance of the Work. Such Statements require the approval of, and the Affidavits the certification of, the Industrial Statistician of the Department of Labor and Industries before such Statements or Affidavits are submitted to the Port. The Department of Labor and Industries charges a fee for such approval and certification, which fee shall be paid by the Contractor. Any change in the fee will not be grounds for revision in Contract Sum.
- G. If a State of Washington minimum wage rate conflicts with an applicable federal minimum wage rate for the same labor classification, the higher of the two shall govern.

**G-04.06 Materials and Equipment to be New**

All materials and equipment required to be incorporated into the Work shall be new, unless specifically provided otherwise in the Contract Documents. All such materials and equipment shall be applied, installed, connected, erected, used, cleaned, maintained and conditioned in accordance with the instructions of the applicable manufacturer, fabricator or processor, unless specifically provided otherwise in the Contract Documents. Upon the request of the Engineer, the Contractor shall furnish satisfactory evidence as to the kind, quality, and manufacturer of materials and equipment.

**G-04.07 Substitutions of Materials or Equipment**

The product, equipment, materials, or methods described or noted within the Contract Documents are to establish a standard of quality, function, appearance, dimension, and shall be deemed to be followed by the words "or equal". By proposing a substitute, Contractor represents that the proposed substitution has equal attributes in all material respects to that specified and no such substitutions shall be allowed if the Port rejects in its sole discretion such product, equipment, materials, or methods offered in the substitution.

**G-04.08 Disposal of Demolished or Excavated Materials**

- A. All materials to be demolished or excavated or dredged, and which are to be disposed of off of Port property shall become the property of the Contractor upon their severance, demolition or excavation, and shall be tested as required by the Port prior to removal from Port property, except as otherwise provided in the Contract Documents. The Contractor is solely responsible for the lawful disposal of all demolished or excavated materials (whether disposed of on or off Port property), and shall indemnify and hold the Port harmless from all liability, claims, damages, lawsuits, penalties, and expenses, whether direct, indirect, or consequential (including but not limited to attorney's and consultant's fees and other expenses of litigation or arbitration) arising out of or connected in any way with the demolition, excavation, dredging or disposal of materials.
- B. Prior to offsite disposal, Contractor shall provide, for the Engineer's approval, the name and location of the disposal sites and copies of permits or other documentation demonstrating that the disposal sites are approved by appropriate regulatory jurisdictions to receive such materials. Under no circumstances shall soil be placed as fill in adjoining waterways or on Tribal Trust land.
- C. With respect to hazardous wastes or hazardous substances which originate at the site and are not brought onto the site by the Contractor, the Contractor shall not have liability as an owner, operator, generator or discharge of such hazardous wastes or hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (42 U.S.C. section 9601 et seq.), or the Resource Conservation and Recovery Act of 1976, as amended (42 U.S.C. Section 6901 et seq.), or WAC 173-303 Dangerous Waste Regulations, or, WAC 173-340 The Model Toxics Control Act (MTCA) Cleanup Regulations. Contractor shall, however, have liability for performing this Contract, and such liability shall include the responsibility to fully and completely comply with all applicable federal, state and local laws, statutes, standards, rules, regulations, orders or permits that apply to the Work.
- D. After Final Completion of the Work by Contractor in accordance with the Contract Documents, subject to its continuing obligations under the Contract Documents (including, without limitation, its obligations under the representations, warranties and guaranties with respect to the Work performed), Contractor shall not be responsible for the performance of any further remedial action, removal actions or cleanup of hazardous waste or hazardous substances at the site that the Port may be ordered, directed or required to perform by any governmental authority after the date of Final Completion, unless such remedial action, removal action or cleanup is necessary because of the Contractor's failure to perform this Contract, any negligence in the performance of the Work, or any willful misconduct in connection with the performance of the Work.

- E. Nothing in this paragraph shall limit or restrict the liability or responsibility of the Contractor (or any of its subcontractors, consultants, employees or agents) in the event of any failure to perform or comply with the terms of the Contract Documents, any negligence in the performance of the Work, nor shall this paragraph in any way limit or restrict the Contractor's responsibilities under the Contract Documents and applicable law in connection with the handling, transport, storage or disposal of hazardous waste or hazardous substances and/or the arranging thereof.

**G-04.09 Warranties**

- A. All Work will be of good quality, free from fault or defect, and in strict accordance with the requirements of the Contract Documents. Any Work not conforming to the foregoing warranty, including unapproved or unauthorized substitutions, shall be considered defective.
- B. All Subcontractors', Sub-subcontractors', manufacturers', and Suppliers' warranties, expressed or implied, respecting any part of the Work and all materials used therein shall be obtained and enforced by the Contractor for the benefit of the Port without the necessity of separate transfer or assignment thereof. When directed by the Engineer or required by the Contract Documents, the Contractor shall require that Subcontractors, Sub-subcontractors, manufacturers, and Suppliers execute separate warranties in writing directly to the Port. Warranty provisions which purport to limit or alter the Port's rights under the Contract Documents are null and void.
- C. The Contractor warrants that title to all Work, materials and equipment covered by a request for a progress payment or final payment will pass to the Port either by incorporation in the construction or upon the receipt of payment by the Contractor, whichever occurs first, free and clear of all liens, claims, security interests or encumbrances. The Contractor further warrants that no Work, materials, or equipment covered by a request for a progress payment or final payment will have been acquired by the Contractor, or by any other person performing Work at the project site or furnishing materials and equipment for the project, which Work, materials, or equipment are subject to an agreement under which an interest therein or an encumbrance thereon is retained by the seller of the same or is otherwise imposed by the Contractor or other person.

**G-04.10 State and Local Taxes**

- A. All or a portion of the labor and materials furnished under this Contract may be subject to retail sales taxes and other state and local taxes which taxes are payable by the Contractor.
- B. All questions concerning applicable taxes on any portion of the Work should be directed by the Contractor to the State of Washington Department of Revenue or to the local taxing authority.
- C. State and local retail sales taxes applicable to the transaction between the Port and Contractor for sales to the Port of tangible personal property or charges to the Port for labor or services which constitute a retail sale under Section 82.04.050 of the Revised Code of Washington will be added to the Contract Sum. The Port will add retail sales tax to each progress payment for the Contractor to forward to the taxing authority.

**G-04.11 Permits, Licenses, Fees and Notices**

- A. Unless otherwise specified, the Contractor shall procure and pay for all permits, licenses, and all governmental inspection fees which are necessary or incidental to the performance of the Work, and shall give all notices required by such permits and licenses. Any action taken by the Port to assist the Contractor in obtaining permits or licenses shall not relieve the Contractor of its sole responsibility to obtain permits or licenses.
- B. Where applicable law, regulations, ordinances or agency policy prohibits the issuance of a necessary temporary operational or other permit to entities other than a public agency, the Port will support the Contractor's request for such permit and will accept the permit in the Port's name, but only if:
  - 1. The Contractor takes all necessary action leading to the issuance of the permit;
  - 2. The permit is determined to be in the public interest;
  - 3. The permit applies only to Work performed in connection with this project;
  - 4. The Contractor agrees in writing, in a form approved by the Port, to abide by all requirements of the permit, and to defend and hold harmless the Port from any liability in connection with Work prosecuted under the permit; and
  - 5. The Contractor agrees, in writing, to indemnify, defend, and hold the Port harmless from all expenses incurred in connection with such permit.
- C. All costs incurred in connection with permits and licenses shall be considered incidental to the Contract and included in the Contract Sum; no increase in the Contract Time or Contract Sum will be made. Loss of time, if any, suffered by the Contractor due to unreasonable delays in obtaining

permits or licenses may be considered in relation to a request by the Contractor for an adjustment to the Contract Time in accordance with paragraph G-07.03.

- D. The Contractor shall assume all costs and liabilities arising from the use of patented devices, materials, or processes used on or in performance of the Work.

#### G-04.12 Utilities and Similar Facilities

- A. Where removal or relocation of utilities is necessary to accommodate construction, such removal or relocation shall be performed at the Contractor's sole expense unless it is specified in the Contract Documents that it will be performed by the utility owner or others.
- B. Where the utility owner is identified as being responsible for removing or relocating utilities, such Work will be accomplished at the utility owner's convenience, either during or in advance of construction. If the Contractor discovers the presence of any utilities at the Project site, it shall immediately so notify the Engineer in writing. Unless otherwise specified, it shall be the Contractor's sole responsibility to coordinate, schedule, and pay for Work performed by the utilities.
- C. The right is reserved to the Port and the utility owner to enter upon the Project site from time to time to make such changes as are necessary for the relocation of the utilities or to make necessary connections or repairs. The Contractor shall cooperate with the forces engaged in such Work and shall conduct its operations in such a manner as to avoid unnecessary delay or hindrance to the Work being performed by such other forces. Whenever necessary, the Contractor shall make timely arrangements with the utility owner for the coordination of the Work.
- D. When the Contractor wishes to have any rearrangement made to any utility or other improvement for the Contractor's convenience in order to facilitate the construction operation, which rearrangement is in addition to or different from the rearrangement indicated in the Contract Documents, the Contractor shall (after obtaining the Port's written approval of the proposed rearrangement) make whatever arrangements are necessary with the owners of such utility or other improvements for such proposed rearrangement and the Contractor shall bear all expenses in connection therewith.
- E. All costs incurred as a result of performance of the Contractor's obligations under this paragraph shall be considered incidental to the Contract and included in the Contract Sum; no increase in the Contract Sum or Contract Time will be granted. Loss of time, if any, suffered by the Contractor due to unreasonable delays in removal or relocation of any utilities by others may be considered in relation to a request by the Contractor for an adjustment to the Contract Time in accordance with paragraph G-07.03.
- F. If any underground utility not identified in the Contract Documents must be relocated to accommodate the Project, the Engineer will either arrange for the relocation of such utility or provide written authorization for the Contractor to do such Work. If the Contractor performs such Work, at the Port's option the Contractor will be paid for the Work by unit prices, if applicable, a price previously agreed to by the Engineer and the Contractor, or on a Force Account basis.
- G. R.C.W. 19.122.030 requires that the Contractor "call before you dig" not less than 48 hours before beginning excavation where any underground utilities may be located. The number to call in the Puget Sound region is 1-800-424-5555. The Contractor shall comply with this law and, in addition, shall utilize a locator service to locate utilities on Port property.

#### G-04.13 Contractor to Comply with All Laws

The Contractor shall at all times comply with all federal, state and local laws, ordinances, and regulations. Such compliance shall include, but is not limited to, the payment of all applicable taxes, royalties, license fees, penalties, and duties.

#### G-04.14 Safety

- A. The Contractor assumes full responsibility for and shall comply with all safety laws, regulations, ordinances and governmental orders with respect to the performance of the Work and shall be responsible for employing adequate safety measures and taking all other actions reasonably necessary to protect the life, health and safety of the public and to protect adjacent and Port-owned property in connection with the performance of the Work. The Contractor shall perform the Work in a manner to offer the least possible obstruction and inconvenience to the Port, its tenants, public and abutting property owners.

The Contractor shall have the sole responsibility for the safety, efficiency and adequacy of the Contractor's plant, appliances and methods, and for any damage or injury resulting from their failure, or improper maintenance, use, or operation. The Contractor shall be solely and completely responsible for the conditions of the Project site, including safety of all persons and property in performance of the Work. This requirement shall apply continuously, and not be limited to normal working hours. The required or implied duty of the Engineer to conduct construction review of the

Contractor's performance does not, and shall not, be intended to include review and adequacy of the Contractor's safety measures in, on, or near the Project site.

- B. In carrying out its obligations set forth in G-04.14A, Contractor shall consider establishing and supervising the following as part of its safety program:

1. a safe and healthy working environment;
2. an accident prevention program; and
3. training programs to improve the skill and competency of all employees in the field of occupational safety and health.

The Washington State Department of Labor and Industries shall be the sole and paramount administrative agency responsible for the administration of the provisions of the Washington Industrial Safety and Health Act of 1973 (WISHA).

- C. The Contractor shall comply with the Federal Occupational Safety and Health Act of 1970 (OSHA), including all revisions and amendments thereto; the provisions of the Washington Industrial Safety Act of 1973 (WISHA); and the requirements of the following chapters of the Washington Administrative Code:

1. Chapter 296-24 WAC General Safety and Health Standards.
2. Chapter 296-62 WAC Occupational Health Standards.
3. Chapter 296-155 WAC Safety Standards for Construction Work.

- D. In addition, the Contractor shall comply with the following requirements when they are applicable:

1. Chapter 296-44 WAC Safety Standards - Electrical Construction Code.
2. Chapter 296-45 WAC Safety Standards - Electrical Workers.
3. Local Building and Construction Codes.

In cases of conflict between different safety regulations, the more stringent regulation shall apply.

- E. The Contractor shall maintain at the Project site office, or other well-known place at the Project site, all articles necessary for providing first aid to the injured. The Contractor shall establish, publish and make known to all employees, procedures for ensuring immediate removal to a hospital, or doctor's care, persons, including employees, who may have been injured on the Project site. Employees should not be permitted to work on the Project site before the Contractor has established and made known procedures for removal of injured persons to a hospital or a doctor's care.

#### G-04.15 Disruptions Caused by Labor or Other Disputes

- A. Definition: The term "dispute" as used in this paragraph includes labor-related and nonlabor-related disputes, whether or not the persons or other entities involved in the dispute have an employment relationship with either the Contractor or the Port. Examples of such disputes include, but are not limited to, informational or other picketing, and all other forms of concerted or non-concerted activity.

- B. Required Contractor Actions: The Contractor will take all reasonable steps to prevent all disputes arising from the presence of or the performance of the Work by the Contractor, its Subcontractors, Sub-subcontractors or Suppliers, from disrupting the Project or otherwise interfering with access to Port property by the Port, its agents, employees, tenants or employees thereof, or other contractors engaged on or near the site of the Work. If such dispute disrupts the progress of the Work or interferes with access to Port property, the Contractor shall promptly and expeditiously take all reasonable action to eliminate or minimize such disruption or interference, including but not limited to: (a) utilizing all reasonable means to prevent all unlawful conduct or picketing, or to restrict all lawful picketing or other activities to a single entrance to Port property; (b) posting notices or signs which advise interested persons and labor organizations that a particular entrance to Port property is for the employees or "primary" or, as the case may be, "neutral" employers; (c) policing entrances to assure that only authorized personnel may use the same; (d) notifying all interested labor organizations of the "primary" or "neutral" status of particular entrances; (e) upon the request of the Port, altering or rerouting the access to the site(s) of the Work; and (f) in the event any such picketing or activity is unlawful or has a secondary impact upon the employees of neutral employers, tenants or their suppliers or Contractors, promptly and expeditiously taking appropriate action to seek recourse through the appropriate governmental agency or state or federal courts to limit the location of such picketing so as to reduce the impact thereof upon neutral employers.

The Port will cooperate with the Contractor to accomplish the foregoing actions and will render its assistance where appropriate; however, the Port shall have the right, without providing additional compensation to the Contractor, to direct the Contractor to modify any of the foregoing actions

which the Contractor has taken or plans to take, or to overrule such actions, to designate the entrances to be used as "primary" or "neutral" entrances, and to take appropriate legal action in order to protect the interests of the Port and those of its tenants and other Contractors. The foregoing actions to be taken by the Contractor are the Contractor's primary responsibility. Neither the failure of the Port to request that the Contractor take a specific action nor the exercise by the Port of its rights under this paragraph shall modify or constitute a defense to or waiver of the obligations imposed upon the Contractor in this paragraph.

Failure to take the action described above or to comply with the directives of the Port shall be considered a material breach of the Contract Documents.

- C. If and to the extent that the Contractor fails to satisfy the obligations imposed on it by subparagraph B of this paragraph, the Contractor shall be liable for and defend, indemnify and hold harmless the Port, Commission, Engineer, and all other officers, employees, and agents of the Port from all liability, claims, damages, losses, and expenses (including but not limited to, attorneys' and consultants' fees and other expenses of litigation or arbitration) brought against the Port by a third party (including, but not limited to, lessees, tenants, contractors, customers, licensees and invitees of the Port) for injunctive relief or for monetary losses caused by loss of use, lost revenue, or interference with the activities of the Port or such third party.
- D. The Contractor shall pay all attorneys' fees and expenses incurred by the Port in establishing and enforcing the Port's rights under this paragraph, whether or not suit was instituted.

#### G-04.16 Progress Schedule

- A. Promptly after the award of the Contract, the Contractor shall prepare a Progress Schedule in a form satisfactory to the Engineer. Within ten (10) days after issuance of the notice of award, the Contractor shall submit six (6) copies of the Progress Schedule to the Port. Failure of the Contractor to submit a proposed Progress Schedule in a form satisfactory to the Engineer within the allowed time will not constitute grounds for an extension of the Contract Time.
- B. Unless otherwise specified, the Progress Schedule shall consist of a network analysis of the Critical Path Method (CPM) in arrow diagram form showing an activity description, cost, activity precedence, and duration (in calendar days) for all significant design, manufacturing, construction, and installation activities. An activity list shall be included with each copy of the Progress Schedule.
- C. Within ten (10) days after its receipt by the Port, two (2) copies of the Progress Schedule will be returned to the Contractor. These copies will be returned with comments, if any, following review by the Port. Review by the Port of the proposed Progress Schedule shall not constitute an approval of the Contractor's construction means, methods, sequences, or schedule.
- D. The Progress Schedule shall outline the proposed operations, the interrelations of the various operations, and the order of performance in sufficient detail that progress of the Work can be evaluated accurately at any time during the performance of the Work. If abbreviations are used in the make-up of the Progress Schedule, a legend shall be provided to define all abbreviations.
- E. If milestone completions are required by the Contract Documents, then those milestones shall be clearly defined on the Progress Schedule.
- F. Should it become evident that the Contractor may fail to meet the scheduled dates as shown; the Engineer may require the Contractor to submit a recovery schedule demonstrating its proposed plan to make up lag in scheduled progress and to ensure completion of the work within the Contract Time. The Contractor may be required at Contractor's own expense to submit a revised Progress Schedule and to increase Contractor's work force and working hours (second and third shifts) as required to bring the actual completion dates of the activities into conformance with the Progress Schedule. Further, Contractor shall submit a revised Progress Schedule at no cost to the Port when, in the opinion of the Engineer, Contractor's sequence of Work varies significantly from that shown on the Progress Schedule. The Port reserves the right to withhold progress payments until such time as an approved modified Progress Schedule in a form satisfactory to the Engineer has been provided by the Contractor.
- G. Failure of the Contractor to substantially comply with the requirements of this Paragraph may be considered grounds for a determination by the Port that the Contractor is failing to prosecute the Work with such diligence as will ensure its completion within the time specified, and to take whatever action the Port deems necessary and appropriate under Article G-10.

#### G-04.17 On-Site Documents

- A. The Contractor shall maintain at the Project site, in good order for ready reference by the Engineer, one complete record copy of the Contract Documents, including the Addenda, Change Orders, and all working drawings, Progress Schedule, and other approved submittals.



- B. The Contract record drawings shall be marked to truly record all changes made during construction, i.e., the "as-built" conditions. The location of all existing or new underground piping, valves and utilities, and obstructions as located during the Work, shall be appropriately marked on the ground until the Contractor incorporates the actual field location dimensions and coordinates into the Project's record drawings. The Project's record drawings shall be updated on a weekly basis and before elements of the Work are covered or hidden from view. After the completion of the Work or portions of the Work and before requesting final inspection, the record copy of the Drawings shall be given to the Engineer.

**G-04.18 Working Drawings, Product Data, Samples, and other Submittals**

- A. The Contractor shall review and submit all working drawings, product data, samples and other items required by the Contract Documents to be submitted to the Port accompanied by a "shop drawing transmittal" form. Such submittals shall be given to the Port in a complete and final form at least 30 days prior to any Contractor need for review response or such other longer time that may be needed to allow time for detailed review by the Port or others. The Contractor shall take into account sufficient time for the possibility of rejection of the submittal, needed revisions, and resubmittal review time.
- B. By submitting working drawings, product data, and samples, the Contractor represents that it has determined and verified all materials, field measurements, and related field construction criteria are in accordance with the Contract Documents, and that the Contractor has checked and coordinated the information contained within the submittal with the requirements of the Work and the Contract Documents. The costs incurred by the Port to review resubmitted working drawings, product data, and samples may be offset from any monies due the Contractor when the Contractor has failed to comply with this Subparagraph.
- C. Review by the Port of the Contractor's working drawings, product data, or samples shall not relieve the Contractor of responsibility for the accuracy of dimensions and details. Such review shall likewise not constitute acceptance by the Port of the correctness or adequacy of such submittals, nor shall it constitute a representation or warranty by the Port that the drawings will satisfy the requirements of the Contract Documents. The review of a specific item shall not indicate approval of an assembly in which the item functions. The Port's review of a submittal shall not relieve the Contractor from responsibility for errors or omissions in the submittals.
- D. Any Work delayed by reason of a properly rejected submittal is deemed to be entirely the Contractor's risk, and shall not be the basis for a claim by the Contractor for additional compensation or an extension of Contract Time. Drawings marked "subject to change" or the like will not be reviewed. The Port is not required to review submittals that depend for their review on other submittals not yet submitted. See paragraph G-03.04.
- E. When resubmitting a submittal, the Contractor shall direct specific attention, in writing or on the resubmittal itself, to all revisions it has made.
- F. No portion of the Work requiring submittal of a working drawing, product data, or sample shall be commenced until the submittal has been approved by the Port as provided in paragraph G-03.04. All portions of the Work involving submittals shall be performed in accordance with the approved submittals.

**G-04.19 Cutting, Fitting, and Patching of Work**

- A. The Contractor shall be responsible for all cutting, fitting, patching or such other altering as may be required to complete the Work, or to make its several parts fit together properly.
- B. The Contractor shall not damage or endanger any portion of the Work, other work of the Port, or that of any separate contractor's by cutting, fitting, patching or other altering of any work, or by excavation. The Contractor shall not alter any of the work of the Port or any separate contractor without written authorization from the Port.

**G-04.20 Inspection of the Work**

The Engineer or Engineer's authorized representative shall have the right but not the obligation to inspect the Work, and to reject and refuse all labor and materials or methods of application, or any part thereof, that does not comply in kind, quality or material with the requirements of the Contract Documents. Any labor or material rejected, as not conforming to the Contract Documents shall be promptly removed, and labor and materials, which do so conform, shall be furnished and delivered in place thereof.

**G-04.21 Uncovering of Work**

- A. If any portion of the Work should be covered prior to inspection called for by law or as required by the Contract Documents, the Contractor shall, upon request of the Engineer, uncover or remove the Work for inspection by the Engineer or other governmental representatives, and replace the Work to the standard required by the Contract Documents, all at the Contractor's expense.

- B. If any other portion of the Work has been covered or completed, the Contractor shall, upon the request of the Engineer, remove or uncover such Work for the Engineer's observation. The Contractor shall subsequently restore that portion of the Work to the standard required by the Contract Documents.

**G-04.22 Correction of Work**

- A. The Contractor shall, at no additional expense to the Port, promptly correct all Work which is defective or otherwise fails to conform to the requirements of the Contract Documents. Such Work shall be corrected even though it was previously inspected by the Port, payment for it was included in a progress payment, whether or not it was completed, and whether or not it was observed before or after the date of Substantial Completion.
- B. If, within one year after Substantial Completion of the Work (except as otherwise may be provided pursuant to subparagraph C of paragraph G-08.08), or within such longer period of time as may be prescribed by law or by the terms of any applicable additional warranty required by the Contract Documents, any of the Work is found to be defective or otherwise not in conformance with the Contract Documents, the Contractor shall, at its cost, promptly correct such defective or non-conforming Work after receipt of written notice from the Port to do so. The obligation of this subparagraph shall survive termination of the Contract.
- C. If the Contractor refuses or neglects to correct the defects as the Engineer may direct, then the Port may obtain, use and employ materials, labor, tools and implements to do the same and the expense thereof shall be deducted from moneys which may otherwise be then due or thereafter may become due to the Contract, or the Port may terminate this Contract as provided in paragraph G-10.06.
- D. Work corrected by the Contractor shall also be subject to the provisions of this paragraph to the same extent as Work originally performed and for an additional one-year period. Such one-year time period shall commence upon the acceptance by the Port of the corrected Work.
- E. Nothing contained in this paragraph G-04.22 shall be construed to establish a period of limitation with respect to any other obligation imposed on the Contractor by the Contract Documents or law, including the obligations imposed by paragraph G-04.09. The establishment of the time period of one year after the date of Final Completion or such longer period of time as may be prescribed by law or by the terms of any warranty required by the Contract Documents relates only to the specific obligation of the Contractor to correct defective or non-conforming Work, and bears no relationship to the time within which the Contractor's 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 obligations imposed on it by the Contract Documents or as otherwise may exist in law.
- F. The Port may, at its sole option, elect to retain defective or nonconforming Work. In such case, the Port shall reduce the Contract Sum in a reasonable amount to account for such defect or non-conformance.

**G-04.23 Responsibility for Work**

All Work performed under the Contract and all materials to be incorporated in the Work, whether in storage or on the Project site and whether under the care, custody and control of the Contractor, Subcontractors, or Sub-subcontractors, shall be at the sole risk of loss and responsibility of the Contractor until Final Completion of the entire Project, except as may be limited by the Engineer in writing for the period following Substantial Completion of the Work or designated portion thereof as provided in subparagraph G-08.08B. Damage from any cause to either permanent or temporary Work, utilities, materials, equipment, existing structures, the Project site, and other property owned by the Port or others, shall be repaired by the Contractor to the satisfaction of the Engineer at no additional cost to the Port. At no time during the execution of this Contract shall the Contractor direct Port staff or Port agents to assist in the execution of the Work.

**G-04.24 Hazardous Materials**

The Contractor shall exchange Hazardous Materials information to prevent injury or illness to Port or Contractor personnel, to comply with WISHA WAC 296-62-054.

- 1. The Port has available to the Contractor the following:
  - a. A list of all known Hazardous Materials in use at the Port. Information on each can be obtained by reviewing the Material Safety Data Sheets (MSDS).
  - b. Precautions to be taken to lessen the possibility of exposure.
- 2. The Contractor will:

- a. Notify all subcontractors and/or suppliers of any Hazardous Materials the Port may have on site.
  - b. Label any Hazardous Materials brought on site as to contents, hazard warning, name and address of manufacturer.
  - c. Provide the following written information, prior to commencement of Work:
    - 1) A list of Hazardous Materials to be used during the construction phase of the Work, along with the MSDS's.
    - 2) A list of any Hazardous Materials that have been incorporated into the project and will remain on site, along with the MSDS's.
3. Contractor shall not cause or permit any "Hazardous Materials" (as defined herein) to be brought upon, kept or used in or about the job site except to the extent such Hazardous Materials are necessary for the prosecution of the Work or are required pursuant to the Contract Documents. Removal of such Hazardous Materials shall be undertaken within twenty-four (24) hours following Port's demand for such removal. Such removal shall be undertaken by Contractor at its sole cost and expense, and shall be performed in accordance with all applicable laws. Any damage to the Work, the job site or any adjacent property resulting from the improper use, or any discharge or release of Hazardous Materials shall be remedied by Contractor at its sole cost and expense, and in compliance with all applicable laws. Contractor shall immediately notify Port of any release or discharge of any Hazardous Materials on the job site. Contractor shall be responsible for making any and all disclosures required under applicable "Community Right-to-Know" laws. Contractor shall not clean or service any tools, equipment, vehicles, materials or other items in such a manner as to cause a violation of any laws or regulations relating to Hazardous Materials. All residue and waste materials resulting from any such cleaning or servicing shall be collected and moved from the job site in accordance with all applicable laws and regulations. Contractor shall immediately notify Port of any citations, orders or warnings issued to or received by Contractor, or of which Contractor otherwise becomes aware, which relate to any Hazardous Materials on the job site. Without limiting any other indemnification provisions pursuant to law or specified in this Contract, Contractor shall indemnify, defend (at Contractor's sole cost, with legal counsel approved by Port) and hold Port harmless from and against any and all such claims, demands, losses, damages, disbursements, liabilities, obligations, fines, penalties, costs and expenses in removing or remediating the effect of any Hazardous Materials on, under, from or about the job site, arising out of or relating to, directly or indirectly, Contractor's failure to comply with any of the requirements of this Subparagraph G-04.24.3.

**G-04.25 Clean-up**

- A. At all times, and as may specifically be requested by the Engineer, the Contractor shall clean-up and remove all refuse resulting from the Work in order that the Project site remains free from an accumulation of construction debris. Upon failure to do so within 24 hours after request by the Engineer, such clean-up Work may be done by the Port and the cost thereof shall be charged to the Contractor and deducted from the Contract Sum.
- B. Upon completion of the Work and before final inspection, the Contractor shall clean the entire Work premises occupied or used in connection with the Work of all rubbish, surplus and discarded materials, false work, temporary structures, equipment, and debris. The entire Work premises shall be left in a clean, neat, and presentable condition. The Contractor shall not remove warning, regulatory, or guide signs prior to Final Completion except as requested by the Engineer.

**G-04.26 Protection of Work During Suspension**

In preparation for and during any suspension of Work as provided in paragraph G-10.03, the Contractor shall take every precaution to prevent damage to, or deterioration of, the Work. Except as provided elsewhere in the Contract Documents, the Contractor shall be responsible for all damage or deterioration to the Work during the period of suspension and shall, at its sole expense, correct or restore the Work to a condition acceptable to the Engineer prior to resuming Work. A suspension of Work shall not relieve the Contractor of any of its responsibilities under the Contract Documents.

**G-04.27 Survey**

All benchmarks and construction survey shall be accomplished by the Contractor unless otherwise provided in the contract.

**G-04.28 Archeological Items**

If resources of potential archeological significance are encountered during construction or excavation, the following steps shall be taken.

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- A. The Contractor will immediately stop work in the vicinity of the find and notify the Port's Project Manager.
- B. 24-Hour security will be arranged by the Port.
- C. The Port and its Contractor shall work with a professional archaeologist to resume construction as soon as possible without compromising the archeological find.

**G-04.29 Gratuities**

The Contractor shall not extend any loan, gratuity, or gift of money or services in any form whatsoever to any employee or officer of the Port or Port consultant, nor shall the Contractor rent or purchase any equipment, materials, or services from any employee or officer of the Port or Port consultant.

**G-04.30 Notice and Detailed Breakdown of Claim**

- A. Notice. If unforeseen conditions or changes in the Work arise for which the Contractor believes an equitable adjustment in time or money or any other adjustment in Contract Time or Contract Sum is or will be due, the Contractor shall give the Port immediate oral notice followed by written notice within seven (7) days of such event, which notice in all events must be given and the Engineer's direction received prior to performing the Work which Contractor believes entitles it to such adjustments. Such notice must identify in detail the basis for the claim. The date such written notice is received by the Port shall define the start of time for any purpose regarding the claim.
- B. Detailed Breakdown. Within 30 calendar days of the Port's receipt of written notice above, the Contractor shall provide the Port with a written breakdown of all of the elements and sub elements of the claim detailing the increase in the Contract time or Contract Sum being sought.
- C. A request for an equitable adjustment Contract Sum shall be based on written notice delivered to the Port within seven (7) Days of the occurrence of the event giving rise to the request. For purposes of this part, "occurrence" means when Contractor knew, or in its diligent prosecution of the Work should have known, of the event giving rise to the request.
- D. Failure to give such written notice shall, to the extent Port's interests are prejudiced, constitute a waiver of contractor's right to an equitable adjustment.

**G-04.31 Prerequisite to Suit**

No legal action against the Port may be filed on account of a claim or other liability arising, out of or related to the Project unless:

- A. the requirements of paragraph G-04.30 have been complied with, and
- B. the procedures of paragraph G-09.05 have been exhausted, and
- C. the lawsuit is filed and served on the Port within 180 days of the date of Substantial Completion. The Contractor's failure to strictly comply with all requirements of this section shall be a complete bar to any claims, suit or cause of action against the Port.

**G-04.32 Responsibility for Damage**

- A. The Contractor shall bear sole responsibility for any pollution which may occur as a result of its operations, including but not limited to soil, air, water, noise, light, or other pollution, including but not limited to any costs (including attorneys' and consultants' fees), penalties, or other liabilities imposed or sought to be imposed as a result of such pollution.
- B. The Contractor shall protect from damage all private, public, and Port-owned utilities, including but not limited to communication lines, power lines, sewer and water lines, railroad tracks and appurtenances, traffic lighting and signal systems, and similar facilities.
- C. The Contractor shall be responsible for damage to the Work caused by winds, storms, or other causes, and must make good any defects arising from or discovered in the Work until Final Completion of the Work.

**G-04.33 Indemnification**

- A. The Contractor shall defend, indemnify and hold the Port, its officers, officials, employees and volunteers harmless from any and all claims, injuries, damages, losses or suits including attorney fees, arising out of or in connection with the performance of this Agreement, except for injuries and damages caused by the sole negligence of the Port.
- B. Should a court of competent jurisdiction determine that this Agreement is subject to RCW 4.24.115, then, in the event of liability for damages arising out of bodily injury to persons or damages to property caused by or resulting from the concurrent negligence of the Contractor and the Port, its officers, officials, employees, and volunteers, the Contractor's liability hereunder shall be only to the extent of the Contractor's negligence. It is further specifically and expressly understood that the

indemnification provided herein constitutes the Contractor's waiver of immunity under Industrial Insurance, Title 51 RCW, solely for the purposes of this indemnification. This waiver has been mutually negotiated by the parties. The provisions of this section shall survive the expiration or termination of this Agreement.

- C. The Contractor shall pay all attorney's fees and expenses incurred by the Port in establishing and enforcing the Port's rights under this paragraph, whether or not suit was instituted.

#### ARTICLE G-05

#### SUBCONTRACTORS AND SUPPLIERS

##### G-05.01 Contractor is Responsible for Actions of Subcontractors and Suppliers.

The Contractor is fully responsible for the acts and omissions of all Subcontractors, Sub-subcontractors, Suppliers, and all other persons performing a portion of the Work.

##### G-05.02 Award of Contracts to Subcontractors and Suppliers

- A. The Contractor shall, if required by the Contract Documents, submit to the Engineer in writing the identity of subcontractors and suppliers proposed to furnish materials or equipment specifically designed for this Project. This list shall be provided to the Port not more than ten (10) days after Notice of Award. The Engineer will respond to the Contractor within ten (10) days in writing stating whether or not the Port has an objection to any such proposed subcontractor or supplier. Failure of the Engineer to respond shall constitute notice of no objection. If at any time during the performance of the Work the Contractor wishes to make a substitution for a proposed subcontractor or supplier, the Contractor shall first give the notice required above, and the Port may object to such proposed substitution within ten (10) days of being so notified.
- B. The Contractor shall not enter into a contract with a proposed subcontractor or a supplier of specifically designed equipment to whom the Port has made reasonable objection pursuant to subparagraph A of this paragraph. Likewise, the Contractor will not be required by the Port to contract with an entity to whom the Contractor has a reasonable objection.
- C. The award of a subcontract or contract for the supplying of materials or equipment by the Contractor does not create a contract between the Port and the Subcontractor or Supplier. Except as otherwise set forth by statute, Subcontractors and Suppliers shall have no rights whatsoever against the Port by reason of their contract with the Contractor. The foregoing provision shall apply with equal force to Subcontractors, Sub-subcontractors, Suppliers, and all other persons otherwise engaged to do any portion of the Work.
- D. When a portion of the Work, which has been subcontracted by the Contractor, is not being prosecuted in accordance with the Contract Documents, the Contractor shall, on the written request of Engineer, take immediate steps to correct the deficiency or remove the Subcontractor, or Sub-subcontractor, from the Project. In the event of removal, the removed Subcontractor, or Sub-subcontractor, shall not be further employed in the Work.
- E. The Contractor shall make available to each Subcontractor, Sub-subcontractor and Supplier, prior to execution of contracts by the same, a copy of the Contract Documents to which the Subcontractor, Sub-subcontractor, or Supplier is to be bound.
- F. The Port reserves the right to obtain copies of any Subcontractor, Sub-Subcontractor and Supplier agreements at any tier from the Contractor.

##### G-05.03 Subcontractor and Supplier Relations

By an appropriate agreement, the Contractor shall require that each Subcontractor and Supplier, to the extent of the Work to be performed by that Subcontractor or Supplier, be bound to the Contractor to perform such portion of the Work according to the terms of the Contract Documents and to assume toward the Contractor all of the obligations which the Contractor assumes toward the Port under the Contract Documents. Such agreement shall preserve and protect the rights of the Port with respect to the Work to be performed by the Subcontractor or Supplier so that the Contracting thereof by the Contractor to others will not prejudice the Port's right to have the Work performed in accordance with the Contract Documents. The Contractor shall require each Subcontractor and Supplier to enter into similar agreements with all Sub-subcontractors and Suppliers, so that this requirement shall be applicable to Sub-subcontractors and Suppliers at all tiers.

Each subcontract agreement for a portion of the Work is hereby assigned by the Contractor to the Port provided that:

1. The assignment is effective only after termination by the Port for cause pursuant to section G-10.06 and only for those subcontracts which the Port accepts by notifying the Subcontractor or Supplier in writing; and
2. After the assignment is effective, the Port will assume all future duties and obligations toward the Subcontractor or Supplier which Contractor assumed in the subcontract agreement.
3. The assignment is subject to the prior rights of the surety, if any, under any bond in accordance with the Contract Documents.

ARTICLE G-06

NON-DISCRIMINATION

G-06.01 Comply with all laws

The Contractor shall fully comply with all applicable laws, regulations, and ordinances pertaining to non-discrimination.

G-06.02 Minority Business Enterprise/Women Business Enterprise Participation.

- A. The policy of the Port of Port Angeles is to provide and promote the maximum lawful, practicable opportunity for increased participation by Minority and Women's Business Enterprises in contracting and procurement processes with the Port.
- B. Definitions for the minority groups protected by the Civil Rights Act of 1964 and women will be those used by the State of Washington, Office of Minority and Women Business Enterprises.

ARTICLE G-07

TIME

G-07.01 Contract Time

- A. The Contract Time is that period of time allotted in the Contract Documents, as adjusted by Change Orders, for Contractor to achieve Substantial and/or Final Completion of the Work as more fully set forth in the Contract Documents.
- B. The Contract Time starts as set forth in the Supplementary Conditions.
- C. Substantial Completion occurs when the Port can use or occupy the Work for the use for which it is intended, and when all documentation required to operate the facility constructed has been properly submitted to the Port in accordance with the Contract Documents. Such documentation shall include but is not necessarily limited to:
  1. Maintenance and Operations manuals;
  2. Warranties;
  3. Submittals required by the Specifications; and
  4. Occupancy permits and related approvals by any authority with jurisdiction for same.
- D. Final Completion occurs when all requirements of the Contract Documents have been properly and completely fulfilled including but not limited to:
  1. Completion of, reinspection and Port approval of all Punch List items;
  2. Submittal of final invoice and approval by the Engineer;
  3. Submittal of list of all subcontractors and MWBE suppliers used on the project and the amount paid to each;
  4. Submittal of all properly completed as-built record drawings; and
  5. Submittal of any other documents required by the Contract Documents.
- E. Acceptance is the formal action of the Port Commission accepting the Work as complete.

G-07.02 Progress and Completion

- A. All time limits stated in the Contract Documents are of the essence of this Contract.

- B. The Contractor shall begin the Work as set forth in the Supplementary Conditions and shall diligently prosecute the Work with adequate equipment and forces in order to bring the Work to completion within the Contract Time.

**G-07.03 Extension of Time**

- A. Reasonable Delays. The Contractor should anticipate that some reasonable delays, including those caused by normal weather patterns, may occur. The Contractor shall not be entitled to any compensation, damages, or extension of the Contract Time for such reasonable delays.
- B. Excusable Delays. For Excusable Delays the sole and exclusive remedy of the Contractor will be an equitable extension of time allowed for completion. The Contract Time may be extended without compensation by the Port for a period equivalent to the time that the Contractor was delayed in the Work by one or more of the following causes, beyond the control of the Port and the Contractor, occurring during the performance of the Work:
  - 1. Fire or other casualty for which the Contractor is not at fault or otherwise responsible;
  - 2. Strike, riot, war, or civil disorder;
  - 3. Suspension of Work due to unusual and severe weather;
  - 4. Delay cause by another contractor in the performance of a contract with the Port;
  - 5. Suspension of Work due to other unsuitable conditions in accordance with paragraph G-10.03.
- C. Unreasonable Delays. Extensions of Contract Time, if any, shall be determined by the Engineer. Time extensions will be allowed only to the extent that completion of the Work is unreasonably delayed through no fault of the Contractor, which must in all cases be substantiated by impact to the critical path on the Progress Schedule. Any extension of the Contract Time by the Port will be set forth in a Change Order, which shall specify the calendar days by which the Contract Time is to be increased.
- D. No extension of time shall be allowed for any claimed delay which is caused by or results from concurrent delay or the fault, negligence, or collusion of the Contractor, or its Subcontractors, Sub-Subcontractors, Suppliers, or any others, or any of their acts or failure to act or to timely perform the Work according to the Contract. Failure to make timely submittals to the Port, procure materials or workmen or perform the Work in accordance with the requirements of the Contract Documents or to adequately plan for such functions will not be an adequate reason for an extension of Contract Time.
- E. In no event shall the Contractor be entitled to loss or damage, including a change in Contract Sum for any delay in the Contractor's prosecution of the Work, even if such delay is caused by the Port, except to the extent such acts or omissions of the Port result in a delay to the Project's critical path, in which case the Contractor may receive an adjustment to the Contract Sum. Any request for such cost shall be established and documented by the Contractor in detail to the satisfaction of the Engineer in accordance with Paragraph G-09.03, Compensation for Changes.
- F. If the Contractor fails to fully comply with paragraph G-04.30, its claim for an extension of Contract Time or adjustment to the Contract Sum on account of such claimed delay is waived.

**ARTICLE G-08**

**PAYMENTS, COMPLETION AND ACCEPTANCE**

**G-08.01 All Payments Subject to Applicable Laws**

- A. All payments made to the Contractor are subject to all laws applicable to the Port.
- B. The Port shall not make any payments to the Contractor under this Contract until approved Statements of Intent to Pay Prevailing Wages have been filed with the Port as required by paragraph G-04.05 and R.C.W. 39.12.040. By submitting an invoice, Contractor certifies that wages have been paid in accordance with the approved Statements of Intent.

**G-08.02 Scope of Payment**

- A. The Contractor shall be compensated as provided for in the Contract Documents for performing all of the Work in accordance with the Contract Documents, including changes made to the Work by Change Order. Payment of the Contract Sum shall constitute the full compensation to the Contractor for performance of the Work, including all risk, loss, damages, or expense of whatever character arising out of the nature of the Work or the prosecution thereof, and for all reasonable

expenses properly incurred in the event and consequence of a suspension or discontinuance of the Work pursuant to the Contract Documents.

- B. The Port need not pay for work done beyond lines and grades established by the Engineer, or extra work or materials furnished without prior written approval of the Engineer. The Port may order such unauthorized work to be removed at no expense to the Port.

**G-08.03 Retained Percentage (Retainage)**

In accordance with Chapter 60.28 R.C.W., the Port will retain five (5) percent of each monthly progress payment. For purposes of Chapter 60.28 R.C.W. "completion" shall mean Final Completion.

**G-08.04 Progress Payments**

- A. Progress payments will be made following the Contractor's request therefore once each month during the Contract Time; payment shall be based upon invoices approved by the Engineer.
- B. Within eight (8) days after receipt of the progress payment invoice, the Engineer will review the request and either approve the request, or indicate in writing to the Contractor specific reasons why part or all of the payment is being withheld and what remedial action the Contractor must take to receive the withheld amount. If the Engineer recommends payment the Port will, within thirty (30) days of receipt of the Contractor's properly completed invoice, pay the Contractor's progress payment subject to retention requirements.
- C. If the Engineer does not concur with the invoice, the Contractor may make the changes necessary to obtain the Engineer's concurrence and resubmit the progress payment request. If the Engineer recommends payment, the Port will, within thirty (30) days after the Contractor satisfactorily completes the remedial actions identified in the Engineer's rejection of the payment request, pay the Contractor's progress payment.
- D. Payment shall be based upon the actual quantities of Work performed according to the Contract Documents. Quantities will be determined as percentages of each scheduled activity for lump sum Contracts. Where the Contract provides for unit prices, quantities will be determined by the actual measurement of completed units in accordance with the Contract Documents.
- E. Payment requests shall be accompanied by a complete revised construction schedule in accordance with Article 04.16.
- F. The Contractor is required to make payment to all Subcontractors and all Suppliers within ten (10) calendar days from the receipt of all progress payments for all the Work included in the progress payments. Furthermore, the Contractor shall require all subcontracts issued under this contract to all Subcontractors and Suppliers at all tiers to also make all due payments within ten (10) calendar days of their receipt of payment. The Contractor must justify to the Port in writing any intent to withhold payment of monies due to any Subcontractor or Supplier within the same ten (10) calendar days.
- G. The Contractor shall supply with each payment request the Port's form of certification signed by a corporate or company officer. This certification shall attest that all payments by the Contractor due to Subcontractors or Suppliers from the last payment estimate have been made within the ten (10) calendar days payment period. The certification shall attest that the Contractor will make payment within ten (10) calendar days of all obligations due from the current payment estimate. The Contractor is required to receive the same certification from all Subcontractors and Suppliers at all tiers. No progress payments will be processed until the Contractor's certification is received.

**G-08.05 Payment for Stored Materials**

- A. On-site Materials: At the Engineer's sole option, a progress payment may include payment for permanent materials or equipment to be incorporated into the Work if approved in advance by the Engineer and properly stored and safeguarded on the site.
- B. Off-site Materials: At the Engineer's sole option, a progress payment may also include payment for permanent prefabricated materials or specifically designed equipment to be incorporated into the Work if approved in advance by the Engineer and properly stored, even though off-site. The maximum allowable payment for such off-site material will be eighty-five percent (85%) of the invoice price for the material.
- C. Any payment for materials or equipment stored on or off the site but not yet incorporated into the Work shall be based upon the cost of the materials or equipment as determined by the Port considering invoices to the Contractor, bills of sale, or by such other means satisfactory to the Engineer and which will establish the Port's title to such materials or equipment and otherwise protect the Port's interest. This shall include provisions for insurance and transportation to the site in the case of materials and equipment stored off the site.

**G-08.06 Payment for Work Done on a Force Account Basis**



- A. Whenever, under the terms of the Contract, work, materials, or equipment are to be paid for on a Force Account basis, the amount of such payment shall be certified in writing on a daily basis by agreement of Contractor and the Engineer. Claims for Work done on a Force Account basis may be submitted for payment at any time subsequent to the performance of the Force Account Work; however, all such claims must be made before Final Completion, or they are waived. Payment for Force Account Work shall be determined as follows:
1. Labor:

For all labor, including such foreman supervision (but excluding the superintendent and project manager) as may be necessary upon any particular operation, the Contractor shall be paid an amount equal to the sum of the following:

    - a. Weighted Wage Rate

The agreed weighted wage rate for all labor used shall include and be restricted to the current certified basic wage plus fringe benefits made the obligation of the Contractor by a collective bargaining agreement or other employment agreement, and benefits paid on an account of such labor by the Contractor pursuant to the:

      - 1) Federal Insurance Compensation Act (FICA);
      - 2) Federal Unemployment Tax Act (FUTA); and
      - 3) State Unemployment Compensation Act (SUCA).
    - b. Travel Allowance and/or Subsistence

The Contractor shall be reimbursed the actual costs of travel and subsistence allowances paid to laborers engaged upon the Work when such allowances are required by the terms of employment for such laborers.
    - c. Industrial Insurance and Medical Aid Premiums

The Contractor shall receive reimbursement for industrial insurance premiums as may be required under State or federal statutes, and medical aid premiums which become an obligation of the Contractor and are chargeable to the labor performed on the Work to be paid for on a Force Account basis. The rate of compensation for the above premiums shall be a composite rate based upon the full premium for Industrial Insurance and one-half the premium for medical aid, which premiums are prescribed by the regulatory body for the Contractor, Subcontractor, Sub-subcontractor, or other person actually performing the Force Account Work. This composite rate may be adjusted upon request to conform with adjustment prescribed by the regulatory body.
    - d. Overhead and Fee

The Contractor shall be reimbursed in an amount equal to Fifteen percent (15%) of the sum of the items listed in subparagraphs a, b, and c above for the Contractor's overhead and fee, bonds, all insurance (except as specified in subparagraph c above), and all other costs incurred in supplying such labor.
  2. Materials
    - a. For all materials furnished by the Contractor for the Work, payment shall be made in the amount of the actual invoice cost for such materials, including actual freight and express charges and applicable taxes less all offered or available discounts and rebates, notwithstanding the fact that they may not have been taken by the Contractor. To the above-determined cost shall be added a sum equal to fifteen percent (15%) for overhead, fee, bonds, insurance, and all other costs incurred in supplying such materials.
    - b. The Contractor shall furnish to the Port, as support for all charges for materials, valid copies of supplier invoices, including freight and express bills. As to such materials as may be furnished from the Contractor's own inventory for which an invoice is not available, the Contractor shall furnish a sworn affidavit certifying its actual cost of such materials.
    - c. If, in the opinion of the Engineer, the Contractor's cost of such materials furnished is excessive or if the Contractor does not furnish satisfactory evidence of its costs, the Port reserves the right to establish the cost of all or part of such materials at the lowest current wholesale prices less all applicable discounts and exemptions at which said materials are available in the quantities required to be furnished pursuant to the Contract Documents.

- d. The Port reserves the right to furnish such materials to the Contractor as it deems advisable, and the Contractor shall have no claim for any costs, overhead, or fee on such materials.

3. Equipment

- a. For any machine-power tools or equipment, except small tools, which the Engineer deems necessary for the Contractor to use, payment shall be made in accordance with the rates stated in the "AGC-Washington State Department of Transportation Equipment Rental Agreement", in effect at the time such tools or equipment were used, subject to reduction under subparagraph b below.
- b. The rates stated in the "AGC Washington State Department of Transportation Equipment Rental Agreement," are the maximum rates allowable for equipment of modern design and in good working condition, and include and are full compensation for overhead, fee, bonds, and for furnishing all fuel, oil, lubrication, repairs, maintenance, insurance, and all other costs incidental to the furnishing of such tools and equipment, except for the labor to operate the same. The stated compensation for use of tools or equipment not of modern design or not in good working conditions shall be reasonably reduced as determined by the Engineer. If equipment is required for which a rental rate is not included in the current schedule, an agreed rental rate shall be established for that equipment based upon the same elements of costs used in establishing the current schedule or rental rates. Such rates must be approved by the Engineer prior to use of the equipment on the Force Account work.
- c. A current "AGC-Washington State Department of Transportation Equipment Rental Agreement" is maintained at each district office of the Department of Transportation and at each of the offices of the Associated General Contractors of America.
- d. If the necessary equipment is not already at the site of the project and it is not anticipated that it would be required for the performance of other Work under the terms of the Contract, the Contractor will be paid in accordance with the terms and conditions specified in the then current "AGC-Washington State Department of Transportation Equipment Rental Agreement".
- e. Overhead and Fee  

The Contractor shall be reimbursed in an amount equal to Fifteen percent (15%) of the sum of the items listed in subparagraphs a. thru d. above for the Contractor's overhead and fee, bonds, all insurance, and all other costs incurred in supplying such labor.

4. Subcontractors

When Work is performed on a Force Account basis by Subcontractors, the Contractor will be allowed an additional markup based on the following schedule:

- a. First \$10,000.00 of Work done on each Change Order by Subcontractors (less Subcontractor markups for overhead and fee) the Contractor will be allowed ten percent (10%) supplemental markup.
- b. All Work in excess of \$10,000.00 done by Subcontractors on each Change Order (less Subcontractor markups for overhead and fee) the Contractor will be allowed a five percent (5%) supplemental markup.

The ten percent supplemental markup shall apply to the first \$10,000.00 accumulated total of all Force Account Work performed by all subcontractors on any single change order.

5. Sub-subcontractors

- a. The provisions of this subparagraph as applicable to the Contractor shall also be applied in the same manner to Subcontractors at each tier.
- b. The payment provided for in subparagraph A.1 through A.5 of this paragraph shall constitute full compensation for all Work done on a Force Account basis, for all delays related in any way to the change requiring the Work done on Force Account basis or which may result from the performance of such changed Work. Such payment shall cover all costs of labor, materials, equipment, overhead, fee, damages, if any, and all other costs or expenses, of whatever kind or type, which are occasioned either directly or indirectly, including payments required under the Social Security Act, State Unemployment Compensation Act, occupational tax,

and any other federal or state insurance policies, and for the use of small tools and equipment for which no rental is allowed.

6. No compensation for Work performed on a Force Account basis shall be paid unless the Engineer provided prior written direction to the Contractor to perform the Work on such a basis. No Work shall be considered to be Force Account work which can be measured and paid for at the unit price in the Schedule of Prices.

#### G-08.07 Payment for Changes

Compensation for Changes in the Work as provided in a Change Order will be made in accordance with the payment provisions of the Contract Documents.

#### G-08.08 Substantial Completion

- A. A portion of the Work will be considered for Substantial Completion prior to completion of the entire Work only if such portion is specifically so designated in the Contract Documents or the Engineer determines that it is in the best interest of the Port.
- B. When the Work, or a designated portion thereof, is considered by the Contractor to be substantially complete and the Contractor has submitted the documents required by subparagraph G-07.01C, the Contractor may request that the Engineer schedule an inspection. With the request the Contractor shall provide a preliminary list of items to be completed or corrected in order to make the Work comply with the Contract Documents. The Engineer will review the list and determine whether the Work is ready for inspection. The Engineer will perform the inspection together with the Contractor. The preliminary list, as revised during the inspection, is referred to as the Punch List. The Engineer may revise the Punch list at any time prior to Final Completion when items needing completion or correction are discovered.
- C. When Substantial Completion of the Work or designated portion thereof has been achieved, the Engineer will advise the Contractor in writing of the date Substantial Completion for the Work or such designated portion thereof was achieved. Such writing will state whether the Port shall thereupon assume responsibility for security, maintenance, heat, utilities, risk of loss, and insurance with respect to the Work or designated portion thereof determined to be substantially complete. If such writing does not so state, all responsibility for the foregoing items shall remain with the Contractor until the date of the Final Completion as provided for in paragraph G-08.09 below. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise indicated by the Engineer in the notice of Substantial Completion. The Engineer will review the Punch List with the Contractor and establish a time limit for the completion of the items on the Punch list.
- D. The failure of the Contractor or the Engineer to include any items on the Punch List does not alter the Contractor's responsibility to complete all Work in accordance with the Contract Documents, nor shall such failure be any indication that the Engineer considers any items not included on the Punch List to be complete.

#### G-08.09 Final Completion

When the Contractor has completed all items on the approved Punch List or otherwise considers the Work to be fully completed in accordance with the Contract Documents and the Contractor has submitted the documents required by subparagraph G-07.01D, the Contractor shall so notify the Engineer and request a final inspection. The Engineer will perform such inspection. If the Engineer finds the Work not to be complete, the Engineer will so advise the Contractor and provide the Contractor with a revised Punch List of items to be completed or corrected, and then a re-inspection will be scheduled. When the Engineer finds that the Work is complete in accordance with the Contract Documents, the Engineer will so advise the Contractor in writing by sending a notice of Final Completion.

#### G-08.10 Completion of Punch List

If the Contractor does not expeditiously proceed with correctional completion of Punch List items identified in the final Inspection, the Port may, in its sole discretion, remove such items from the scope of Work by Change Order. In such instance, the Port may choose to (1) have the Work performed by another contractor with the cost of such work to be deducted from the amount due the Contractor or claimed against the retained percentage, or (2) accept a credit for the uncompleted work to be deleted by change order, with the amount of the credit to be negotiated between the parties. The rights provided the Port under this paragraph shall not relieve the Contractor of its responsibilities as required under any other provisions of the Contract Documents.

#### G-08.11 Acceptance

Acceptance shall be by formal action of the Port of Port Angeles Commission. Acceptance shall not constitute acceptance of unauthorized or defective Work, material or equipment. The Port shall not be

barred by Acceptance from requiring the Contractor to remove, replace, repair, or dispose of unauthorized or defective Work, material, or equipment or from recovering damages for the same.

**G-08.12 Final Payment**

- A. The Final Payment shall be the release to the Contractor of the retained percentage. The Final Payment will be made only upon receipt of:
1. Certificate of Releases from Washington State Departments of Labor and Industries, Revenue, and Unemployment Security; and
  2. Approved Affidavits of Wages Paid for the Contractor and all Subcontractors (at all tiers).
- No monies will be released to the Contractor prior to forty-five (45) days after Final Completion, and until such time as all properly filed liens have been removed.
- B. The making of the Final Payment shall not relieve the Contractor from claims arising from: liens, faulty or defective work appearing or discovery after completion of the Work, failure of the Work to comply with the requirements of the Contract Documents, or from the terms of special warranties required by the Contract Documents.
- C. The Contractor's and all Subcontractors' (at all tiers) original accounting records, certified payrolls, and all other relevant records pertaining to the Work or submitted as a claim for additional compensation, additional time or any combination thereof, shall be open to inspection and audit by representatives of the Port for a period of not less than three (3) years after the date of Final Completion, and the Contractor shall retain such records for that period. The Port shall have the right to seek reimbursement of any amount it determines was overpaid to the Contractor. Where payment for equipment, materials, labor or other incidentals thereto is based on the cost to parties other than the Contractor, the Contractor expressly guarantees that the records of such other parties shall be open to inspection and audit by representatives of the Port on the same terms and conditions as the records of the Contractor. If an audit is to be commenced more than sixty (60) days after Final Completion of the Contract, the Contractor will be given a reasonable notice of the time when such audit is to begin. The Contractor agrees that no claim shall be made against the Port for the Work described herein unless the Contractor makes available to the Port all records to be maintained in accordance with this subparagraph.

**G-08.13 Payments Do Not Relieve Contractor From Responsibility For Work**

Payment to the Contractor of progress payments or the Final Payment does not in any way relieve the Contractor from its responsibility for the Work or its responsibility to repair, replace, or otherwise make good defective Work, materials or equipment. Likewise, the making of such payment does not constitute a waiver of the Port's right to reject defective or non-conforming Work, materials, or equipment (even though the same is covered by the payment), nor is it a waiver of any other rights of the Port.

**ARTICLE G-09**

**CHANGES IN THE WORK**

**G-09.01 The Port May Make Changes**

Without invalidating the Contract and without notice to the Contractor's surety, and at any time during the progress of the Work, the Port may make changes in the Work, which changes include but are not limited to the following:

- A. increases or decreases in quantities of Work;
- B. deletion or alteration of any portion of the Work;
- C. changes in design or Specifications; and
- D. addition of new Work.

All such changes in the Work shall be authorized by Change Order, which order shall provide for any increase or decrease in the Contract Time or Contract Sum caused by such change. The Contract Sum and Contract Time may be changed only by Change Order. Contractor shall be deemed to have waived any claim for a change in Contract Time or Contract Term if Contractor fails to strictly comply with the provisions of paragraph 04.30.

**G-09.02 Request for Proposal**

In connection with a possible or proposed change, the Port may request that the Contractor submit a proposal or provide other information to the Port. The Contractor will submit such proposal or other information in a form and within the time period requested by the Port. The Contractor's proposal shall include detailed price calculations for the proposed change, which shall specify the cost of all labor, material,

equipment, and Subcontractor quotations. The Contractor's proposal shall also show as a separate item the proposed amount for markup, contingency, overhead, and fee, the total of which shall not exceed the applicable percentage as would be allowed for Work performed on a force account basis pursuant to paragraph G-08.06. A request by the Port to the Contractor for a proposal shall not constitute authorization for the Contractor to proceed with any such proposed change in the Work, nor shall such request justify any delay in the performance of existing Work.

**G-09.03 Compensation for Changes**

- A. General. Change Order Work under this Contract may be measured for payment at the Port's sole discretion, as unit price work or as a lump sum item or as Force Account Work. "Unit price work", includes Work for which a unit price is established in the Contract's Schedule of Prices or by Change Order, but excludes items of Work listed either in such schedule or a Change Order as "lump sum" items. "Bid Quantity", means the total quantity of an item of unit price work which is listed in the Schedule of Prices.
- B. Changes in the quantity of unit price Work. Where the nature of the changed Work does not differ materially from Work which is unit price Work, the change shall be measured and paid for (or credited) at the established unit prices, subject to the following exceptions:
  - 1. Where quantity is less than 80%. If the quantity of an item or unit price Work actually performed or to be performed is less than 80 percent of the bid quantity for that item, the Contractor or the Port may request a Change Order revising the unit price for the item. Such request shall be accompanied by evidence to support the requested revision. The proposed revision will be evaluated by the Port considering such factors as the changes, if any, to the Contractor of the item, and the share, if any, of fixed expenses properly chargeable to the change in quantity of that item. If the Port and the Contractor agree on the change, a Change Order will be executed. If the parties cannot agree, the Port may nevertheless issue the Change Order pursuant to paragraph G-09.04, and the Contractor will have the rights provided in paragraph G-09.05.
  - 2. Where quantity is more than 120%. If the quantity of an item of unit price Work actually performed or to be performed is more than 120 percent of the bid quantity for that item, the Contractor or the Port may request a change order revising the unit price for that portion of the Work which exceeds 120 percent of the bid quantity. Such request shall be accompanied by evidence to support the requested revision. The proposed revision will be evaluated considering such factors as the change in actual cost, if any, to the Contractor of that portion of the Work exceeding 120 percent of the bid quantity, and the share, if any, of fixed expenses properly chargeable to that portion of change in quantity which exceeds 120 percent of the bid quantity. If the Port and Contractor agree on the change, a change order shall be executed. If the parties cannot agree, the Port may nevertheless issue a change order pursuant to paragraph G-09.04 and the Contractor will have the rights provided in paragraph G-09.05.
- C. Changes to Work Other than Unit Price Work
  - 1. Additional Work. If no unit price has been established for Work added to the Contract by the Port, the Port and the Contractor will attempt to reach agreement as to the increase or decrease, if any, in the Contract Sum and the Contract Time caused by such change. The Engineer may require, prior to approval of such change order, that the Contractor submit a proposal detailing the information identified in paragraph G-09.02. If the Port and Contractor agree, on the change, a Change Order will be executed. If the parties cannot so agree, the Port may nevertheless issue a Change Order pursuant to paragraph G-09.04 and the Contractor will have the rights provided in paragraph G-09.05.
  - 2. Deleted Work. If the Port elects to delete all or a portion of the Work, the Engineer shall so advise the Contractor in writing, and the Contract Sum shall be decreased in an amount determined as follows:
    - a. By an amount agreed upon by the Port and the Contractor. This amount may either be submitted by the Contractor or determined by itemizing the elements of Work deleted (labor, material, and equipment) and the amount of markup, contingency, overhead, and fee used by the Contractor in preparation of the original bid, less any costs properly expended to date in connection with the performance of the deleted Work. If the Contractor cannot document the above amount to the satisfaction of the Engineer, the amount allowed for markup, contingency, overhead, and fee shall be determined in the same manner as if the deleted Work was to be performed on a Force Account basis pursuant to paragraph G-08.06.
    - b. Acceptable materials ordered by the Contractor or delivered prior to the date the Contractor was notified to delete the Work may, at the Port's option, be

purchased from the Contractor at the Contractor's actual cost and thereupon become the property of the Port, or the Port will reimburse the Contractor for its actual costs connected with returning such materials to the suppliers.

- c. No amount will be paid to the Contractor for any anticipated or estimated fee, which the Contractor could or would have earned if the deleted Work had been performed.

**G-09.04 Issuance of Change Order**

- A. If the Port and the Contractor are unable to reach agreement concerning the adjustment, if any, in the Contract Sum or Contract Time caused by a change, the Port may nevertheless issue a Change Order implementing the change in the Work and directing the Contractor to perform the Work as changed. The Change Order may embody such terms as the Port deems appropriate, and the Contractor shall diligently prosecute the Work in the most efficient, economical, and workmanlike manner, consistent with the best interests of the Port. Unless otherwise stated in the Change Order the Contractor shall perform the changed Work on a Force Account basis pursuant to paragraph G-08.06. The Contractor shall be entitled to a change in the Contract Sum, or Contract Time to the extent directly caused by the change in Work.

**G-09.05 Procedure for Protest by the Contractor**

- A. If the Contractor accepts the terms of a change order by the Contractor's endorsement thereon, or by failure to protest as provided in this paragraph, payment by the Port in accordance with the terms of the Change Order shall constitute full compensation, including but not limited to that for labor, material, equipment, overhead, fee (including profit), and damages (direct or indirect) or any other claim for damages of any kind or nature, if any, and for all changes to the Work and to the Contract Time.
- B. If the Contractor disagrees with any of the terms of a Change Order issued by the Port, the Contractor shall give immediate oral notice of protest to the Engineer prior to performing the Work and shall submit a written protest to the Engineer within ten (10) calendar days of the Contractor's receipt of the Change Order. The protest shall identify the point of disagreement, those portions of the Contract Documents believed to be applicable, and an estimate of quantities and costs involved in the change. When protest of a Change Order relates to compensation, the Contractor shall keep full and complete records of the cost of such changed Work and shall permit the Port to have access to those records as requested by the Port to enable the Port to evaluate the merits of the protest.
- C. A protest shall not relieve the Contractor of its obligation to proceed without delay with the Work as directed in the Change Order. No adjustment to the Contract Sum or Contract Time will be made on account of Work performed preceding the Contractor giving oral notice of protest to the Engineer (to be followed by written protest as required in subparagraph B of this paragraph).
- D. Within thirty (30) calendar days of the Port's receipt of written notice above, the Contractor shall provide the Port with the following details:
  - 1. A detailed factual statement of the claim for a change in Contract Sum and Contract Time, if any, providing all necessary dates, locations and items of Work affected by the claim;
  - 2. The date on which facts arose which gave rise to the claim;
  - 3. The name of each employee or agent or consultant of Port, knowledgeable about the claim;
  - 4. The specific provisions of the Contract Documents which support the claim,
  - 5. The identification of any documents and the substance of any oral communications that support the claim;
  - 6. Copies of any identified documents, other than the Contract Documents, that support the claim;
  - 7. If an adjustment in the Contract Time is sought, the specific days and dates for which it is sought; the specific reasons Contractor believes an extension in the Contract Time should be granted; and Contractor's analysis of its progress schedule to demonstrate the reason for the extension in Contract Time (time impact analysis);
  - 8. If an adjustment in the Contract Sum is sought, the exact amount sought and a breakdown of that amount into the categories set forth in article, G-09.02;
  - 9. A statement certifying, under penalty of perjury, that the claim is made in good faith, that the supporting cost and pricing data are true and accurate to the best of Contractor's knowledge and belief, that the claim is fully supported by the accompanying data, and that the amount requested accurately reflects the adjustment in the Contract Sum or Contract

- Time for which Contractor believes the Port is liable. The individual signing such certification shall be a duly authorized representative of the Contractor who has the necessary and appropriate authority and responsibility to commit the Contractor to the truthfulness of the certification; and
10. A statement that the claim covers all changes in cost and in time (direct, indirect, impact, consequential, and otherwise) to which the Contractor (and Subcontractors and Suppliers of any tier) is entitled..
- E. The Port shall be entitled to recover its costs incurred for analysis/administration of processing and evaluating a claim to the extent a portion of the claim that is determined to be not recoverable from the Port. The cost of reimbursement will be the percentage of the original claim that is determined to be not recoverable times the cost of analysis/administration.
- F. Dispute Resolution Process
1. Level I. Within seven (7) days of receipt of the Contractor's documentation, the senior site representative of the Contractor and the Project Manager shall meet, confer, and set a schedule for resolving the claim.
  2. Level II. Within seven (7) days of the close of the Level I meetings, the general manager (or equivalent) of the Contractor and the Engineer for the Port, (none of whom attended the Level I meeting) shall be jointly briefed by both the Port and Contractor Level I representatives on the results of the Level I meetings, their respective positions, and remaining areas of disagreement. The Port and Contractor Level II representatives shall then establish a schedule for resolving the claim. The Port shall have the right to request additional information from the Contractor and its Subcontractors, Suppliers, etc. at any time prior to or during the Level II meeting. If an adjustment to the Level II meeting schedule is necessary to accommodate such requests for additional information, such adjustment shall be as mutually agreed by the representatives. If agreement on the schedule cannot be reached, the Level II meetings shall be terminated and the matter referred to the following Level III.
  3. Level III: Within seven (7) days of the close of the Level II meeting, the owner or corporate officer of the Contractor (who did not attend the Level I or II meetings) and the Port's Executive Director (who did not attend the Level I or II meetings) shall be jointly briefed by both the Port and Contractor Level II representatives on the results of the Level II meetings, their respective positions, and remaining areas of disagreement. The Port and Contractor Level III representatives shall then establish a schedule for resolving the claim. The Port shall have the right to request additional information from the Contractor and its Subcontractors, Suppliers, etc. at any time prior to or during the Level III meeting. If an adjustment to the Level III meeting schedule is necessary to accommodate such requests for additional information, such adjustment shall be as mutually agreed by the representatives. If agreement on the schedule cannot be reached, the Level III meetings shall be terminated and the matter referred to the next level in this Dispute Resolution Process.
  4. The terms of the resolution of all claims concluded in Level I, II or III meetings shall be documented in writing and signed by each party.
  5. Dispute Review Board. When a Dispute Review Board is required by Supplemental Conditions, and the claim is not resolved within seven (7) days of completion of the Level III meeting, the claim shall be submitted to the Dispute Review Board as provided for in the Supplementary Conditions.
  6. Mediation. If the claim is not resolved in the Level III meeting and no Dispute Review Board is required, the Contractor may bring no claim against the Port in litigation unless the claim is first subject to non-binding mediation or non-binding arbitration as mutually agreed by the Port and Contractor. If no agreement is reached, then Port has the sole right to determine which method is utilized. Mediation shall be conducted before a single mediator under the Voluntary Construction Mediation Rules of the American Arbitration Association. The parties shall schedule mediation sessions at the earliest possible date(s), subject to the schedule of the selected (or appointed) mediator. The parties shall cooperate with the mediator and assure timely and full access to such personnel and documents as the mediator may request. The costs of mediation and/or arbitration shall be equally divided between the parties. Payment to the mediator shall be by the Port who, after payment, shall deduct 50% of the cost (less 50% of any costs that may have been paid directly by the Contractor) from monies due the Contractor.
- G. Litigation. The Contractor may bring no litigation on claims unless such claims have been properly raised and considered in the procedures above. All unresolved claims of the Contractor shall be waived and released unless the Contractor has strictly complied with the time limits of the Contract

Documents, and a lawsuit is served and filed within the limits stated in Paragraph G-04.31. This requirement cannot be waived except by an explicit written waiver signed by the Port.

- H. Claims Audits. All claims filed against Port shall be subject to audit at any time following the filing of the claim. Failure of Contractor, or Subcontractors of any tier, to maintain and retain sufficient records to allow the Port to verify all or a portion of the claim or to permit the Port access to the books and records of the Contractor, or Subcontractors of any tier, shall constitute a waiver of the claim and shall bar any recovery. The audit may be performed by employees of Port or a representative of the Port. The Contractor, and its Subcontractors, shall provide adequate facilities acceptable to the Port for the audit during normal business hours. The Contractor, and all Subcontractors, shall make a good-faith effort to cooperate with the Port's auditors.
- I. Joinder. At Port's sole discretion, Port may require all claims or controversies arising out of this Contract may be consolidated in mediation between Port and Contractor and its Subcontractors or Sub-subcontractors.

#### G-09.06 Changed Conditions

- A. In the event Contractor encounters: (a) subsurface or latent physical conditions at the site differing materially from those indicated in the Contract Documents, (b) unknown physical conditions of an unusual nature at the site differing materially from those ordinarily encountered and generally recognized as inherent in the Work of the character provided for in the Contract Documents, and such conditions cause an increase in Contractor's cost or time of performance, Contractor may be entitled to an equitable adjustment in Contract Time. The Contractor shall notify the Engineer promptly orally and in writing in accordance with G04.30 of such changed conditions or other conditions for which an equitable adjustment in Contract Sum or Contract Time is desired. If such notice is not given prior to the condition being disturbed (or other action being taken by the Contractor which may result in a claim for an increase in the Contract Time or the Contract Sum), or such condition is disturbed before the Port directs the Contractor to proceed with the Work despite the condition, the Contractor will be deemed to have waived any claim for extra compensation or extension of the Contract Time on account of any additional or different work (including labor, material and equipment) required because of such condition. Oral notice alone by the Contractor to the Port regarding such condition shall not be adequate to avoid such waiver.
- B. If the Engineer determines that conditions exist which entitle the Contractor to equitable adjustment in the Contract Sum to account for the performance of the work involved, and the additional Contract Time, if any, required to perform such work, Engineer will determine such adjustment. If the Port and the Contractor agree on such adjustment, the same shall be set forth in a Change Order to be executed by the parties. If the parties are unable to so agree, the Port may nevertheless issue a Change Order directing the Contractor to perform the changed Work pursuant to paragraphs G-09.03, and G-09.04.
- C. If the Engineer determines that the Contractor's request does not warrant an equitable adjustment in the Contract Sum and/or Contract Time, the Contractor shall diligently pursue the Work in accordance with the Engineer's direction while retaining the right to protest the Engineer's decision in accordance with paragraph G-09.05.

### ARTICLE G-10

#### PORT OF PORT ANGELES'S RIGHTS AND REMEDIES, AND TERMINATION OF CONTRACT

##### G-10.01 General

- A. The rights and remedies of the Port set forth in the Contract Documents are cumulative and in addition to and not in limitation of any rights and remedies otherwise available to the Port under law. The pursuit of any remedy by the Port shall not be construed to bar the Port from the pursuit of any other remedy in the event of similar, different, or subsequent breaches of this Contract.
- B. The rights reserved or possessed by the Port to take any action with respect to the Project shall not give rise to any duty on the part of the Port to exercise any such right for the benefit of the Contractor, Subcontractor, Sub-subcontractor, Supplier, or any other person.

##### G-10.02 No Waiver of Port's Rights

- A. No action, delay in acting, or failure to act by the Port shall constitute a waiver of any right or remedy of the Port or be held to reduce any amount owed to the Port by the Contractor. Nor shall such action, delay, or failure to act constitute an approval or acquiescence in any breach or defect in Work, materials, or equipment. Likewise, delay or failure of the Port to act upon or enforce any provision of this Contract shall not constitute a waiver of such provision or otherwise prejudice the right of the Port to enforce such provision at any subsequent time. No provision of this Contract shall be held to be waived, modified, or deleted except as expressly stated in a Change Order.



- B. The Port shall not be precluded or estopped by any measurement, estimate, or certificate made either before or after the Substantial Completion or Final Completion of the Work and payment therefore from showing the true amount and character of the Work performed and materials furnished by the Contractor, or from showing that any such measurement, estimate or certificate is untrue or was incorrectly made, or that the Work or materials do not conform in fact to the requirements of the Contract Documents. Notwithstanding any such measurement, estimate, certificate, or payment in accordance therewith, the Port shall not be precluded or estopped from recovering from the Contractor and its sureties such damages as the Port may sustain by reason of the Contractor's failure to perform the Work in accordance with the Contract Documents or to otherwise comply with the requirements of the Contract Documents.
- C. Neither the final inspection, Final Completion, Acceptance, nor any payment for the whole any part of the Work, nor any extension of time, nor any possession or use of the Work taken or made by the Port, shall operate as a waiver by the Port of any provision of the Contract Documents or of any rights, remedies, or damages herein provided for, or bar recovery of any money wrongfully or erroneously paid to the Contractor.

**G-10.03 Port's Right to Suspend Work for Unsuitable Weather and Other Conditions**

- A. The Engineer may direct that all or any part of the Work be suspended for such time period as the Engineer deems proper because of unsuitable weather or other conditions beyond the control of the Port and the Contractor, which prevents satisfactory performance of the Work. The Contractor shall immediately comply with the directive to suspend Work. The Contractor shall resume the suspended Work when so directed by the Engineer.
- B. Such suspension of Work by the Engineer shall not be grounds for a claim by the Contractor for an increase in the Contract Sum, however, Contract Time may be adjusted in accordance with paragraph G-07.03 unless the Engineer concludes that the Contractor could have performed the suspended Work if the Contractor had diligently prosecuted the Work prior to such suspension.

**G-10.04 Port's Right to Stop the Work**

- A. If the Contractor fails to perform the Work in accordance with the Contract Documents, fails to correct defective work as required by paragraph G-04.22, or fails to comply with any other directive issued by the Port, the Port may order, in writing, that the Contractor stop all or any portion of the Work until the cause for such order is eliminated.
- B. In the event of an order to stop Work, the Contractor shall not be entitled to any increase in the Contract Time or Contract Sum, nor to any damages or relief from liability, on account of such order to stop Work.
- C. Upon ten days' written notice to the Contractor, the Port may suspend the Work for its convenience and without cause. In the event such suspension causes a change in Contractor's cost or time of performance of the Work, Contractor shall be entitled to make a claim for a change in Contract Time and Contract Price as set forth in Article G-09.

**G-10.05 Port's Right to Withhold Payment**

The Port has the right to withhold making all or part of any payment otherwise due the Contractor if and so long as the Contractor is in breach of any of its obligations under this Contract.

**G-10.06 Termination of Contract for Cause**

- A. The Port may terminate the Contract as to all or any portion of the Work remaining to be performed upon seven (7) days written notice to the Contractor and Contractor's surety, and to complete the Work by whatever method the Port may deem expedient, and recover the costs thereof from the Contractor in the event the Contractor:
  - 1. Refuses or fails to supply sufficient, properly skilled workers or materials of the proper quality or quantity;
  - 2. Refuses or fails to make prompt payment to Subcontractors, or for labor or materials;
  - 3. Fails to prosecute the Work continuously to completion with promptness and diligence;
  - 4. Fails to perform any of its obligations under the Contract; or
  - 5. Becomes insolvent or is declared bankrupt or commits any acts of bankruptcy or insolvency or makes an assignment for the benefit of Contractor's creditors.
- B. Upon termination of the Contract under this paragraph, the Port may exclude the Contractor from the Project site(s), take possession of the Work and all materials and equipment stored on or off site for which payment has been made pursuant to paragraph G-08.05, and complete the Work if and as it sees fit.

- C. If the Port elects not to complete the Work, the Contractor shall not thereby be released from any liability it may have to the Port for damages on account of the breach of its obligations under this Contract.
- D. If the Port elects to complete all or a portion of the Work, it may do so as it sees fit. The Port shall not be obligated to the Contractor to accept the lowest bid for completion of the Work. The Port may choose to complete all or a portion of the Work using its own work force. The cost of such Work shall be deducted from the amount due the Contractor or claimed against the retained percentage. In any event, if the costs to the Port (including all administrative costs) exceed the unpaid portion of the Contract Sum applicable thereto, the Contractor is liable for and shall pay the difference to the Port.
- E. The rights provided by this paragraph shall survive the termination of this Contract, as shall all other rights to damages or other remedies against the Contractor.

**G-10.07 Termination for Convenience**

Upon ten days' written notice to the Contractor, the Port may terminate the Contract at its convenience and without cause. In such case, the Contractor shall be paid for all Work performed and reasonable expenses properly incurred in connection with the termination. No amount will be paid to the Contractor for any anticipated or estimated fee or profit for Work not performed which the Contractor could or would or may have earned if the Contract had not been terminated. Title to all Work performed at the time of termination shall be transferred to the Port upon payment therefore.

**G-10.08 Damages for Unexcused Delays by the Contractor**

- A. The Contractor recognizes that any unexcused delay by the Contractor in the prosecution and completion of the Work will cause inconvenience and expense to the Port, its lessees, and other users of Port facilities. It is further acknowledged by the Contractor that unexcused delays in the prosecution and completion of the Work may obstruct water, or other traffic, interfere with and delay business and commerce, or expose the Port to possible claims of direct and consequential damages from third parties. Additionally, such delays may cause the Port to incur substantially increased costs of administration, engineering, supervision, and inspection in connection with the completion of the Work.
- B. In certain circumstances, it is recognized that it will be impracticable and extremely difficult to ascertain and determine the actual damages, as generally described above, which will be suffered by the Port as a result of an unexcused delay by the Contractor. In such circumstances, where specifically provided for in the Supplementary Conditions, the Contractor shall be liable to the Port for liquidated damages in the amount set forth in the Supplementary Conditions, for each calendar day following the Substantial Completion date that Contractor achieves Substantial Completion and for each day following the Final Completion date that Contractor achieves Final Completion. Neither this subsection nor any amounts specified in the Supplementary Conditions as liquidated damages shall be considered to be a penalty, it being the express agreement of the Contractor and the Port that the liquidated damages provided shall be a reasonable approximation of actual damages to be suffered by the Port for late performance.
- C. Any deduction or payment of liquidated damages shall not in any way release the Contractor from any further or other obligation and liability with respect to Contractor's obligation to achieve Final Completion.
- D. If the Supplementary Conditions do not provide for liquidated damages as provided in subparagraph B of this paragraph, the Contractor shall be subject to liability for the actual damages (including but not limited to the items set forth in subparagraph A of this paragraph) suffered by the Port as a result of delay in completing the Work.

**G-10.09 Port's Right to Use the Premises**

- A. The Port reserves the right to use any part of the Work before completion of the entire Work without relieving the Contractor of any of its obligations under the Contract. Such use shall not constitute acceptance by the Port of any of the Work.
- B. No additional compensation will be paid to the Contractor for costs incurred by it as a result of the Port's use or occupancy of the Work or a designated portion thereof following its Substantial Completion, or for additional safety measures including warning device costs, made necessary to protect the Contractor's operations, the public, or Port employees.

**G-10.10 Prevailing Party to be Awarded Litigation Expenses**

In any action between the Port and the Contractor concerning the rights and obligations imposed on them by this Contract, the prevailing party in such action, upon a finding by a court having jurisdiction, shall be entitled to recover from the other party its expenses of litigation (including reasonable attorneys' fees, expert

consultants' fees, and other expenses related to the action). The cost of publicly employed counsel of the Port shall be recoverable by the Port under this paragraph, and the fees of such counsel shall be established based on the prevailing rate for attorneys in private practice of comparable qualifications and experience.

## SECTION G-11

### BONDS AND INSURANCE

#### G-11.01 Performance Bond

- A. The Contractor shall furnish a duly executed performance bond upon a form acceptable to the Port, within ten calendar days following receipt of the notice of award. The bond shall be executed by a licensed surety (or sureties) which is registered with the Washington State Insurance Commissioner and the surety's name shall appear in the current Authorized Insurance Company List for the state of Washington published by the Office of the Insurance Commissioner, and must be approved by the U. S. Department of Treasury as evidenced by a listing in the Federal Register. In addition, the surety or sureties must be rated "A-, FSC (6)", or higher by A.M. Best Rating Guide. The penal amount of the bond shall be in an amount equal to the Contract Sum plus Washington State Sales Tax, if applicable, and conditioned upon the faithful performance of the Contract by the Contractor within the Contract Time.
- B. If the Contract Sum does not exceed \$25,000 the Contractor may, in lieu of providing a bond, request the Port to retain 50% of the Contract amount earned for a period of 45 days following Final Completion of the Work or until receipt of all necessary releases and settlement of any liens filed under Chapter 60.28 R.C.W., whichever is later, at which time the Port will make Final Payment.

#### G-11.02 Payment Bond

- A. The Contractor shall also furnish a duly executed payment bond upon a form acceptable to the Port, within ten calendar days following receipt of the notice of award. The bond shall be executed by a licensed surety (or sureties) which is registered with the Washington State Insurance Commissioner and the Surety's name shall appear in the current Authorized Insurance Company List in the state of Washington published by the Office of the Insurance Commissioner, and must be approved by the U. S. Department of Treasury as evidenced by a listing in the Federal Register. In addition, the surety or sureties must be rated "A-, FSC (6)", or higher by A.M. Best Rating Guide. The penal amount of the bond shall be in an amount equal to the Contract Sum plus Washington State Sales Tax, if applicable, and conditioned upon the payment by the Contractor to all laborers, mechanics, Subcontractors, and Suppliers, and all persons who shall supply the Contractor, subcontractors or sub-subcontractors with provisions, equipment, or supplies for the performance of the Work covered by this Contract.
- B. If the Contract Sum does not exceed \$25,000 the Contractor may, in lieu of providing a bond, request the Port to retain 50% of the Contract amount earned for a period of 45 days following Final Completion of the Work or until receipt of all necessary releases and settlement of any liens filed under Chapter 60.20 R.C.W., whichever is later, at which time the Port will make Final Payment.

#### G-11.03 Failure to Provide Bonds

- A. Failure to timely provide performance and payment bonds will result in cancellation of the Contract award and forfeiture of the bid guaranty to the Port.
- B. The Port may, from time to time, require the Contractor's surety or sureties to appear and qualify themselves upon the bonds. If such surety or sureties shall refuse or fail to so appear and qualify, or if the Port determines that such surety or sureties are insufficient to fulfill the terms and conditions of the bonds, then the Port shall require the Contractor to furnish additional surety or sureties as may be necessary to fulfill the terms and conditions of the bonds. Payments may be withheld on the Contract until sufficient surety, as required, is furnished.
- C. If the Contract Sum is increased by Change Order, the Contractor agrees to provide the Port with such additional performance and payment bonds as required to assure performance of any additional Work and payment for the labor and materials incidental to such Work. Change Orders may be issued without notice to sureties. Compensation for additional bonding, where required by a Change Order, shall be included in the 15% markup allowed the Contractor for all Change Orders.

#### G-11.04 Insurance

The Contractor shall procure and maintain for the duration of the Agreement, insurance against claims for injuries to persons or damage to property which may arise from or in connection with the performance of the work hereunder by the Contractor, their agents, representatives, employees or subcontractors.

No Limitation. Contractor's maintenance of insurance as required by the agreement shall not be construed to limit the liability of the Contractor to the coverage provided by such insurance, or otherwise limit the Port's recourse to any remedy available at law or in equity.

A. Minimum Scope of Insurance

Contractor shall obtain insurance of the types described below:

1. Automobile Liability insurance covering all owned, non-owned, hired and leased vehicles. Coverage shall be written on Insurance Services Office (ISO) form CA 00 01 or a substitute form, providing equivalent liability coverage. If necessary, the policy shall be endorsed to provide contractual liability coverage.
2. Commercial General Liability insurance shall be written on ISO occurrence form CG 00 01 or the equivalent and shall cover liability arising from premises, operations, independent contractors, products-completed operations, stop gap liability, personal injury and advertising injury, and liability assumed under an insured contract. The Port shall be named as an insured under the Contractor's Commercial General Liability insurance policy with respect to the work performed for the Port.
3. Workers' Compensation coverage as required by the Industrial Insurance laws of the state of Washington.

B. Minimum Amounts of Insurance

Contractor shall maintain the following insurance limits:

1. Automobile Liability insurance with a minimum combined single limit for bodily injury and property damage of \$1,000,000 per accident.
2. Commercial General Liability insurance shall be written with limits no less than \$1,000,000 each occurrence, \$2,000,000 general aggregate and a \$2,000,000 products-completed operations aggregate limit.

C. Other Insurance Provisions

The insurance policies are to contain, or be endorsed to contain, the following provisions for Automobile Liability and Commercial General Liability insurance:

1. The Port requires a specific additional insured endorsement naming the Port as the additional insured. We do not accept blanket additional insured endorsements. The Port will consider CG 20 10 and CG 20 37 Additional Insured Endorsements naming the Port of Port Angeles as the additional insured.
2. The Contractor's insurance coverage shall be primary insurance as respects the Port. Any Insurance, self-insurance, or insurance pool coverage maintained by the Port shall be excess of the Contractor's insurance and shall not contribute with it.
3. The Contractor's insurance shall be endorsed to state that coverage shall not be cancelled by either party, except after thirty (30) days prior written notice by certified mail, return receipt requested, has been given to the Port.
4. The Contractor shall procure and maintain any other insurance applicable to this contract as may be required by local, state, or federal law.
5. Contractor's Insurance For Other Losses

The Contractor shall assume full responsibility for all loss or damage from any cause whatsoever to any tools, Contractor's employee owned tools, machinery, equipment, or equipment/boom borrowed from the Port, or motor vehicles owned or rented by the Contractor, or the Contractor's agents, suppliers or Contractors as well as to any temporary structures, scaffolding and protective fences.

D. Acceptability of Insurers

Insurance is to be placed with insurers with a current A.M. Best rating of not less than A:VII.

E. Verification of Coverage

Contractor shall furnish the Port with original certificates and a copy of the amendatory endorsements, including but not necessarily limited to the additional insured endorsement, evidencing the insurance requirements of the Contractor before commencement of the work.

F. Subcontractors

Contractor shall ensure that each subcontractor of every tier obtain at a minimum the same insurance coverage and limits as stated herein for the Contractor. Upon request from the Port, the Contractor shall provide evidence of such insurance.

ARTICLE G-12

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#### CONTRACTOR'S CHECKLIST

1. Submit Project Superintendent's name and phone number within 10 days of award.
2. File "Statement of Intent to Pay Prevailing Wages" for prime and all subcontractors.
3. Furnish progress schedule within 10 days of award.
4. Submit Prime Contractor's manning table and use of subcontractor's plan.
5. Provide Payment and Performance Bonds within 10 days after award.
6. Provide Certificate of Insurance within 10 days after award.

**END OF SECTION**

## **DIVISION 0 - BIDDING AND CONTRACT DOCUMENTS**

### **Section 00 73 00 - Supplementary Conditions**

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The following supplements shall modify, delete, and/or add to the General Conditions or Instructions to Bidders. Where any article, paragraph, or subparagraph in the General Conditions is supplemented by one of the following paragraphs, the provisions of such article, paragraph, or subparagraph shall remain in effect and the supplemental provisions shall be considered as added thereto. Where any article, paragraph, or subparagraph in the General Conditions is amended, voided, or superseded by any of the following paragraphs, the provisions of such article, paragraph, or subparagraph not so amended, voided, or superseded shall remain in effect.

The supplements referenced within this section are identified with the same number and title used for that topic in the General Conditions.

#### **SC-3.06 SUPPLEMENTAL BIDDER RESPONSIBILITY CRITERIA**

Supplement Specification Section 00 21 13, Paragraph 3.06 with the following:

- H. Bidder must also meet the following relevant supplemental bidder responsibility criteria applicable to the project:
  - 1. The Contractor shall have 5 years commercial building / facility contracting experience.
  - 2. Documentation required to demonstrate compliance with above:
    - a. Resume showing previous similar experience.
    - b. References with contact information for the Owners and Architect/Engineer project managers.

#### **SC-02.02 CORRELATION OF THE CONTRACT DOCUMENTS**

Supplement Article G-02.02 with the following:

Contract Drawings: The following drawings are a part of the Contract Documents:

1	A-0.0	Cover Sheet
2	C-1.0	Existing Civil Plan Utilities
3	A-1.0	Site Plan
4	A-2.0	Overall Floor Plan
5	A-2.1	Demolition Floor Plan
6	A-2.2	Proposed Floor Plan
7	A-2.3	Schedules
8	A-4.0	Building Sections
9	A-5.0	Wall Sections
10	A-6.0	Details
11	M-1.0	Mechanical Cover Sheet

## DIVISION 0 - BIDDING AND CONTRACT DOCUMENTS

### Section 00 73 00 - Supplementary Conditions

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12	M-1.1	Schedules
13	M-1.2	Energy Code / Heating & Cooling Load Calcs
14	M-2.0	First Floor Plan Plumbing
15	M-3.0	First Floor Plan HVAC
16	M-4.0	Details
17	E-1.0	Notes, Cable Codes & Index
18	E-1.1	Electrical Overall Floor Plan
19	E-2.0	Electrical Demolition Plan
20	E-2.1	Electrical Power Plan North
21	E-3.1	Electrical Lighting Plan North
22	E-4.1	Electrical Ancillaries Plan North
23	E-6.1	Power System Riser Diagram
24	E-6.2	Panel Schedules

#### SC-04.01 EXAMINATION OF THE SITE OF WORK AND CONTRACT DOCUMENTS

Supplement Article G-04.11 with the following:

- A. A pre-bid examination of the site has been scheduled for **August 28, 2017 at 10:00am**. The site visit will convene at the project site located at 2007 S 'O' Street, Port Angeles, WA 98363.
- B. Prospective bidders and primary subcontractors are strongly encouraged to attend a pre-bid conference and site visit as stipulated in the advertisement for bid. Attendees should review the information and safety precautions set forth in the Contract Documents to determine for themselves appropriate protective clothing or equipment.
- C. Attendees further agree to indemnify and hold the Port harmless from any and all claims of personal injury arising from their participation in the site visit.

#### SC-04.05 PREVAILING WAGE RATES TO BE PAID

Supplement Article G-04.05 with the following:

- E. Based on the bid submittal deadline for this contract, the applicable effective date for Clallam County prevailing wage rates is **September 6, 2017**.

## **DIVISION 0 - BIDDING AND CONTRACT DOCUMENTS**

### **Section 00 73 00 - Supplementary Conditions**

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#### SC-04.11 PERMITS, LICENSES, FEES AND NOTICES

Supplement Article G-04.11 with the following:

- E. The following permits for this Project are available at the City of Port Angeles permit counter. The Contractor shall obtain the permits listed from the City. The Contractor will assume responsibility for payment of the permits listed.
  - 1. Mechanical
  - 2. Electrical
- F. The Contractor shall be responsible for complying with the requirements of all permits obtained by the Port of Port Angeles as well as those obtained by the Contractor. Any additional permits, certificates or agency approvals required for completion of this work are the responsibility of the Contractor per G-4.11.

#### SC-04.16 PROGRESS SCHEDULE

Supplement Article G-4.16 with the following:

- H. The Progress Schedule shall represent a practical plan to complete the work within the contract time(s) of completion indicated, and shall convey the contractor's intent in the manner of prosecution and progress of the work.
- I. The scheduling and execution of construction in accordance with the contract documents are the responsibility of the contractor. The Contractor shall involve and coordinate all Subcontractors and material suppliers in the development and updating of Progress Schedules.
- J. The submittal of Progress Schedules shall be understood to be the contractors representation that the Progress Schedule meets the requirements of the contract documents and that the work will be executed in the sequence and duration indicated in the Progress Schedule.
- K. The Progress Schedule shall be produced in the Critical Path Method (CPM) format and shall be submitted on CD. The schedule shall be computer produced utilizing scheduling software that is fully compatible Microsoft Project.
- L. The Progress Schedule shall illustrate a time scale, network and logic diagram, start and completion dates of each phase of the project and shall define each activity in sufficient detail to identify the work that is to be accomplished.

## DIVISION 0 - BIDDING AND CONTRACT DOCUMENTS

### Section 00 73 00 - Supplementary Conditions

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- M. The Progress Schedule shall be used as the base document for preparation of the three-week look-ahead schedule presented at each weekly construction meeting.
- N. The base-line Progress Schedule shall be submitted at the pre-construction meeting.

#### SC-04.17 ON-SITE DOCUMENTS

Supplement Article G-04.17 with the following:

- A. The Contractor must maintain a document control system to monitor the generation, status and filing of documents. Documents such as Contracts, Requests For Information (RFI's), Requests For Proposal (RFP's), Change Order Requests (COR's), Transmittals, Meeting Minutes, Punch Lists and Correspondence with the Port must be controlled using the system. The Port will provide necessary forms and templates that the Contractor will be required to use.

#### SC-07.01 CONTRACT TIME

- B. The award of the base bid portion of the contract, if it is awarded, will be made within sixty (60) calendar days after the date of opening of the bids.

#### SC-8.08 SUBSTANTIAL COMPLETION

Supplement Article G-08.08 with the following:

- E. The Contract, in its entirety, shall be Substantially Complete by **November 20, 2017** and shall be Finally Complete within thirty (30) calendar days of Substantial Completion.

#### SC-10.08 DAMAGES FOR UNEXCUSED DELAYS BY THE CONTRACTOR

Supplement Article G-10.08B with the following:

Pursuant to the requirements of the General Conditions, the Liquidated Damages for failure to achieve completion for the phases of construction shall be **One Thousand Dollars (\$1,000.00) per day**. Failure to achieve Final Completion within an additional thirty days after Substantial Completion shall be 10% of the Liquidated Damages daily rate for failure to achieve Substantial Completion.

The damages stipulated above are to be deducted as Liquidated Damages from any monies due or to become due.

**DIVISION 0 - BIDDING AND CONTRACT DOCUMENTS**  
**Section 00 73 00 - Supplementary Conditions**

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SC-11.04 INSURANCE

Supplement Article G-11.04C

5. The Port does not accept blanket additionally insured forms. The Port must be specifically names.

END OF SECTION

**DIVISION 0 – BIDDING AND CONTRACT DOCUMENTS**  
**Section 00 73 19 – Health and Safety Provisions**

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PART 1 – GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

- A. The provisions and intent of the Contract, including the General Conditions, Supplementary Conditions, and General Requirements apply to this work as if specified in this section.

1.02 DESCRIPTION OF WORK

- A. The work includes the requirements for health and safety provisions necessary for all work at the site for this project. Work at the site includes subsurface excavations below a depth of four feet, contaminated soil handling, storage, and transportation, and contaminated water collection and treatment.
- B. Detailed information regarding about soil and water at the site is included in the reference documents. Known contaminants of potential concern include metals, petroleum hydrocarbons, polycyclic aromatic hydrocarbons, and dioxins/furans.
- C. Failure on the part of the Contractor to follow its site-specific Health and Safety Plan(s) or to conduct work in an unsafe manner may result in suspension of the work by the Port. The Contractor shall not be entitled to extra compensation for health and safety related suspensions, nor shall the Contract completion date be extended.

1.03 APPLICABLE LAWS AND REGULATIONS

- A. The Contractor shall perform all work in compliance with the applicable provisions of the Washington Industrial Safety and Health Act, as well as other applicable federal, state, and local laws, regulations, and permits. The Contractor is fully responsible for planning and executing all the Work under this Contract in a manner that meets the regulatory requirements of Chapter 296-843 of the Washington Administrative Code (WAC) for protecting the health and safety of workers and the public.
- B. While performing the work, the Contractor may be subject to on-site inspections by regulatory inspectors from the Washington State Department of Labor and Industries, and other federal, state, or local agencies. If the Contractor is found to be in violation of pertinent regulations, the Contractor shall cease all work immediately, notify the Port, and correct the violation. Standby time required to resolve such violation shall be at the Contractor's sole expense.

**DIVISION 0 – BIDDING AND CONTRACT DOCUMENTS**  
**Section 00 73 19 – Health and Safety Provisions**

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PART 2 – PRODUCTS

2.01 MATERIALS

- A. The Contractor shall provide all health and safety equipment and supplies (e.g., shoring equipment, personal protective equipment, fencing, gas meters, first aid supplies, etc.) necessary to support the Contractor's and subcontractors work.
- B. All personnel shall be trained to operate the appropriate safety equipment that would be utilized during the course of their work. It is the responsibility of the Contractor's Site Safety and Health Officer to ascertain that all safety equipment is being used appropriately.
- C. All equipment and supplies shall be kept in proper working order.
- D. Personal protective equipment shall be worn to minimize dermal contact with soil and groundwater.
- E. Based on site data, use of modified Level D personal protective equipment is expected. The use of respirators is not anticipated, but may be required periodically for odorous conditions or in the event that an unexpected situation arises involving a high concentration of volatiles. Workers should be respirator certified.
- F. Complete sets of personal protective equipment required for entry to the site shall be made available at all times by the Contractor to the Port Engineer and agency inspectors.

PART 3 – EXECUTION

3.01 PREPARE HEALTH AND SAFETY PLAN

- A. Prior to the start of any work, the Contractor shall prepare a site-specific Health and Safety Plan (HASP) which meets all the requirements of WAC 296-843-100 as well as other applicable local, state and federal laws, regulations, and permits for construction safety and hazardous waste operations and emergency response (HAZWOPER). A copy of the HASP shall be submitted to the Port and any government agency performing a health and safety inspection.
- B. Each organization with on-site workers is expected to prepare a HASP. The Contractor can submit one comprehensive HASP for all Contractor and subcontractor work, or subcontractors can prepare separate plans at no additional cost to the Port.



## **DIVISION 0 – BIDDING AND CONTRACT DOCUMENTS**

### **Section 00 73 19 – Health and Safety Provisions**

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#### **3.02 SITE SAFETY AND HEALTH OFFICER**

- A. The Contractor shall provide a person designated as the Site Safety and Health Officer, who is thoroughly trained in rescue procedures and the use of all necessary safety equipment, air monitoring equipment, and gas detectors. The person must be present at all times while work is being performed and conduct testing, as necessary.
- B. The Site Safety and Health Officer shall be empowered with the delegated authority to order any person or worker on the project site to follow the construction and health and safety rules. Failure to observe these rules is sufficient cause for removal of the person or worker(s) from this project.
- C. The Site Safety and Health Officer is responsible for determining the extent to which any safety equipment must be utilized, depending on conditions encountered at the site.

#### **3.03 IMPLEMENT HEALTH AND SAFETY PLAN**

- A. The Contractor shall perform whatever work is necessary for safety and be solely and completely responsible for conditions of the job site, including safety of all persons (including employees of the Engineer, Engineer's Representative, and Contractor) and property during the contract period. This requirement applies continuously and is not limited to normal working hours.
- B. The Contractor shall inform all persons entering the site, including Contractor employees, subcontractor employees, and visitors, of the potential danger associated with construction activities and contaminated media at the site. The Contractor shall maintain proof that all on-site persons have read the Site Health and Safety Plan and are aware of the site hazards.
- C. The Contractor shall maintain at least one copy of the site-specific HASP(s) at the work site at all times.
- D. The Engineer's review of the Contractor's submittals and performance does not include approval of the adequacy of the Contractor's Site Safety and Health Officer, the site-specific HASP, safety program or any safety measures taken in, on, or near the construction site.

## **DIVISION 0 – BIDDING AND CONTRACT DOCUMENTS**

### **Section 00 73 19 – Health and Safety Provisions**

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- E. On-site activities involving potential soil or water exposures must be performed by HAZWOPER-trained personnel with current certifications. These personnel must have cards in their possession verifying current training status, and must present the cards when requested by the Port, the organization(s) conducting oversight, and/or regulatory officials.
- F. A third-party organization will be conducting airborne dust monitoring during the project. The Contractor shall allow for the third-party organization to monitor the breathing zone of Contractor employees. The Contractor shall stop work or take additional dust control measures approved by the Port Engineer if the time-weighted average of a daily dust measurement exceeds the Airborne Dust Action Level in the IAWP.
- G. The Contractor is solely responsible for all health and safety procedures and mitigation measures associated with asphyxiating (toxic) gases, explosive gases, and oxygen-deficiency conditions (e.g., confined space entry).
- H. The Contractor shall conduct regular on-site health and safety meetings and include other on-site workers such as subcontractors, the organization(s) conducting oversight, and third party samplers. The Contractor shall also brief on-site visitors about pertinent health and safety matters.
- I. Accidents causing death, injuries, or damage must be reported immediately to the Engineer in person or by telephone or messenger. In addition, promptly report in writing to the Engineer all accidents whatsoever arising out of, or in connection with, the performance of the work whether on, or adjacent to, the site, giving full details and statements of witnesses.
- J. If a claim is made by anyone against the Contractor or any subcontractor on account of any accident, the Contractor shall promptly report the facts in writing within 24 hours after occurrence, to the Engineer, giving full details of the claim.

#### **PART 4 MEASUREMENT AND PAYMENT**

Refer to Specification Section 01 20 00 Measurement and Payment

END OF SECTION

# **DIVISION 1 - GENERAL REQUIREMENTS**

## **Section 01 11 00 - Summary of Work**

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### **PART 1 - GENERAL**

#### **1.01 SCOPE**

- A. The work included in this Contract is defined on the drawings listed in Section 00 73 00, and within these specifications under the following Division Numbers:

1. DIVISION 0 - BIDDING AND CONTRACT REQUIREMENTS
2. DIVISION 1 - GENERAL REQUIREMENTS
3. DIVISION 3 – CONCRETE
4. DIVISION 7 – THERMAL AND MOISTURE PROTECTION
5. DIVISION 8 – DOORS AND WINDOWS
6. DIVISION 9 - FINISHES
7. DIVISION 10 – SPECIALTIES
8. DIVISION 11 – EQUIPMENT
9. DIVISION 23 – MECHANICAL
10. DIVISION 26 – ELECTRICAL
11. DIVISION 28 - SECURITY

- B. The work under this contract is to provide and furnish and/or install all labor, materials and equipment, as may be required to complete the work, installed, tested, and ready for use, and as described in these documents.

The Project consists of furnishing all labor, materials and other incidentals for the construction of a 12,500 S.F. tenant improvement. The tenant improvement will be within an existing, fully sprinkled, 1-story pre-engineered steel Type V-B building, as per the Special Provisions, the Standard Specifications including the amendments thereto, and Contract Documents hereunder.

#### **1.02 LOCATION**

- A. This project is located on the Port's North Airport Industrial Park, located at 2007 S 'O' Street Suite C-E, Port Angeles, WA 98363.

#### **1.03 ACCESS TO SITE**

- A. The Contractor shall have access to the construction site via city street, Absolutely no parking of private vehicles overnight on site is permitted. The Contractor may be required to relocate entry and related work areas as required by Port Engineer. Contractor shall conduct all business through the gate assigned by the Engineer.

## **DIVISION 1 - GENERAL REQUIREMENTS**

### **Section 01 11 00 - Summary of Work**

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#### **1.04 EXAMINATION**

- A. Persons performing Work shall examine surfaces to receive their Work and shall report in writing to Contractor, with copy to Architect, conditions detrimental to Work. Failure to examine and report makes the person responsible, at no increase in Contract Sum, for corrections Architect may require. Commencement of Work constitutes acceptance of surface.

#### **1.05 SURROUNDING SITE CONDITION SURVEY**

- A. Prior to commencement of Work Contractor, Owner, and Architect shall jointly survey the existing site, and surrounding conditions making permanent note of such existing damage as cracks, sags, or other similar damage. This record shall serve as a basis for determination of subsequent damage due to the Contractor's operations.

#### **1.06 PROTECTION OF EXISTING STRUCTURES AND UTILITIES**

- A. The Drawings indicate existing above and below grade structures, drainage lines, storm drains, sewers, water, gas, electrical, and other similar items, and utilities which are known to the Owner.
- B. The Contractor shall locate these known existing installations before proceeding with trenching, or other operations which may cause damage, shall maintain them in service where appropriate, and shall repair any damage to them caused by the Work, at no increase in Contract Sum.

#### **1.07 ENGINEERING AND INSPECTION**

- A. Engineers, inspectors and other representatives of the Port of Port Angeles will perform necessary engineering and inspection work throughout the duration of the Contract.
- B. Engineers and inspectors of the City of Port Angeles will enter the project site and shall perform its necessary engineering and inspection work.

#### **1.08 COORDINATION**

- A. The Contractor shall coordinate its activity with Port of Port Angeles operations, so interference with Port activities will be minimized.
- B. The Contractor shall also coordinate its work with others throughout the life of this contract at no additional expense to the Port. Others may include, but are not limited to, the following:

## **DIVISION 1 - GENERAL REQUIREMENTS**

### **Section 01 11 00 - Summary of Work**

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1. City of Port Angeles Light Operations: Adjacent same building tenant in Suites A & B.

#### **1.09 MATERIALS TESTING**

- A. Necessary materials testing shall be performed by an independent testing laboratory and paid for in accordance with Section 01 45 00 Quality Control and Testing Laboratories. Access to the area necessary to perform the testing and/or to secure the material for testing, shall be provided by the Contractor.

#### **PART 2 - PRODUCTS**

Not used

#### **PART 3 - EXECUTION**

Not used

**END OF SECTION**

## **DIVISION 1 - GENERAL REQUIREMENTS**

### **Section 01 31 10 – Project Coordination**

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#### **PART 1 - GENERAL**

##### **1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of Contract, including General Conditions, Supplementary Conditions and Divisions 0 and 1 Specification Sections, apply to work of this Section.

##### **1.02 PROJECT COORDINATION**

- A. General:
  - 1. Coordinate with Work of other Sections to ensure that all fixtures, devices, switches, outlets, ducts, pipes, and similar items can be installed as shown without modifications to framing. Provide all blockouts, raceways and similar framing as required.
  - 2. Coordinate the Work; do not delegate responsibility for coordination to any subcontractor.
  - 3. Anticipate interrelationship of all subcontractors and their relationship with the total Work.
  - 4. Resolve differences or disputes between subcontractors and materials suppliers concerning coordination, interference, or extent of Work between Sections. Contractor's decisions, if consistent with Contract Document requirements, shall be final.

##### **1.03 MECHANICAL AND ELECTRICAL COORDINATION**

- A. "Tight" Conditions:
  - 1. Resolve all "tight" conditions involving Work of various Sections in advance of installation.
  - 2. If necessary, and before Work proceeds in these areas, prepare supplementary drawings for review showing all Work in "tight" areas.
  - 3. Provide supplementary drawings, and additional Work necessary to overcome "tight" conditions, at no increase in Contract Sum.

##### **1.04 JOB SITE ADMINISTRATION**

- A. Field Measurements and Templates:
  - 1. Obtain field measurements required for accurate fabrication and installation of Work included in this Contract. Exact measurements are the Contractor's responsibility.
  - 2. Furnish or obtain templates, patterns, and setting instructions as required for installation of all Work. Verify in field.

## **DIVISION 1 - GENERAL REQUIREMENTS**

### **Section 01 31 10 – Project Coordination**

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- B. Responsibility:
  - 1. The Contractor shall be in charge of this Contract and the Site, as well as directing and scheduling of all Work.
  - 2. Final responsibility for performance, interface, and completion of Work and Project shall be the Contractor's.

## **PART 2 - PRODUCTS**

### **2.01 MATERIALS**

- A. Comply with Specifications for each specific product involved.

## **PART 3 - EXECUTION**

### **3.01 CUTTING AND PATCHING**

- A. Execute cutting and patching Work and structural reinforcing in a manner to prevent damage to other Work and to provide proper surfaces for installation of repairs, penetrations through surfaces, or other items.
- B. For all new Work employ original installer or fabricator to perform cutting and patching for weather exposed or moisture resistance elements, fireproofing, and finished surfaces exposed to view.
- C. Provide cutting and patching for all existing work, where mechanical and electrical utilities or similar services extend beyond limits of work for new construction, to match existing.
- D. General: Provide and be responsible for all cutting, fitting, and patching required to complete the Work, or to:
  - 1. Make its several parts fit together and to provide for installation of ill-timed Work.
  - 2. Uncover portions of Work to provide for installation of ill-timed Work.
  - 3. Remove and replace defective Work.
  - 4. Remove and replace Work not conforming to Contract Document requirements.
  - 5. Remove samples of installed Work as specified for testing.
  - 6. Provide routine penetrations on non-structural surfaces for installation of piping.
- E. Project Conditions:
  - 1. Inspect existing conditions including elements subject to damage or movement during cutting and patching.
  - 2. After uncovering Work, inspect conditions affecting installation of products or performance of Work.

## **DIVISION 1 - GENERAL REQUIREMENTS**

### **Section 01 31 10 – Project Coordination**

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3. Report unsatisfactory or questionable conditions to Architect in writing. Do not proceed with Work until Architect provides further instructions.
- F. Materials:
1. Those required for original installation.
  2. For any change in materials, submit request for substitution to Architect.
- G. Preparation:
1. Provide adequate temporary support as required to assure structural value or integrity of the affected portion of the Work.
  2. Provide devices and methods to protect other portions of the Project which may be exposed by uncovering Work.
- H. Performance:
1. Execute cutting and patching by methods which will avoid damage to other areas, and will provide proper surfaces to receive patching and finishing. Cutting which will in any way impair the structural strength of the buildings will not be allowed. Pay all costs, as determined by Architect for remedial Work necessitated by cutting which impaired the structural integrity of the building.
  2. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances, and finishes.
  3. Restore Work which has been cut or removed; install new products to provide completed Work in accordance with Contract Document requirements.
- I. Adjust and fit products to provide a neat installation. Finish or refinish surfaces, as required, to match adjacent finishes. Repaint surfaces to nearest change in plane.

END OF SECTION



**DIVISION 1 - GENERAL REQUIREMENTS**  
**Section 01 31 19 – Project Meetings**

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PART 1 - GENERAL

1.01 PRECONSTRUCTION MEETING

A. NOTIFICATION

1. Following the award, the Engineer will notify the selected bidder of the time and date of a preconstruction meeting.

B. LOCATION

1. The preconstruction meeting will be scheduled at the Port of Port Angeles Administrative Office Building.

C. ATTENDANCE

1. The following are requested to attend:

a. PORT OF PORT ANGELES REPRESENTATIVES:

- (1) Project Manager
- (2) Project Engineers
- (3) Contract Administrator
- (4) Consultants
- (5) Port Operations

b. CONTRACTOR'S REPRESENTATIVES:

- (1) Project Manager (Superintendent)
- (2) Contract Administrator
- (3) Major Subcontractors
- (4) Major Suppliers

c. CITY OF PORT ANGELES REPRESENTATIVES:

- (1) City Engineers and/or Inspectors
- (2) Utility Representatives

## **DIVISION 1 - GENERAL REQUIREMENTS**

### **Section 01 31 19 – Project Meetings**

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d. SUGGESTED AGENDA:

- (1) Communications and routing
- (2) Precontract Submittals
  - (a) Certificate of Insurance
  - (b) Performance Bond
  - (c) Labor and Materials Payment Bond
  - (d) Schedule of Values
- (3) Execution of the Contract
- (4) Discussion of the General Conditions
- (5) Discussion of the Special Conditions
- (6) Discussion of the General Requirements
- (7) Discussion of the Technical Specifications
- (8) Site visit

#### 1.02 PROGRESS MEETINGS

- A. The Engineer will schedule and administer weekly progress meetings throughout progress of the work.
- B. The Engineer will arrange meetings, prepare standard agenda with copies for participants, preside at meetings, record minutes and distribute copies within ten working days to the Contractor, meeting participants, and others affected by decisions made.
- C. Attendance is required for the Contractor's job superintendent, major subcontractors and suppliers, Engineer, and Port's representative as appropriate to the agenda topics for each meeting.
- D. Standard Agenda
  1. Review minutes of previous meeting.
  2. Review of work progress.
  3. Field observations, problems, and decisions.
  4. Identification of problems that impede planned progress.
  5. Maintenance of progress schedule.
  6. Corrective measures to regain projected schedules.
  7. Planned progress during succeeding work period.
  8. Coordination of projected progress.
  9. Maintenance of quality and work standards.
  10. Effect of proposed changes on progress schedule and coordination.
  11. Demonstration that the project record drawings are up-to-date.
  12. Other business relating to the work.

END OF SECTION

## **DIVISION 1 - GENERAL REQUIREMENTS**

### **Section 01 33 00 - Submittals**

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#### **PART 1 - GENERAL**

##### **1.01 RELATED WORK DESCRIBED ELSEWHERE**

- A. Division 1 contractual requirements for submittals:
  - 1. Section 00 72 00 General Conditions
  - 2. Section 00 73 00 Supplementary Conditions
- B. Individual submittals required in accordance with the pertinent sections of these specifications.

#### **PART 2 - PRODUCTS**

##### **2.01 COMPLIANCE**

- A. Failure to comply with these requirements shall be deemed as the Contractor's agreement to furnish the exact materials specified or materials selected by the Engineer based on these specifications.

##### **2.02 SHOP DRAWINGS**

- A. The Port of Port Angeles will not accept shop drawings that prohibit the Port from making sepias or copies for its own use.
- B. Quality: Shop drawings shall be prepared accurately to scale sufficiently large to indicate all pertinent features of the products and the method of fabrication, connection, erection, or assembly with respect to the work.
- C. All drawings submitted to the Engineer for this approval shall be drawn on sheets in 11" x 17" format or sheets that are multiples of 8-1/2 inches by 11 inches. Upon the Engineer's specific request, the Contractor shall furnish copies of any drawing on sheets having the dimensions 22 inches wide by 34 inches long in overall dimensions.
- D. Type of Prints Required:
  - 1. Whenever possible, the Contractor shall transit all submittals in Adobe portable document format (PDF).
  - 2. If PDF format is not feasible, the Contractor shall submit six prints or copies of all shop drawings or supplemental working drawings in accordance with the General Conditions.
  - 3. Distribution: The Port will review any drawings provided by the Contractor, mark with appropriate notations, prepare the required

## **DIVISION 1 - GENERAL REQUIREMENTS**

### **Section 01 33 00 - Submittals**

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number of prints for its use, and return marked copies to the Contractor. The Contractor may then order as many additional copies as required for Contractor's work.

#### **2.03 MANUFACTURERS' LITERATURE**

- A. The Contractor shall submit six (6) copies of manufacturers' literature for approval.
- B. Catalog cuts or brochures shall show the type, size, ratings, style, color, manufacturer, and catalog number of each item and be complete enough to provide for positive and rapid identification in the field. Catalog data shall be submitted in an orderly bound form. General catalogs or partial lists will not be accepted.
- C. In lieu of the above, submittals typically provided on paper may be submitted electronically as an Adobe portable document format (PDF). The manufacturer's original electronic issue is preferred.

#### **2.04 SAMPLES**

- A. The sample submitted shall be the exact or precise article proposed to be furnished.
- B. Samples, color chips, finish styles, etc., shall be submitted in sufficient number as to provide the Engineer with alternate choices.

#### **2.05 SUBSTITUTIONS**

- A. The Contract is based on the materials, equipment, and methods described in the Contract Documents.
- B. The Engineer will consider proposals for substitutions of materials, equipment, and methods only when such proposals are accompanied by full and complete technical data and all other information required by the Engineer to evaluate the proposed substitution.
- C. Do not substitute materials, equipment, or methods unless such substitution has been specifically approved in writing for this work by the Engineer.
- D. Requests for substitutions may be made after award. Such requests shall be accompanied by all technical data and costs, and delivery information. When, in the sole opinion of the Engineer, the product is equal, or better, in all respects to the product specified, it will be approved subject to contract requirements and the Contractor's assumption of all responsibility therefore.

## **DIVISION 1 - GENERAL REQUIREMENTS**

### **Section 01 33 00 - Submittals**

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- E. After written approval, this submission shall become a part of the Contract, and may not be deviated from except upon written approval of the Port.
- F. Catalog data for equipment approved by the Engineer does not in any case supersede the Contract Documents. The approval by the Engineer shall not relieve the Contractor from responsibility for deviations from drawings or specifications, unless Contractor has in writing called the Engineer's attention to such deviations at the time of the submission, nor shall it relieve him from responsibility for errors of any sort in the items submitted. The Contractor shall check the work described by the catalog data with the Contract Documents for deviations and errors.
- G. It shall be the responsibility of the Contractor to insure that items to be furnished fit the space available. Contractor shall make necessary field measurements to ascertain space requirements, including those for connections and shall order such sizes and shapes of equipment that the final installation shall suit the true intent and meaning of the Drawings and Specifications.
- H. Where equipment requiring different arrangement of connections from those shown as approved is used, it shall be the responsibility of the Contractor to install the equipment to operate properly, and in harmony with the intent on the Drawings and Specifications, and to make all changes in the work required by the different arrangement of connections together with any cost of redesign necessitated thereby, all at Contractor's expense.
- I. Where the phrase "or equal" or "or equal as approved by the Engineer" occurs in the Contract Documents, do not assume that material, equipment, or methods will be approved as equal by the Engineer unless the item has specifically been approved for this Work by the Engineer.
- J. The decision of the Engineer shall be final.

## **DIVISION 1 - GENERAL REQUIREMENTS**

### **Section 01 33 00 - Submittals**

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#### PART 3 - EXECUTION

##### 3.01 TRANSMITTALS

- A. General: The Contractor shall submit all shop drawings, catalog cuts, brochures and mailable samples accompanied with a Shop Drawing Transmittal form. Preferred method is PDF format. When not feasible, **six (6) copies of each submittal shall be transmitted.**
- B. Preparation: A separate submittal form shall be prepared for each product or procedure and shall be further identified by referencing the Specification the Section and paragraph number and each submittal shall be numbered consecutively.
- C. Mailing: The original shall be sent in every instance and will be the Contractor's record and final correspondence for every submittal.

##### 3.02 COORDINATION

- A. Shop and detail drawings shall be submitted in related packages. All equipment or material details which are interdependent or are related in any way must be submitted indicating the complete installation. Submittals shall not be altered once approved for Construction. Revisions shall be clearly marked and dated. Major revisions must be submitted for approval.
- B. The Contractor shall thoroughly review all shop and detail drawings, prior to submittal, to assure coordination with other parts of the work. The Contractor's failure to do this will be the cause for rejection. Submittals shall bear this approval stamp and initials.
- C. Components or materials which require shop drawings and which arrive at the job site prior to approval of shop drawings shall be considered as not being made for this project and shall be subject to rejection and removal from the premises.

END OF SECTION

## **DIVISION 1 - GENERAL REQUIREMENTS**

### **Section 01 33 00 - Submittals**

---

#### **PART 1 - GENERAL**

##### **1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of Contract, including General Conditions, Supplementary Conditions and Divisions 0 and 1 Specification Sections, apply to work of this Section.

##### **1.02 SUMMARY**

- A. Items requiring Shop Drawings, Product Data, and Samples are specified in the individual Sections. Submission of Shop Drawings, Product Data, and Samples is required only for those items where submittals are specified.
- B. Unspecified submittals will not be reviewed by the Architect. Subcontractor's drawings, setting diagrams and similar information required by the Contractor for coordination shall remain between the Contractor and subcontractors and will not be reviewed by the Architect.
- C. Related Sections:
  - 1. Product Substitution Procedures: Section 01 60 00.

##### **1.03 SHOP DRAWINGS**

- A. Present information required on Shop Drawings in a clear and thorough manner. Identify details by reference to drawing and detail, schedule, or room numbers shown and specified.

##### **1.04 PRODUCT DATA**

- A. Clearly mark each copy to identify pertinent products or models. Show performance characteristics and capacities, dimensions and clearances required, wiring or piping diagrams and controls.
- B. Modify manufacturer's standard schematic drawings and diagrams to delete information which is not applicable to the Work.
- C. Supplement standard information to provide information specifically applicable to the Work.

##### **1.05 SAMPLES**

- A. Samples shall be of sufficient size and quality to clearly illustrate functional characteristics of product, with integrally related parts and attachment devices.

## **DIVISION 1 - GENERAL REQUIREMENTS**

### **Section 01 33 00 - Submittals**

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- B. Submit full range of colors, textures, and patterns.

#### **1.06 CONTRACTOR'S RESPONSIBILITIES**

- A. Review, mark up as appropriate, and stamp Shop Drawings, Product Data, and Samples prior to submission.
- B. Determine and verify field measurements, field construction criteria, catalog numbers and similar data, and conformance with requirements of Contract Documents.
- C. Coordinate each submittal with requirements of the Work and of the Contract Documents.
- D. Notify Architect in writing, at time of submission, of any deviation in submittals from requirements of Contract Documents.
- E. Begin no fabrication or Work which requires submittals until return of Architect's final reviewed submittals.

#### **1.07 SUBMISSION REQUIREMENTS**

- A. Make submittals promptly in accordance with approved schedule and in such a manner as to cause no delay in the Work.
- B. Number of Submittals Required:
  - 1. Shop Drawings: Submit one reproducible transparency, which will be returned for reproduction and distribution by the Contractor, and two opaque reproductions which will be used for checking and will not be returned. Resubmit as required until final action by the Architect.
  - 2. Product Data, and Non-Reproducible Submittals: Submit the number of copies which the Contractor requires, plus two which will be retained by the Architect.
  - 3. Samples: Submit number stated in each Section.
- C. Submittals shall Contain:
  - 1. Date of submission and dates of any previous submissions with identification of revisions on any re-submittals.
  - 2. Project title and number; Contract identification; names of Contractor, supplier, and manufacturer.
  - 3. Relation to adjacent or critical features of the Work or materials.
  - 4. Applicable Standards, such as ASTM or Federal Specification numbers.



## **DIVISION 1 - GENERAL REQUIREMENTS**

### **Section 01 33 00 - Submittals**

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#### **1.08 SUBMITTAL SCHEDULE**

- A. Time of submission of Shop Drawings, Product Data, and Samples by the Contractor and their processing and return by the Architect, is a matter which must be jointly agreed to by both parties in order that items covered by required submittals will be available when needed by the construction process and so that each party can plan their workload in an orderly manner.
- B. The Contractor shall prepare a Submittal Schedule in the format provided, coordinated with the Progress Schedule, and submit to the Architect 15 calendar days prior to submission of the first submittals or simultaneously with the Progress Schedule, whichever is earlier. No submittals will be processed before the Submittal Schedule has been reviewed by the Architect.
  - 1. Sample Submittal Schedule Form attached to end of this Section.
- C. In preparing the Submittal Schedule, the Contractor shall first determine, from the Progress Schedule, the date the particular item is needed on the Work for installation. Working backwards, the Contractor will then add the number of days for shipment, time for fabrication, and similar items, to determine the date of first submittal. Note that the Architect will determine the time required in steps 5 and 8 of the form. To secure this, the Contractor shall furnish the Architect with draft copies of the Submittal Schedule with all information in steps 1, 2, and 3 completed.
- D. The intent is to adjust the Schedule to produce an orderly, even workload, without peak loads if possible, and yet meet the needs of the construction process. After the schedule is completed by the Contractor, the Contractor shall, at its expense, furnish copies to the Architect as required.

**PART 2 - PRODUCTS - NOT USED**

**PART 3 - EXECUTION - NOT USED**

**END OF SECTION**

**DIVISION 1 - GENERAL REQUIREMENTS**  
**Section 01 33 00 - Submittals**

SUBMITTAL SCHEDULE (SAMPLE)

1. Subcontractor			
2. Specification Section			
3. Item of Work			
4. Received by Contractor and Time for Checking			
5. First Delivered to Architect and Time for Checking			
6. Returned to Contractor			
7. Corrections Completed and Time for Corrections			
8. Next Delivered To Architect and Time for Checking			
9. Returned to Contractor			
10. Approval for Job Information			
11. Approval for Fabrication and Time for Fabrication			
12. Fabrication Completed			

**DIVISION 1 - GENERAL REQUIREMENTS**

**Section 01 33 00 - Submittals**

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13. Shipping Date and Time En route			
14. Delivery to Job			
<b>STEP LEGEND</b>			
	= Date this step is scheduled to be completed		
	= Date this step is actually completed		
	= Calendar days required to complete this step (if applicable)		

**DIVISION 1 – GENERAL REQUIREMENTS**  
**Section 01 35 43 – Environmental Controls**

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PART 1 – GENERAL

1.01 RELATED WORK DESCRIBED ELSEWHERE

- A. The provisions and intent of the Contract, including the General Conditions, Supplementary Conditions, Appendices, and other sections of the Contract Documents, apply to this work as if specified in this section.
- B. Work related to this section is described in:  

Section 00 73 19 Health and Safety Provisions

1.02 DESCRIPTION OF WORK

- A. The work includes the requirements to maintain environmental controls by the Contractor until the acceptance of the Contract. The work also includes compliance with all controls or ordinances with respect to safety, noise, odor, dust, fire and police action, civil disobedience, security, or traffic.

1.03 SUBMITTALS

- A. N/A

1.04 SITE MAINTENANCE

- A. The Contractor shall keep the work site, staging areas, and Contractor's facilities clean and free from rubbish and debris. Materials and equipment shall be removed from the site when they are no longer necessary. Upon completion of the work and before final acceptance, the work site shall be cleared of equipment, unused materials, and rubbish to present a clean and neat appearance in conformance with the present condition of the site.
- B. Cleanup:
  - 1. Waste material of any kind shall not be permitted to remain on the site of the work or on adjacent streets. Immediately upon such materials becoming unfit for use in the work, they shall be collected, carried off the site, and properly disposed of by the Contractor.
  - 2. The Contractor shall keep all buildings occupied by the Contractor clear of all refuse, rubbish, and debris that may accumulate from any source and shall keep them in a neat condition to the satisfaction of the Engineer.
  - 3. Maintain copies of including, but not limited to, the Stormwater Pollution Prevention Plan, Spill Control Plan, Solid Waste Plan, Operation and Maintenance Manual, and Engineering Documents

**DIVISION 1 – GENERAL REQUIREMENTS**  
**Section 01 35 43 – Environmental Controls**

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and any related permits on-site, and make available for inspection by Port personnel or regulatory representatives.

4. In the event that waste material, refuse, debris, and/or rubbish are not removed from the work by the Contractor, the Port reserves the right to have the waste material, refuse, debris and/or rubbish removed, and the expense of the removal and disposal charged to the Contractor.
5. Paints, solvents, hydraulic oils, fuels, and other construction materials shall be handled with care to prevent entry of contaminants into storm drains, surface waters, or soils.

C. Street Cleaning:

1. The Contractor shall be responsible for preventing dirt and dust from escaping from trucks departing the project site, by covering all loads, washing truck tires and undercarriages before leaving the site, installing inserts at catch basins, and other reasonable methods. The Contractor is required to take all measures necessary to prevent the tracking of mud and other debris from the project site on City streets and adjacent properties.
2. When working dump trucks and/or other equipment are on paved streets and roadways, gravel roads, and levees, the Contractor will be required to clean said streets, roads, parking areas, etc. at the conclusion of each day's operations at a minimum and as required by the Engineer to prevent tracking of soil or other transported materials on paved roads, gravel roads, and levees at no additional cost to the Port. Properly dispose of all collected material. This shall be the case, whether the vehicles or equipment is owned and/or operated by the Contractor or his subcontractors or not.
3. In the event that the above requirements are violated and no action is taken by the Contractor after notification of infraction by the Engineer, the Port reserves the right to perform the work necessary using labor and equipment by others, and any incurred costs will be charged to the Contractor.

1.05 NOISE CONTROL

- A. Construction involving noisy operations, including starting and warming up of equipment, shall be in compliance with local noise ordinances. Noisy operations shall be scheduled to minimize their duration. The Contractor shall comply with the City of Port Angeles for the hours of operations, unless otherwise approved by the City of Port Angeles and the Port.

**DIVISION 1 – GENERAL REQUIREMENTS**  
**Section 01 35 43 – Environmental Controls**

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- B. The Contractor shall comply with all local, state and federal controls and noise level rules, regulations, and ordinances that apply to any work performed by the Contractor pursuant to the Contract.
- C. Each internal combustion engine, used for any purpose on the job or related to the job, shall be enclosed and be equipped with a muffler and spark arrester of a type recommended by the manufacturer. No internal combustion engine shall be operated on the project without said muffler and enclosure.
- D. Noise levels for scrapers, pavers, graders, and trucks shall not exceed 90 dBA at 50 feet as measured under the noisiest operating conditions. For all other equipment, noise levels shall not exceed 85 dBA. Equipment that cannot meet these levels shall be quieted by use of improved exhaust mufflers, portable acoustical screens, or other means. Equipment not modified to meet these requirements shall be removed from the project.

**1.06 COMPLIANCE WITH ENVIRONMENTAL PLANS AND DOCUMENTS**

- A. The Contractor shall implement and comply with all recommendations and provisions of environmental-related plans prepared in connection with this project including, but not limited to, the Stormwater Pollution Prevention Plan, Spill Control Plan, Solid Waste Plan, Operation and Maintenance Manual, and Engineering Documents and any related permits on-site, and make available for inspection by Port personnel or regulatory representatives

**1.07 TREE AND PLANT PROTECTION**

- A. Temporary Tree Protection:
  - 1. The Contractor shall carefully protect existing trees from damage by construction activities. Trees which may not be removed within the construction limits shown on the drawings will be specifically marked by the Engineer for protection. No trees outside the construction limits shall be removed or damaged, unless authorized by the Engineer.
  - 2. If a tree is damaged or destroyed by construction (other than those designated for removal), the Contractor shall replace it in species and grade with a healthy tree as required by the Engineer. Where it is necessary to replace a tree damaged by construction, the Contractor shall bear all expenses required to establish the replacement tree.

**DIVISION 1 – GENERAL REQUIREMENTS**  
**Section 01 35 43 – Environmental Controls**

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- B. Existing Vegetation Protection:
  - 1. The Contractor shall carefully protect the vegetation outside of the boundaries of the project site from damage by construction activities.
  - 2. If the vegetation is damaged or destroyed by construction, the Contractor shall replace it with species and grade as required by the Engineer.

**1.08 SURFACE WATER AND GROUNDWATER**

- A. The Contractor shall comply with all the requirements set for by the Contract Documents for controlling, conveying, treating and discharge surface and groundwater encountered in connection with the work.
- B. Clearly mark and protect all existing wells to prevent damage from vehicles or equipment. Replace any well within 48 hours at no cost to the Port, if a well becomes damaged as a result of the Contractor's work.
- C. Provide clear and unobstructed access to each well, and coordinate with other work performed by the Port and its agents such as monitoring, inspecting, testing, abandoning and decommissioning wells as located on the Plans.

**1.09 OIL SPILL PREVENTION AND CONTROL**

- A. The Contractor shall be responsible for prevention, containment, and cleanup of spilling of oil, fuel, and other petroleum products used in the Contractor's operations. All such prevention, containment, and cleanup costs shall be borne by the Contractor.
- B. The Contractor is advised that discharge of oil from equipment or facilities into state waters or onto adjacent land is not permitted under state water quality regulations.
- C. The Contractor shall, at a minimum, take the following measures regarding oil spill prevention, containment, and cleanup:
  - 1. Fuel hoses, lubrication equipment, hydraulically-operated equipment, oil drums, and other equipment and facilities shall be inspected regularly for drips, leaks, or signs of damage, and shall be maintained and stored properly to prevent spills. Proper security shall be maintained to discourage vandalism.
  - 2. All land-based oil and products storage tanks shall be diked or located so as to prevent spills from escaping to the water. Diking and subsoils shall be lined with impervious material to prevent oil from seeping through the ground and dikes.

**DIVISION 1 – GENERAL REQUIREMENTS**  
**Section 01 35 43 – Environmental Controls**

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3. All visible floating oils shall be immediately contained with booms, dikes, or other appropriate means and removed from the water prior to discharge into state waters. All visible oils on land shall be immediately contained using dikes, straw bales, or other appropriate means and removed using sand, ground clay, sawdust, or other absorbent material, which shall be properly disposed of by the Contractor. Waste materials shall be temporarily stored in drums or other leak-proof containers after cleanup and during transport to disposal. Waste materials shall be disposed off property at an approved site.
  4. In the event of any oil or product discharges into public waters, or onto land with a potential for entry into public waters, the Contractor shall immediately notify the Port's Environmental Specialist (360-417-3452), and the Port shall notify the following agencies at their listed 24-hour response numbers:
    - a. Washington State Department of Ecology, Southwest Regional Office: 360-407-6300.
    - b. U.S. Coast Guard: 206-217-6002.
- D. Maintain on the job the following materials (as a minimum [required only from time of existing levee breach to substantial completion of project]):
1. Oil-absorbent pads or bulk material, adequate for coverage of 2,000 square feet of surface area
  2. Oil-skimming system
  3. Hay bales
  4. Oil dry-all, gloves, and plastic bags
- E. Any an all spills, discharges, leaks, or other release of materials to the site soils or adjacent waters shall be immediately reported to the Port.

**1.10 CONTAMINATED SOILS**

The Contractor shall comply with all the requirements set for by the Contract Documents for handling, stockpiling, and disposing of the contaminated soils encountered in connection with the work.

**PART 2 – PRODUCTS**

Not Used

**PART 3 – EXECUTION**

Not Used



**DIVISION 1 – GENERAL REQUIREMENTS**  
**Section 01 35 43 – Environmental Controls**

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**PART 4 - MEASUREMENT AND PAYMENT**

All cost associated with this section are to be considered incidental to the project and shall not be measured separately for payment.

**END OF SECTION**

**DIVISION 1 - GENERAL REQUIREMENTS**  
**Section 01 41 00 – REGULATORY REQUIREMENTS**

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PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General Conditions, Supplementary Conditions and Divisions 0 and 1 Specification Sections, apply to work of this Section.

1.02 APPLICABLE CODES AND STANDARDS

- A. Any specific reference in the Specifications to codes, regulations, reference standards, manufacturer's instructions or requirements of regulatory agencies shall mean the latest printed edition of each in effect at the date of submission of bids unless the document is shown dated.
- B. Perform the Work in conformance with the applicable requirements of all regulatory agencies including, but not limited to, the following:
  - 1. International Building Code (IBC) 2015 Edition.
  - 2. National Electrical Code (NEC) current edition.
  - 3. Uniform Plumbing Code (IPC), 2015 Edition.
  - 4. International Mechanical Code (IMC), 2015 Edition.
  - 5. Washington State Non-Residential Energy Code, 2016
  - 6. Washington State Ventilation and Indoor Air Quality Code.
  - 7. ANSI 117.1 Disability Standards.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

## DIVISION 1 - GENERAL REQUIREMENTS

### Section 01 42 00 - References

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#### PART 1 - GENERAL

##### 1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General Conditions, Supplementary Conditions and Divisions 0 and 1 Specification Sections, apply to work of this Section.

##### 1.02 ABBREVIATIONS

- A. The following abbreviations of organizations may be used in the Contract Documents.
  1. AAMA Architectural Aluminum Manufacturer's Association
  2. ACI American Concrete Institute
  3. AGC Associated General Contractors of America
  4. AIA American Institute of Architects
  5. AISC American Institute of Steel Construction
  6. AITC American Institute of Timber Construction
  7. ANSI American National Standards Institute
  8. APA American Plywood Association
  9. ASTM American Society for Testing and Materials
  10. AWPA American Wood Preservers Association
  11. AWS American Welding Society
  12. AWI Architectural Woodwork Institute
  13. BHMA Builder's Hardware Manufacturers Association
  14. CLFMI Chain Link Fence Manufacturers Institute
  15. CRSI Concrete Reinforcing Steel Institute
  16. CS U.S. Commercial Standard
  17. DHI Door and Hardware Institute
  18. FGMA Flat Glass Marketing Association
  19. FM Factory Mutual System
  20. FS Federal Specification
  21. GA Gypsum Association
  22. MLSFA Metal Lath/Steel Framing Association
  23. NAAMM National Association of Architectural Metal Manufacturers
  24. NEC National Electrical Code
  25. NEMA National Electrical Manufacturers Association
  26. NFPA National Fire Protection Association; National Forest Products Association
  27. NWMA National Woodwork Manufacturers' Association
  28. NWWDA National Wood Window and Door Association
  29. PCI Prestressed Concrete Institute
  30. PDCA Painting and Decorating Contractors of America
  31. PS U.S. Product Standard

## DIVISION 1 - GENERAL REQUIREMENTS

### Section 01 42 00 - References

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32.	SDI	Steel Deck Institute; Steel Door Institute
33.	SMACNA	Sheet Metal and Air Conditioning Contractors National Association, Inc.
34.	SSPC	Steel Structures Painting Council
35.	TCA	Tile Council of America
36.	TPI	Truss Plate Institute
37.	UBC	Uniform Building Code
38.	UL	Underwriters' Laboratories, Inc.
39.	UMC	Uniform Mechanical Code
40.	UPC	Uniform Plumbing Code
41.	WABO	Washington Association of Building Officials
42.	WAC	Washington Administrative Code
43.	WSDOT	Washington State Department of Transportation
44.	WWPA	Western Wood Products Association

B. Additional abbreviations, used only on the Drawings, are listed thereon.

#### 1.03 SYMBOLS

A. Symbols, used only on the Drawings, are shown thereon.

#### 1.04 DEFINITIONS

A. Terms used on the Drawings or in the Specifications in addition to those shown in General Conditions shall have the meanings as follows. Terminology is shown to the left, it's meaning is shown to the right.

B. As Directed "By the Architect"

C. As Required "By Code; by good building practice; by the condition prevailing; by Contract Documents; by Owner, or by Architect"

D. As Selected "By Architect"

E. Equal/Equivalent In the opinion of the Architect. The burden of proof of equality is the responsibility of the Contractor.

F. Furnish "Supply and deliver to the Project ready for installation and in operable condition."

G. Install "Incorporate in the Work in final position, complete, anchored, connected, and in operable condition."

H. NIC Not in Contract

I. Owner Port of Port Angeles

## DIVISION 1 - GENERAL REQUIREMENTS

### Section 01 42 00 - References

---

J.	Project	Total construction of which Work performed under the Contract Documents may be the whole or a part.
K.	Provide	"Furnish and install complete." When neither "furnish", "install", nor "provide" is stated, "provide" is implied.
L.	Shown	"As indicated on the Drawings"
M.	Specified	"As written in the Project Manual/Specifications"

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

**DIVISION 1 - GENERAL REQUIREMENTS**  
**Section 01 45 00 - Quality Control**

---

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

- A. All work described in the contract documents must be fully tested in accordance with applicable sections of these specifications.
- B. Unless otherwise specified, the Contractor shall furnish and pay for all labor, equipment, and materials to accommodate and provide access for the testing of installed products, materials, equipment, and improvements.

1.02 REFERENCES AND STANDARDS

- A. For products specified by association, trade, or other consensus standards, comply with the requirements of those standards, except when more stringent requirements are specified, or are required by applicable codes.
- B. Conform to the reference standard with date of issue corresponding to the date of the contract documents, except where a specific date is referenced, or established by code.
- C. Obtain copies of standards where required by product specification sections.
- D. The contractual relationships, duties, and responsibilities of the Contractor, the Port, and the Engineer shall not be altered, as specified in the contract documents, by mention, discussion, or inference in any reference document.

1.03 QUALITY ASSURANCE - CONTROL OF INSTALLATION

- A. Monitor quality control of suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of the specified quality.
- B. Comply with manufacturer instructions and recommendations, including following each step in sequence.
- C. If the manufacturer instructions conflict with the contract documents, request clarification from the Engineer before proceeding.
- D. Comply with the specified standards as minimum quality for the work, except where more stringent tolerances, codes, or specified requirements prescribe higher standards or more precise workmanship.

## **DIVISION 1 - GENERAL REQUIREMENTS**

### **Section 01 45 00 - Quality Control**

---

- E. Perform work by persons qualified and sufficiently experienced to produce the required and specified quality.
- F. Verify that field or other measurements are as indicated on shop drawings, or as instructed and required by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and physical distortion during installation.

#### **1.04 TOLERANCES**

- A. Monitor fabrication and installation tolerance control of products to produce acceptable work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. If the manufacturers' tolerances conflict with the contract documents, request clarification from the Engineer before proceeding.
- C. Adjust products to appropriate dimensions and clearances. Accurately position products before securing products in place.

#### **1.05 TESTING PAID FOR BY THE CONTRACTOR**

- A. Initial sampling and testing necessary to secure approval of materials shall be performed by an independent certified laboratory. These tests must be dated within six (6) months of the submittal date.
- B. Re-testing required because of non-conformance to specified requirements shall be performed by the independent firm that performed the initial testing. Payment for re-testing will be charged to the Contractor by deducting testing charges from the contract sum.

#### **1.06 TESTING PAID FOR BY THE PORT**

- A. Unless otherwise specified, materials testing will be performed by an independent testing laboratory during the execution of the work and will be paid for by the Port of Port Angeles. Access to the area necessary to perform the testing, or to secure the material for testing, shall be provided by the Contractor.
- B. Tests performed by the Port to ensure compliance with the contract documents may include the following: concrete slump, concrete strength, concrete air content, grout strength, welding, bolting.

## **DIVISION 1 - GENERAL REQUIREMENTS**

### **Section 01 45 00 - Quality Control**

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- C. Testing activities of the Port do not relieve the Contractor from its responsibility of installing work that meets the quality and workmanship required by the contract documents.
- D. Subsequent sampling and testing, required as the work progresses to ensure continued control of material quality, compliance with the contract documents, and the Engineer's approval will be the responsibility of the Port, except as required by other sections of the specifications.

#### **PART 2 – PRODUCTS**

Not Used.

#### **PART 3 – EXECUTION**

Not Used.

#### **PART 4 - MEASUREMENT AND PAYMENT**

All cost associated with this section are to be considered incidental to the project and shall not be measured separately for payment.

**END OF SECTION**



**DIVISION 1 - GENERAL REQUIREMENTS**  
**Section 01 50 00 - Temporary Facilities and Controls**

---

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including Divisions 0 and 1 Specification Sections, apply to work of this Section.

1.02 SECTION INCLUDES

- A. This Section specifies administrative and procedural requirements for the Contractor's construction facilities and temporary controls.

1.03 DESCRIPTION

- A. This Section specifies minimum actions required. Other actions may be specified elsewhere in the Contract Documents, manufacturer's literature, and governing regulations.
- B. Nothing in this Section is intended to limit types or amounts of construction facilities and temporary controls.
- C. No omission from this Section will be recognized as a temporary activity that is not required to complete the Work.

1.04 DISPOSAL OF WASTE MATERIALS

- A. Dispose of all refuse and waste material, including excess earth from excavation, off Owner's property in a legal manner conforming to all requirements of local authorities having jurisdiction. Do not stockpile waste material on Owner's property. Immediately clean up any spilled material.
- B. Clean all trash and debris from work area daily. Keep work area, site, and adjacent properties free from accumulations of waste materials, rubbish and windblown debris resulting from construction operations.
- C. Provide on-site containers for collection of waste materials, debris and rubbish. Periodically remove waste from the site. Do not use Owner's waste containers for construction waste.
- D. Waste Construction Liquid Disposal: Provide portable containers for disposal of any waste construction liquids or fluids that are generated by or needed for the construction work. Do not dump any waste construction liquid or fluid (including paint, solvents, plaster mud, brush and tool cleanup water, etc.) down the building sanitary or storm drain systems or anywhere on the site (except clean water). Dispose of contents of all portable containers off site daily.

**DIVISION 1 - GENERAL REQUIREMENTS**  
**Section 01 50 00 - Temporary Facilities and Controls**

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- E. Dispose of all flammable, hazardous, and toxic waste materials daily. Storage of these materials will not be permitted on the interior of building.
- F. Locate dumpster within the fenced Work Area.
  - 1. Dumpsters shall have a hinged lid that shall be closed and locked at the end of each day's work.

**1.05 TEMPORARY ELECTRICITY**

- A. The Contractor shall provide electrical power, including temporary power service or electrical generator(s) required to complete the work of this Contract. The Contractor will provide for all connection costs including but not limited to fees, meters, transformers, disconnects, cabling, etc. and shall remove temporary connections after Work is completed.
- B. Provide temporary electric feeders from electrical service. Power consumption shall not disrupt Owner's need for continuous service. Verify type of service characteristics and provide temporary feeders accordingly.
- C. Provide power outlets for construction operations, with branch wiring and distribution boxes. Provide OSHA/WISHA approved flexible power cords as needed.
- D. Provide temporary service disconnect and over current protection at convenient location.
- E. Permanent convenience receptacles may be utilized during construction provided they are replaced if damaged or defaced in any way.

**1.06 TEMPORARY LIGHTING**

- A. Provide and maintain lighting for construction operations. Provide sufficient lighting to ensure proper workmanship everywhere.
- B. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as needed.
- C. Maintain lighting and provide routine repairs.

**DIVISION 1 - GENERAL REQUIREMENTS**  
**Section 01 50 00 - Temporary Facilities and Controls**

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1.07 TELEPHONE SERVICE

- A. Provide and pay for telephone service to the job office for use of the Contractor, Architect and Owner. Install telephone service at time of mobilization and maintain throughout construction until demobilization is complete.
- B. Provide long distance phone service from vendor of contractor's choice and as approved for billing by the local phone company.
- C. Superintendent shall carry a digital/voice pager or a cellular phone to allow voice communication at all times.

1.08 TEMPORARY WATER SERVICE

- A. Provide, maintain, and pay for suitable quality water service required for construction operations. Pay all costs of connection and piping required to perform the work.
- B. Extend branch piping with outlets located so water is available by hoses with threaded connections.

1.09 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain temporary OSHA/WISHA required portable toilet facilities and enclosures; in sufficient numbers and locations to accommodate the size of workers on site. Maintain daily in clean and sanitary condition.

1.10 TEMPORARY HEAT

- A. Provide and pay for temporary heat devices and energy source as required to maintain conditions required for construction operations.
  - 1. Use of the permanent heating system in the buildings is not permitted.
  - 2. Direct fired gas/oil heaters are not allowed, all combustion/exhaust gases shall be vented to building exterior.
- B. Maintain minimum ambient temperature of 60 degrees F in areas where construction is in progress, unless required otherwise by manufacturers, trade associations, and/or the specification sections.

1.11 TEMPORARY VENTILATION

- A. Provide temporary ventilation equipment to facilitate drying out of materials, to dissipate humidity, to maintain consistent temperature in all areas and to prevent accumulation of dust, fumes, vapors, or gases.

**DIVISION 1 - GENERAL REQUIREMENTS**  
**Section 01 50 00 - Temporary Facilities and Controls**

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1.12 TEMPORARY DEHUMIDIFICATION

- A. Provide temporary dehumidification equipment as required to lower the moisture content of the building interior and dry out materials to required levels.

1.13 BUILDING MATERIALS ACCLIMATIZATION AND DRY OUT

- A. Prior to installation of any building insulation, wall surfaces or finishes, the Contractor shall provide the equipment and expertise required to dry out the building structure and materials, including concrete slabs, to conform with the following minimum criteria:
  - 1. Contractor is responsible for selecting the means and methods utilized to acclimate, ventilate and dry out the building structure and materials, including deciding the proper sequence of construction and other determinates affecting the dry out process; and shall hire an expert consultant to advise in this process if problems or questions are encountered.
  - 2. Acclimate, ventilate and dry out structure and materials as required by manufacturers of materials, finishes or coverings applied over, onto or within the structure or material.
    - a. Refer to Section 03 30 02 for requirements related to concrete floor slabs.
  - 3. Acclimate, ventilate and dry out structure and materials as required to allow installed materials to dry evenly and rapidly as recommended by manufacturer or reference standard.
  - 4. Acclimate, ventilate and dry out structure and materials as required to prevent the formation of water condensation on any material.
  - 5. Do not install thermal insulation until the moisture content and temperature of building materials is being maintained at a level that will prevent condensation from forming in the insulation or on the cold side surface of the insulated cavity.
  - 6. Test and record moisture content of each different building structural element and material on a daily basis during and after acclimatization and dry out process.
    - a. Provide professional quality moisture testing equipment capable of providing consistently accurate moisture content analysis for each different type of material found on project.
    - b. Record moisture content data collected on a printed log showing location of each test and material/structural member tested; key each test to a floor plan.
    - c. Provide copies of the moisture log and keyed floor plan to subcontractors suppliers, Architect and Owner upon request.
  - 7. The Owner may elect to hire a testing lab to perform the moisture testing and recording at the Contractor's expense if the Contractor fails

**DIVISION 1 - GENERAL REQUIREMENTS**  
**Section 01 50 00 - Temporary Facilities and Controls**

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to provide adequate or consistent moisture content testing and recording as specified herein.

1.14 TEMPORARY BARRIERS

- A. Provide barriers to protect the public from any potentially unsafe conditions, and from damage and/or dust from construction operations.
- B. Provide protection for existing plant life designated to remain. Replace damaged plant life.
- C. Protect non-owned vehicular traffic, stored materials, site and structures from damage.

1.15 TEMPORARY CONSTRUCTION SITE FENCING

- A. Commercial grade chain link fencing.
- B. Provide 6 foot high temporary chain link fence around the construction area; equip with vehicular and pedestrian gates with locks.
  - 1. Anchor each fence post securely as required to maintain integrity of security fencing.

1.16 WATER CONTROL

- A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- B. Protect site from puddling or running water.
- C. Provide settling basins and erosion control.
- D. Protect any facilities on-site and off-site from damage due to uncontrolled water.

1.17 TEMPORARY STORAGE

- A. The Contractor shall make whatever provisions necessary to ensure the safe and weathertight protection of materials, or equipment temporarily stored.

1.18 EXTERIOR ENCLOSURES

- A. After roof is installed and insulation or interior finishes are started, provide temporary, weather-tight enclosure over any portion of the building exposed to the weather to prevent the structure and finishes from getting wet.

**DIVISION 1 - GENERAL REQUIREMENTS**  
**Section 01 50 00 - Temporary Facilities and Controls**

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1.19 PROTECTION OF INSTALLED WORK

- A. Protect installed work. Provide special protection where specified in individual specification sections or as required to prevent any type of damage or defacement.
- B. Provide temporary and removable protection for installed products. Control activity in immediate work area to minimize damage.
- C. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer and install protection. Remove and replace waterproofing or roofing material damaged during the work.
- D. Prohibit construction worker access to all rooms and areas which do not have construction work. After work in any area or room is complete, prohibit further worker access.
- E. Prevent any construction dust and dirt from entering the HVAC equipment and ductwork, computer equipment, electrical switchgear, building systems/equipment, smoke detectors or anything that will be adversely affected.

1.20 SECURITY

- A. Lock up or block up all doors, windows and openings in building and lock any gates on the site each day prior to leaving the site to prevent unauthorized entry into the building or site.
- B. Maintain building security until the Owner takes permanent occupancy or until substantial completion is achieved, whichever occurs first.

1.21 ACCESS ROADS

- A. Provide and maintain access to fire hydrants, free of obstructions. Do not block access roads or prevent emergency vehicles access to site.

1.22 PROGRESS CLEANING

- A. Provide periodic cleaning to prevent any buildup or accumulation of construction debris and dirt on the site.
- B. Maintain areas free of waste materials, debris, rubbish and dust. Maintain site in a clean and orderly condition.

**DIVISION 1 - GENERAL REQUIREMENTS**  
**Section 01 50 00 - Temporary Facilities and Controls**

---

- C. Remove waste materials, debris, and rubbish from site weekly and dispose off-site.

1.23 ENVIRONMENTAL PROCEDURES

- A. Comply with all environmental and health safety regulations.
- B. Burning on site is not permitted.

1.24 MACHINERY AND EQUIPMENT RESTRICTIONS

- A. Equipment and Internal Combustion Engine Noise: The noise level of each vehicle or piece of equipment shall not be greater than 90 DB(A) at a distance of 50 feet as measured under noisiest operating conditions. Mufflers for stationary engines shall be hospital-area quality of silencing.

1.25 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary above grade or buried utilities, equipment, facilities, materials,
- B. Remove temporary underground installations to a minimum depth of 2 feet.
- C. Clean and repair damage caused by installation or use of temporary work.

1.26 EMERGENCY CONTACTS

- A. Provide Owner with two emergency contact names (Superintendent and Project Manager), with home phone, cell phone and pager numbers.

1.27 CONSTRUCTION PARKING

- A. Construction workers shall park only in designated areas. Coordinate with Owner for locations.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

**DIVISION 1 - GENERAL REQUIREMENTS**  
**Section 01 50 10 – Temporary Project Sign**

---

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General Conditions, Supplementary Conditions and Divisions 0 and 1 Specification Sections, apply to work of this Section.

1.02 SUMMARY

- A. Supply the following types of signs as indicated by the Architect and conform to the specifications given herein.
- B. Construction/Job Signage must comply with the requirements of the ARRA, the Authorities Having Jurisdiction, and the requirements of the Architect.
- C. Prohibitions: The following may not be used by the Contractor on the site:
  - 1. Separate Contractor's, subcontractor's or supplier's signs or advertisements.
  - 2. Signs that flash, blink, rotate or otherwise draw unusual attention (except where required by safety regulations).
  - 3. Company or agency logos.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. All project signs and construction signs shall be fabricated from the following materials:
  - 1. Plywood Face: High density overlay type, with overlay 0.012" thick each side, 45% resin content by dry weight, and minimum weight of 60 pounds/thousand sq. ft. of surface. 3/4" nominal plywood thickness shall be provided.
  - 2. Paint: Exterior, gloss, alkyd enamel. Provide 2 coats on all sign faces, backs and edges and 1 coat on all posts.
  - 3. Aluminum Paint: Exterior paint conforming to Federal Spec. TT-E-38. Provide 2 coats on all plywood edges and post tops.
  - 4. Wood Posts: Douglas Fir, S4S, with design stress of 1400 psi fb minimum. Paint the entire post before embedding in earth. Provide posts in sizes and depths of embedment as indicated. All signs will be reviewed with the Architect for location and nature of mounting details.



**DIVISION 1 - GENERAL REQUIREMENTS**  
**Section 01 50 10 – Temporary Project Sign**

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2.02 SIGNS

- A. The Contractor shall provide the “Project Sign”.
  - 1. Layout and design are provided in this specification
  - 2. Area of plywood shall be 4 feet x 8 feet.
- B. The Contractor shall provide all required signs and postings of all Authorities Having Jurisdiction.

PART 3 - EXECUTION

3.01 FABRICATION AND INSTALLATION

- A. All project signs and construction signs shall conform to the following:
  - 1. Sign Panel: All cuts and edges shall be square and clean and all defects patched before painting.
  - 2. Image: Symbol or type may be screened or hand painted. No screen pattering, paint build-up, bleed-through or drips and runs will be allowed. Hand-made patterns must be carefully cut and true to the symbols provided therein. Only clear, crisp sign painting is acceptable. Hand-painted graphics shall be true to the design.
  - 3. Posts: All signposts shall be embedded in earth and braced. All signs 4' x 8' and larger shall have compacted gravel around each post.

END OF SECTION

**DIVISION 1 – GENERAL REQUIREMENTS**  
**Section 01 51 36 – Temporary Construction Water**

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PART 1. GENERAL

1.01 DESCRIPTION OF WORK

This Work consists of furnishing, hauling, and applying water for compacting embankments, constructing subgrade, placing of crushed surfacing, dust control, and as the Engineer requires.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 CONSTRUCTION REQUIREMENTS

The Contractor shall apply water by means of tank trucks equipped with spray bars. Spray controls shall ensure that the water flows evenly and in the amounts required by the Engineer. The Engineer may direct that the Contractor apply water at night or early in the morning to reduce evaporation losses.

PART 4 - MEASUREMENT AND PAYMENT

All cost associated with this section are to be considered incidental to the project and shall not be measured separately for payment.

END OF SECTION

## **DIVISION 1 – GENERAL REQUIREMENTS**

### **Section 01 57 19 – Spill Prevention, Control and Countermeasures Plan**

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#### **PART 1. GENERAL**

##### **1.01 RELATED WORK SPECIFIED ELSEWHERE**

The provisions and intent of the Contract, including the General Conditions, Supplementary Conditions, and General Requirements, apply to this work as if specified in this section. Work related to this section is described in:

- A. Section 00 73 19 Health and Safety Provisions
- B. Section 01 35 13 Special Provisions for Contaminated Sites
- C. Section 02 61 00 Removal and Disposal of Contaminated Soil
- D. Section 31 23 19 Site Water Control and Treatment
- E. Section 31 25 00 Erosion Control and Water Pollution Control

##### **1.01 DESCRIPTION OF WORK**

- A. In an effort to prevent, control, and stop water pollution and erosion within the project, thereby protecting the Work, nearby land, streams, and other bodies of water, the Contractor shall perform all Work in strict accordance with all Federal, State, and local laws and regulations governing waters of the State, as well as permits acquired for the project.
- B. The Contractor shall perform all temporary water pollution/erosion control measures shown in the Plans, specified in the Specifications, proposed by the Contractor and approved by the Engineer, or ordered by the Engineer as Work proceeds.

#### **PART 2 PRODUCTS**

Not Used

#### **PART 3 EXECUTION**

##### **3.01 SPILL PREVENTION, CONTROL AND COUNTERMEASURES PLAN**

- A. The Contractor shall prepare a project specific spill prevention, control and countermeasures (SPCC) plan to be used for the duration of the project. The plan shall be submitted to the Engineer prior to the commencement of any on site construction activities. The Contractor shall maintain a copy of the plan at the Work site, including any necessary updates as the Work progresses. If hazardous materials are encountered during construction, the Contractor shall do everything possible to control and contain the material until appropriate measures can be taken.

## **DIVISION 1 – GENERAL REQUIREMENTS**

### **Section 01 57 19 – Spill Prevention, Control and Countermeasures Plan**

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Hazardous material, as referred to within this Specification, is defined in RCW 70.105.010 under “Hazardous Substances”.

- B. Occupational safety and health requirements that may pertain to SPCC planning are contained in but not limited to WAC 296-824 and WAC 296-843.
- C. The SPCC plan shall address the following project-specific information:
  - 1. SPCC Plan Elements:
    - a. Site Information: Identify general site information useful in construction planning, recognizing potential sources of spills, and identifying personnel responsible for managing and implementing the plan.
    - b. Project Site Description: Identify staging, storage, maintenance, and refueling areas and their relationship to drainage pathways, waterways, and other sensitive areas, specifically address:
      - 1. The Contractor’s equipment maintenance, refueling, and cleaning activities.
      - 2. The Contractor’s on site storage areas for hazardous materials.
    - c. Spill Prevention and Containment: For each of the locations identified in B, above, specifically address:
      - 1. Spill prevention and containment measures to be used at each location.
      - 2. The method of collecting and treating, or disposing of runoff from each location.
      - 3. The method of diverting project runoff from each location.
    - d. Spill Response: Outline spill response procedures including assessment of the hazard, securing spill response and personal protective equipment, containing and eliminating the spill source, and mitigation, removal and disposal of the material.
    - e. Standby, On-Site, Material and Equipment: The plan shall identify the equipment and materials the Contractor will maintain on site to carry out the preventive and responsive measures for the items listed.
    - f. Reporting: The plan shall list all federal, state and local agency telephone numbers the Contractor must notify in the event of a spill.

## **DIVISION 1 – GENERAL REQUIREMENTS**

### **Section 01 57 19 – Spill Prevention, Control and Countermeasures Plan**

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- g. Program Management: Identify site security measures, inspection procedures and personnel training procedures as they relate to spill prevention, containment, response, management and cleanup.
- h. Preexisting Contamination: If preexisting contamination in the project area is described elsewhere in the Plans or Specifications, the SPCC plan shall indicate measures the Contractor will take to conduct Work without allowing release or further spreading of the materials.
- i. Work Below the Ordinary High Water Line: Identify equipment that will be used below the ordinary high water line. Outline daily inspection and cleanup procedures that ensure equipment is free of all external petroleum-based products. Identify refueling procedures for equipment that cannot be moved from below the ordinary high water line.
- j. Attachments: Site plan showing the locations identified in (1. B. and 1. C.) noted previously.
- k. Spill and Incident Report Forms, if any, that the Contractor will be using.

#### **3.02 IMPLEMENTATION REQUIREMENTS**

- A. The Contractor shall implement prevention and containment measures identified in the SPCC plan prior to performing any of the following:
  - 1. Placing materials or equipment in staging or storage areas
  - 2. Equipment refueling
  - 3. Equipment washing
  - 4. Stockpiling contaminated materials

#### **PART 4 MEASUREMENT AND PAYMENT**

All cost associated with this section are to be considered incidental to the project and shall not be measured separately for payment.

END OF SECTION

**DIVISION 1 - GENERAL REQUIREMENTS**  
**Section 01 60 00 – Product Requirements**

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PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General Conditions, Supplementary Conditions and Divisions 0 and 1 Specification Sections, apply to work of this Section.

1.02 SECTION INCLUDES

- A. This Section specifies administrative and procedural requirements for materials and equipment related to:
  1. Transportation and handling
  2. Storage and protection
  3. Product options

1.03 DEFINITIONS

- A. Performance Specifications: No manufacturer is specified, and requirements are specified by descriptive requirements, design requirements, performance requirements, reference standards, and codes. Product options complying with or exceeding provisions of Contract Documents are acceptable and require no Substitution Request.
- B. Closed Proprietary Specifications: Products by one or more manufacturers are specified and specification Section does not allow for approval of other products by Substitution Request. No other product options will be accepted. Provide products and Work specified.
- C. Open Proprietary Specifications: Products by one or more manufacturers are specified, and specification Section allows for approval of other products by Substitution Request. Submit Substitution Request for other products to Architect under provisions of this Section.

1.04 SUBSTITUTION REQUESTS DURING BIDDING PERIOD

- A. Submit Substitution Request to reach Architect's office before 5:00 PM at least ten (10) working days prior to date for receiving Bids, and in conformance with Instructions to Bidders.
- B. Bidders will be notified by Addendum of products approved in addition to those specified. No other form of approval, including verbal or implied, is acceptable to indicate approval of Substitution Request.

**DIVISION 1 - GENERAL REQUIREMENTS**  
**Section 01 60 00 – Product Requirements**

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**1.05 SUBSTITUTION REQUESTS DURING CONSTRUCTION PERIOD**

- A. Substitution Requests, submitted by Contractor will not be considered, except for the following reasons. Indicate one or more reasons why substitution is required with Substitution Request.
  - 1. Unavailability: Specified item has been discontinued or is unavailable in time to meet Construction Schedule through no fault of Contractor or subcontractor.
  - 2. Unsuitability: Subsequent information discloses specified item is unsuitable, inappropriate, unable to perform properly, or fit designated space.
  - 3. Regulatory Requirements: Substitution is required to comply with Code interpretations or insurance regulations.
  - 4. Warranty: Manufacturer or fabricator declare specified item to be unsuitable for use intended or refuses to certify or warrant performance of specified item for Project.
- B. During Construction Period, Contractor will be notified by Architect in writing of decision to accept or reject Substitution Request.

**1.06 SUBMITTAL REQUIREMENTS**

- A. Submit two copies of Substitution Request. Limit each request to one Substitution Request form.
- B. Burden of proof is upon Substitution Request, as proposed, to show compliance with specified requirements. Submit drawings, product data, samples, certified test results, and as needed to fully describe Substitution request for evaluation by Architect.
- C. Where product data includes other than that proposed by substitution Request, clearly mark, or otherwise indicate, exact substitution.
- D. Document each Substitution Request with complete data substantiating that proposed substitution complies with provisions of Contract Documents.
- E. Submission of Substitution Request constitutes representation that Bidder or Contractor:
  - 1. Has investigated proposed product and determined that it meets or exceeds, in all respects, specified product.
  - 2. Shall provide the same or better warranty for substitution as for specified product.
  - 3. Shall be responsible for effect of substitution upon related Work, shall coordinate installation, and be responsible for other changes which may be required for Work to be complete in all respects, in compliance with design intent and in compliance with all applicable codes and regulatory requirements.

**DIVISION 1 - GENERAL REQUIREMENTS**  
**Section 01 60 00 – Product Requirements**

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4. Be responsible for additional costs which may subsequently become apparent. This includes additional costs for required additional Architect's services made necessary by the substitution.
  5. Shall provide all cost savings to Contract Sum as credits.
  6. Shall provide specified product, material, or system should substitution be rejected, at no change in Contract Sum.
- F. Substitutions indicated or implied on submittals, such as Shop Drawings, will not be accepted.
- G. Products and materials included in the Work, not specified or approved by Substitution Request, are defined as Non-Conforming Work. Remove and replace with conforming Work at Contractor's expense with no increase in Contract Time, as directed by Architect.

**1.07 ARCHITECT WILL NOT CONSIDER**

- A. Substitution Requests which do not provide adequate or clearly defined information for complete and timely appraisal.
- B. Substitutions which, if accepted, will require substantial revisions of Contract Documents.
- C. Substitution indicated or implied by Shop Drawings and other submittals.
- D. Substitutions not approved by published Addendum during Bid Period or not approved in writing by Architect during Construction period.
- E. Substitutions not submitted on completed Substitution Request Form.

**PART 2 - PRODUCTS - NOT USED**

**PART 3 - EXECUTION - NOT USED**

**END OF SECTION**



**DIVISION 1 - GENERAL REQUIREMENTS**  
**Section 01 61 00 – Substitution Request Form**

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SUBMITTED TO:

PROJECT: Port of Port Angeles  
Multi-Tenant Industrial Building Facility Improvements – Phase 2

SPECIFIED ITEM:

Section No. Paragraph No. Description of Specified Item

The Undersigned requests consideration for the following substitution to that specified

PROPOSED SUBSTITUTION:

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ATTACHED DATA:

Include product description, specifications, drawings, photographs, performance, and test data as necessary for evaluation. Clearly identify proposed substitution and portions of data from other items where more than one item is described.

Include description of changes to Contract Documents required by proposed substitution.

CERTIFICATION:

The Undersigned certifies that the following paragraphs are correct:

1. Proposed substitution does not affect dimensions shown on Drawings.
2. The Undersigned will pay for changes to building design, including engineering design, detailing, and construction costs, caused by requested substitution.
3. Proposed substitution will have no adverse effect on other trades, Construction Schedule, or specified warranty requirements.
4. Maintenance and service parts will be locally available for proposed substitution.

Undersigned further states that function, appearance, and quality of proposed substitution are equivalent or superior to specified item.

**DIVISION 1 - GENERAL REQUIREMENTS**  
**Section 01 61 00 – Substitution Request Form**

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SUBMITTED BY:

Signature \_\_\_\_\_

Firm \_\_\_\_\_

Address \_\_\_\_\_

Date \_\_\_\_\_

Telephone (    ) \_\_\_\_\_

FAX (    ) \_\_\_\_\_

LIST ATTACHMENTS:

FOR USE BY ARCHITECT:

Approved                       Approved as Noted

Not Approved                 Received too Late

By \_\_\_\_\_

Date \_\_\_\_\_

Remarks \_\_\_\_\_

END OF SECTION

## **DIVISION 1 - GENERAL REQUIREMENTS**

### **Section 01 70 00 - Project Closeout**

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#### **PART 1 - GENERAL**

- A. RELATED WORK DESCRIBED ELSEWHERE
  - 1. Section 01 78 50 – Operations and Maintenance Data
- B. The provisions and intent of the Contract, including the General Conditions, Supplementary Conditions, and other sections of the General Requirements apply to this work as if specified in this section. Work related to this section is described throughout the specifications.
- C. Prior to requesting final inspection, the Contractor shall assure itself that the project is complete in all aspects.

#### **PART 2 - PRODUCTS**

##### **2.01 WARRANTY**

- A. The Contractor warrants the labor, materials and equipment delivered under the contract to be free from defects in design, material, or workmanship, and against damage caused prior to final inspection. Unless otherwise specified, this warranty extends for a period of one (1) year from the date of Substantial Completion.
- B. The Contractor shall promptly repair or replace all defective or damaged items delivered under the contract. The Contractor may elect to have any replaced item returned to Contractor's plant at Contractor's expense.
- C. In the event of equipment failure, during such time or in such a location those immediate repairs are mandatory, the Contractor shall respond promptly, irrespective of time. If the Contractor is not available, the Port will effect repairs. The Contractor shall then reimburse the Port for parts and labor necessary to correct deficiencies as defined within the warranty clause and time.

#### **PART 3 - EXECUTION**

##### **3.01 FINAL DOCUMENTS**

- A. Final Project Record Documents
  - Supply Final Record Documents as specified in Specification Section 01 78 90.
- B. The Contractor shall furnish a minimum of 3 copies of each Operation and Maintenance manual prior to substantial completion.
  - 1. Operations and Maintenance manuals must be separate for each item, and will be comprehensive in nature and include all information required for the proper operation and maintenance of

## **DIVISION 1 - GENERAL REQUIREMENTS**

### **Section 01 70 00 - Project Closeout**

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contract installed items. Documentation must include cover, title sheet, table of contents, system description, MSDS, manufacturer's catalog and fact sheets, drawings and diagrams. Copies of required warranties must be included.

#### **3.02 CLEAN-UP**

- A. Final clean-up and clean-up during the course of the work is defined in the General Conditions Paragraph 04.25. Those paragraphs are supplemented to provide the following:
1. General: Prior to completion of the work, remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste.
  2. Site: Unless otherwise specifically directed by the Engineer, hose down all paved areas on the site and all public sidewalks directly adjacent to the site. Completely remove all resultant debris.
  3. Timing: Schedule final cleaning as approved by the Engineer to enable the Port to occupy a completely clean project.

END OF SECTION

**DIVISION 1 - GENERAL REQUIREMENTS**  
**Section 01 78 50 – Operations and Maintenance Data**

---

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General Conditions, Supplementary Conditions and Divisions 0 and 1 Specification Sections, apply to work of this Section.

1.02 SUMMARY

- A. To aid the continued instruction of operating and maintenance personnel, and to provide a positive source of information regarding the products incorporated into the Work, furnish and deliver the data described in this Section and in pertinent other Sections.
- B. Related Work:
  - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1.
  - 2. Required contents of submittals also may be amplified in pertinent other Sections.

1.03 SUBMITTALS

- A. Comply with applicable provisions of Section 01 33 00.
- B. Submit two copies of a preliminary draft of the proposed Manual or Manuals to the Architect for review and comments.
- C. Unless otherwise directed in other Sections, or in writing by the Architect, submit three copies of the final Manual to the Architect prior to instruction of operation and maintenance personnel.

1.04 QUALITY ASSURANCE

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

**DIVISION 1 - GENERAL REQUIREMENTS**  
**Section 01 78 50 – Operations and Maintenance Data**

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PART 2 - PRODUCTS

2.01 INSTRUCTIONS

- A. Where instruction Manuals are required to be submitted under other Sections of these Specifications, prepare in accordance with the provisions of this Section.
  
- B. Format:
  - 1. Size: 8-1/2" x 11".
  - 2. Paper: White bond, at least 20 lb wt.
  - 3. Text: Neatly written or printed.
  - 4. Drawings: 11 inch height preferable; bind in with text; foldout acceptable; larger drawings acceptable but fold to fit within the Manual and provide a drawing pocket inside rear cover or bind in with text.
  - 5. Flysheets: Separate each portion of the Manual, by Specification Section, with neatly prepared flysheets briefly describing contents of the ensuing portion; flysheets may be in color.
  - 6. Binders: Commercial quality heavy-duty plastic or fiberboard 3-ring D-ring binders. All binding is subject to the Architect's approval.
  - 7. Measurements: Provide all measurements in U. S. standard units such as feet-and-inches, lbs, and cfm.
  - 8. Manuals shall be clearly identified on the cover with at least the following information:

2.02 OPERATING AND MAINTENANCE INSTRUCTIONS

- A. Labels: Provide labels as follows:

( )  
( Name and address of work )  
\_\_\_\_\_  
( )  
( Name of contractor )  
\_\_\_\_\_  
( )  
( General subject of this Manual )  
\_\_\_\_\_  
( )  
(Space for approval signature of )  
\_\_\_\_\_  
(The Architect and approval date )  
\_\_\_\_\_

- B. Contents: Include at least the following:

**DIVISION 1 - GENERAL REQUIREMENTS**  
**Section 01 78 50 – Operations and Maintenance Data**

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

**PART 3 - EXECUTION**

**3.01 INSTRUCTION MANUALS**

- A. Preliminary:
  1. Prepare a preliminary draft of each proposed Manual.
  2. Show general arrangement, nature of contents in each portion, probable number of drawings and their size, and proposed method of binding and covering.
  3. Secure the Architect's approval prior to proceeding.
- B. Final: Complete the Manuals in strict accordance with the approved preliminary drafts and the Architect's review comments.
- C. Revisions:
  1. Following the indoctrination and instruction of operation and maintenance personnel, review all proposed revisions of the Manual with the Architect.
  2. If the Contractor is required by the Architect to revise previously approved Manuals, compensation will be made as provided for under "Changes" in the General Conditions.

END OF SECTION

**DIVISION 1 - GENERAL REQUIREMENTS**  
**Section 01 78 90 - Project Record Documents**

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PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General Conditions, Supplementary Conditions and Divisions 0 and 1 Specification Sections, apply to work of this Section.

1.02 SUMMARY

- A. Section Includes:
  - 1. Throughout progress of the Work, maintain an accurate record of changes in Contract Documents, as specified.
  - 2. Product Substitution Procedures: Section 01 60 00.
  - 3. Upon completion of the Work, transfer recorded changes to a set of Record Documents, as specified.
  - 4. Other requirements affecting Project Record Documents may appear in other pertinent Sections.

1.03 SUBMITTALS

- A. Comply with pertinent provisions of Section 01 33 00.
- B. Architect's approval of the current status of Project Record Documents may be a prerequisite to the Architect's approval of requests for progress payment and request for final payment under the Contract.
- C. Prior to submitting request for final payment, submit final Project Record Documents, including any on-site survey, to the Architect and secure approval.

1.04 QUALITY ASSURANCE

- A. Delegate the responsibility for maintenance of Record Documents to one person on the Contractor's staff as approved by the Architect.
- B. Accuracy of records:
  - 1. Thoroughly coordinate changes within Record Documents, making adequate and proper entries on each page of Specifications and each sheet of Drawings and other Documents where such entry is required to show the change properly.
  - 2. Accuracy of records shall be such that future search for items shown in Contract Documents may rely reasonably on information obtained from approved Project Record Documents.
  - 3. Make entries within 24 hours after receipt of information that the change has occurred.



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**Section 01 78 90 - Project Record Documents**

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1.05 PRODUCT HANDLING

- A. Maintain job set of Record Documents completely protected from deterioration and from loss and damage until completion of the Work and transfer of all recorded data to final Project Record Documents.
- B. In the event of loss of recorded data, use means necessary to again secure data to Architect's approval.
  - 1. Such means shall include, if necessary in the opinion of the Architect, removal and replacement of concealing materials.
  - 2. In such case, provide replacements to the standards originally required by Contract Documents.

PART 2 - PRODUCTS

2.01 RECORD DOCUMENTS:

- A. Job set: Promptly following receipt of Owner's Notice to Proceed, secure from the Architect at no charge to the Contractor one complete set of all Documents comprising the Contract.
- B. Final Record Documents: At a time nearing completion of the Work, Contractor to clearly mark in red all as-built conditions for existing underground utilities, conduits, pipes, drains ect.

PART 3 - EXECUTION

3.01 MAINTENANCE OF JOB SET

- A. Immediately upon receipt of the job set described in Paragraph 2.01.A, identify each of the Documents with the title, "RECORD DOCUMENTS - JOB SET."
- B. Preservation:
  - 1. Considering the Contract completion time, probable number of occasions upon which the job set must be taken out for new entries and for examination, and conditions under which these activities will be performed, devise a suitable method for protecting the job set to the approval of the Architect.
  - 2. Do not use the job set for any purpose except entry of new data and for review by the Architect, until start of transfer of data to final Project Record Documents.
  - 3. Maintain job set at the site of Work as that site is designated by the Architect.
- C. Making entries on Drawings:

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**Section 01 78 90 - Project Record Documents**

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1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe the change by graphic line and note as required.
  2. Date all entries.
  3. Call attention to the entry by a "cloud" drawn around the area or areas affected.
  4. In the event of overlapping changes, use different colors for overlapping changes.
- D. Make entries in pertinent other Documents as approved by the Architect. In addition to Drawings and Specifications, a current set of the following documents shall be maintained in the Field Office Building: Addenda, Shop Drawings, Field Clarifications, Modification Proposals, Change Orders, and other Contract Modifications.
- E. Conversion of schematic layouts:
1. In some cases on the Drawings, underground utilities, arrangements of conduits, circuits, piping, ducts, and similar items are shown schematically and are not intended to portray precise physical layout.
    - a. Final physical arrangement is determined by the Contractor, subject to the Architect's approval.
    - b. However, design of future modifications of the facility may require accurate information as to the final physical layout of items which are shown only schematically on the Drawings.
  2. Show on the job set of Record Drawings, by dimension accurate to within one inch, the centerline of each run of items such as are described in subparagraph 3.01.E.1 above.
    - a. Clearly identify the item by an accurate note such as "cast iron drain," "galv. water," and similar items.
    - b. Show, by symbol or note, vertical location of the item ("under slab," "in ceiling plenum," "exposed," and similar situations).
    - c. Make all identification sufficiently descriptive that it may be related reliably to Specifications.
  3. The Architect may waive requirements for conversion of schematic layouts where, in the Architect's judgment, conversion serves no useful purpose. However, do not rely upon waivers being issued except as specifically issued in writing by the Architect.
- F. Final Project Record Documents:
1. The purpose of the final Project Record Documents is to provide factual information regarding all aspects of the Work, both concealed and visible to enable future modification of the Work to proceed without lengthy and expensive site measurement, investigation, and examination.
  2. Approval of recorded date prior to transfer:

**DIVISION 1 - GENERAL REQUIREMENTS**  
**Section 01 78 90 - Project Record Documents**

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- a. Carefully transfer change data shown on the job set of Record Drawings to the corresponding transparencies, coordinating changes as required.
    - b. Make required revisions.
  3. Transfer of data to Drawings:
    - a. Carefully transfer change data shown on the job set of Record Drawings to the corresponding transparencies, coordinating the changes as required.
    - b. Clearly indicate at each affected detail and other Drawing a full description of changes made during construction, and the actual location of items described in subparagraph 3.01.E.1 above.
    - c. Call attention to each entry by drawing a "cloud" around the area or areas affected.
    - d. Make changes neatly, consistently, and with the proper media to assure longevity and clear reproduction.
    - e. The job set of record drawings shall be made available to the Architect for cross checking the corresponding transparencies after the transmittal of the transparencies to the Architect.
  4. Transfer of data to other Documents:
    - a. If Documents other than Drawings have been kept clean during progress of the Work, and if entries thereon have been orderly to the approval of the Architect, the job set of those Documents other than Drawings will be accepted as final Record Documents.
    - b. If any such Document is not so approved by the Architect, secure a new copy of that Document from the Architect at the Architect's usual charge for reproduction and handling, and carefully transfer the change data to the new copy to the approval of the Architect.
  5. Review and submittal:
    - a. Submit completed set of Project Record Documents to the Architect as specified herein.
    - b. Participate in review meetings as required
    - c. Make required changes and promptly deliver the final Project Record Documents to the Architect.
- G. Changes Subsequent To Acceptance: The Contractor has no responsibility for recording changes in the Work subsequent to Final Completion, except for changes resulting from work performed under Warranty.

END OF SECTION

**DIVISION 1 – GENERAL REQUIREMENTS**  
**Section 01 82 00 – Demonstration and Training**

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PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General Conditions, Supplementary Conditions and Divisions 0 and 1 Specification Sections, apply to work of this Section.

1.02 SECTION INCLUDES

- A. Section includes general requirements and procedures for demonstration of products and systems, and training of Owner's operating and maintenance personnel.
- B. Work requiring instruction of Owner's personnel is specified in individual Sections.
- C. Related Sections:
  - 1. Operation and Maintenance Data: Section 01 78 50.

1.03 COMMISSIONING

- A. Schedule instructional meeting or meetings within 2 weeks after Operation and Maintenance manuals have been accepted by the Architect.
- B. Prior to final inspection, fully qualified manufacturers' representatives shall fully instruct Owner's designated operating and maintenance personnel in operation, adjustment, and maintenance of equipment and systems.
- C. Basis of Instruction: Operation and maintenance manuals. Review contents of manuals with Owner's designated personnel, in full detail, to explain all aspects of operation and maintenance.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

**DIVISION 3 - CONCRETE**  
**Section 03 30 01 – Concrete Floor Slabs**

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PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General Conditions, Supplementary Conditions and Divisions 0 and 1 Specification Sections, apply to work of this Section.

1.02 SECTION INCLUDES

- A. Formwork, reinforcing, placement, finishing and curing for concrete floor slabs.

1.03 REFERENCES

- A. All references shall be the latest adopted edition.
- B. American Concrete Institute International:
  - 1. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; American Concrete Institute International
  - 2. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International
  - 3. ACI 302.1R - Guide for Concrete Floor and Slab Construction; American Concrete Institute International
  - 4. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; American Concrete Institute International
  - 5. ACI 305R - Hot Weather Concreting; American Concrete Institute International
  - 6. ACI 306R - Cold Weather Concreting; American Concrete Institute International
  - 7. ACI 318 - Building Code Requirements for Reinforced Concrete and Commentary; American Concrete Institute International
- C. ASTM International:
  - 1. ASTM C33 - Standard Specification for Concrete Aggregates
  - 2. ASTM C94 - Standard Specification for Ready-Mixed Concrete
  - 3. ASTM C150 - Standard Specification for Portland Cement
  - 4. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete
  - 5. ASTM C494 - Specification for Chemical Admixtures for Concrete
  - 6. ASTM C1059 - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete
  - 7. ASTM C1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)

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8. ASTM F1249 - Standard Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor
9. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)

#### **1.04 SUBMITTALS**

- A. Refer to Section 01 33 00, for submittal procedures.
- C. Product Data:
  1. Submit product data for concrete design mix(s) from concrete supplier for each different floor slab condition.
  2. Under slab vapor retarder.
- D. Design Mixes: For each concrete mix, submit proposed mix designs a minimum of 15 days in advance of placing operations for each type of concrete. The submitted mix designs shall include the following:
  1. Supporting test data for mixes that is not more than 12 months old. Include a sufficient number of tests and conduct a statistical analysis in compliance with ACI 301.
  2. Gradation of fine and coarse aggregates not more than 90 days old showing compliance with ASTM C33.
  3. Proportions of all ingredients, including all admixtures added either at the time of batching or at the job site. Aggregate weights shall be based upon saturated surface dry conditions.
  4. Water/cement ratio.
  5. Slump as measured according to ASTM C143. Provide slump test for each mix.
  6. Air content of freshly mixed concrete as measured according to ASTM C231.
  7. Strength measured at 7 and 28 days. Provide strength test for each mix at a frequency of both the 7<sup>th</sup> and 28<sup>th</sup> day.
  8. Certifications that all ingredients in each mix are compatible.
  9. Locations or intended use of each mix design.
  10. Source of all materials.
- E. Material Certificates: Signed by manufacturer's certifying that each of the following items complies with the requirements:
  1. Cementitious materials and aggregates. Include mill certificates for cement.
  2. Steel reinforcement and reinforcement accessories.
  3. Curing materials.
- F. Joint Layout Shop Drawings: Indicate proposed layout for control joints.

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### **Section 03 30 01 – Concrete Floor Slabs**

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- G. Steel Reinforcement Shop Drawings: Details of fabrication, bending, and placement prepared according to ACI 315, “Details and Detailing of Concrete Reinforcement” and as follows:
  - 1. Include material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement, and supports of concrete reinforcement.
  - 2. Include special reinforcement required for openings through concrete structures.
  - 3. Provide placement details for all specific reinforcing intersections and clearance conditions not shown by the typical details on the structural drawings.
  - 4. Prepare drawings in sufficient detail to resolve all reinforcing intersections.

#### **1.05 QUALITY ASSURANCE**

- A. Perform work of this section in accordance with ACI 301 and ACI 318.
- B. Acquire cement from same source and aggregate from same source for entire project.
- C. Perform reinforcing steel installation in accordance with ACI 301.
- D. Follow recommendations of ACI 305R when concreting during hot weather and as specified in General Notes on the Structural Drawings
- E. Follow recommendations of ACI 306R when concreting during cold weather and as specified in General Notes on the Structural Drawings.

#### **1.06 PROJECT CONDITIONS**

- A. Unless adequate protection is provided and acceptance is obtained, concrete shall not be placed during rain, sleet, or snow.
- B. Rainwater shall not be allowed to increase mixing water nor to damage surface finish.
- C. When temperature of surrounding air is expected to be below 40 degrees F during placing or within 24 hours after placing, temperature of plastic concrete, as placed, shall be no lower than 55 degrees F for sections less than 12 inches in any dimension nor 50 degrees F for any other sections. Temperature of concrete as placed shall not exceed 90 degrees F.

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**Section 03 30 01 – Concrete Floor Slabs**

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**PART 2 - PRODUCTS**

**2.01 FORMWORK MATERIALS**

- A. Form Materials (for concrete not exposed to view): Provide per ACI 347R at discretion of Contractor.
- B. Form Material For Type 1 and 2 Concrete Finish (exposed to view): APA rated B-B High Density Concrete Form Overlay plywood, Class I, conforming to PS 1.
  - 1. Plywood shall be new, or used once with face free of defects and nail holes filled.

**2.02 FORM ACCESSORIES:**

- A. Shoring And Bracing: Provide materials/system designed by Contractor to withstand all imposed construction forces.
- B. Form Release Agent: Colorless, non-staining, low or no VOC, will not adversely affect surface coatings or waterproofing.
- C. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.

**2.03 INSERTS & EMBEDS**

- A. Inserts And Embeds: Steel or ductile iron as specified on Structural Drawings, type and configuration suitable for intended load/connection and rated for intended load with generous margin of safety.
- B. Anchorbolts: As specified on Structural Drawings.

**2.04 REINFORCEMENT**

- A. Reinforcing Steel and Welded Wire Mesh: As specified in General Notes on the Structural Drawings.
  - 1. Welded Wire Mesh: As specified on General Notes on the Structural Drawings.
- B. Reinforcement Accessories:
  - 1. Tie Wire: Annealed, minimum 16 gage.
  - 2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
  - 3. Where reinforcement is installed over underslab vapor retarder, provide metal or concrete support pads that will not damage the vapor retarder.



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### Section 03 30 01 – Concrete Floor Slabs

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- a. Provide stainless steel or plastic components for placement within 1-1/2" of weathering surfaces.
- C. Fabrication:
  - 1. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice.
  - 2. Welding of reinforcement is permitted only with the specific approval of Structural Engineer. Perform welding in accordance with AWS D1.4.
  - 3. Locate reinforcing splices not indicated on drawings at point of minimum stress.

#### 2.05 CONCRETE MATERIALS

- A. Cement: As specified in General Notes on the Structural Drawings.
- B. Slag Or Flyash:
  - 1. Slag Or Flyash - Select One Only:
    - a. Slag: Ground granulated blast furnace slag conforming to ASTM C989 Grade 100 or 120.
    - b. Flyash: Conform to ASTM C618, Class F.
    - c. Manufacturers:
      - 1) Boral Material Technologies, Inc.
      - 2) Full Circle Solutions, Inc.
      - 3) Headwater Resources, Inc.
      - 4) Holcim US, Inc.
      - 5) Lafarge North America
      - 6) Mineral Resources Technologies, LLC
      - 7) Mineral Solutions, Inc.
      - 8) The SEFA Group
- D. Aggregates:
  - 1. Aggregates: Conform to the requirements of ASTM C33 and subject to the approval of the structural engineer.
    - a. Do not use high alkaline content aggregates that would prevent slab surface from achieving a pH of 9 or less after curing and dehydration.
- E. Water: Potable and complying with ASTM C94

#### 2.07 ADMIXTURES

- A. Admixtures: As specified in General Notes on the Structural Drawings.
  - 1. Water-Reducing Admixture – Super Plasticizer: Conform to ASTM C494, Type F, provide water reducing, super-plasticizing admixture to concrete mix as required to maintain the water/cement ratio

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specified herein and improve workability and slump required for proper placement, consolidation and finishing.

**2.08 CONCRETE MIX DESIGN**

- A. Proportioning Normal Weight Concrete: Provide concrete mix design that will result in concrete as specified in the General Notes on the Structural Drawings and this Section. Comply with ACI 211.1 recommendations. In addition to the requirements of the General Notes on the Structural Drawings, conform with the following special requirements:
1. Water/Cement Ratio: 0.40 or less; add water-reducing admixture as required to achieve.
  2. Concrete shall not contain high alkaline content aggregates that would prevent slab surface from achieving a pH of 9 or less after curing and dehydration.

**2.09 MIXING**

- A. Transit Mixers: Comply with ASTM C94.

**2.10 CONCRETE ACCESSORIES**

- A. Bonding Agent: ASTM C1059, Type II acrylic non-redispersable type.
- B. Non-Shrink Grout: As specified in General Notes on the Structural Drawings.

**2.12 CONSTRUCTION & CONTROL JOINT ACCESSORIES**

- A. Sealant Filled Control Joints – Slabs Exposed To View: Rigid expansion joint filler conforming with ASTM D1751 or D1752 as required by sealant manufacturer.
1. Removable Top: Provide W.R. Meadows *Snap-Cap* plastic removable top.
  2. Joint Width: 1/2 inch.
- B. Control Joints – Slabs Concealed From View: T-shaped vinyl control joint.
1. W.R. Meadows *Speed-E-Joint*
  2. Zip Strip
  3. Or similar
- C. Expansion/Isolation Joints: Furnish resilient bituminous type. Conform to detail and thickness as shown on drawings.
1. Sternson Ltd. *Flexcell*
  2. Grace Construction Products *Fiber*
  3. Homosote Co. *Homex 300*

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4. Old North Mfg. Co., Inc. *Gray-Flex*
5. Or approved, non-extruding type, full depth of slab as required to bring top to within 1/4 inch of surface of slab, conforming to ASTM D1751.

#### 2.13 SCREED SYSTEM

- A. Select a screed support system that does not penetrate or damage the underslab vapor retarder while providing the level control required to achieve specified floor slab surface tolerances.
  1. Screed System: Grann Adjustable Quick Screed (800.554.7266), or similar screed chairs from either Dayton Richmond (800.745.3700) or Aztek (877.531.3344)
- B. Coordinate flush pipe and conduit penetrations through slab with Divisions 20 through 28 if required to accommodate screed system selected.

#### 2.14 CURING MATERIALS

- A. General: Refer to Curing Schedule in Part 3 of this Section.
- B. Type 1 Curing – Water Curing: Select from the following options as appropriate for conditions:
  1. Option 1 - Continuous Water Curing: Provide water spray equipment to cover entire slab area.
  2. Option 2 – Sheet/Blanket Curing: Curing sheet consisting of white polyethylene sheet with water retaining polyester fabric or natural cellulose fiber backing.
    - a. PNA *HydraCure S16* or *M5*, phone: (800)-542-0214.
    - b. McTech Group *UltraCure SUN*, phone: (866) 913-8363.
    - c. Cold Weather Curing: Whenever there is the potential for freezing temperatures or frost occurring after concrete slabs are placed at any time during the curing period, provide heated enclosure around/over slab or install reinforced polyethylene sheet blanket filled with polypropylene foam insulation or other type of insulating blanket over the curing sheet to protect slabs from freeze damage.
- C. Type 2 Curing: Liquid-type containing minimum 16% acrylic solids, clear acrylic, copolymer curing compound, sealer, dustproofer and hardener conforming to ASTM C309, Type I, Class A and B; Euclid *Aqua-Cure VOX* OR Sealer: “Surebond SB-7000” as manufactured by Sure Bond Company, [info@surebond.com](mailto:info@surebond.com), 888-447-8731 **OR approved substitutions.**

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PART 3 - EXECUTION

3.01 COORDINATION

- A. Review, coordinate and accommodate work of other trades that interface with, affect or are affected by the work of this Section so as to facilitate the execution of the overall Work of this project in a coordinated and efficient manner.
- B. Coordinate and facilitate recessed concrete slab construction to meet requirements of tile flooring.
- C. Coordinate and facilitate concrete slab construction to meet requirements of floor covering manufacturers.
- D. Coordinate and adjust concrete mix and additives to comply with requirements of manufacturers of coatings, sealants and adhesives applied to concrete.
- E. Coordinate and facilitate rough-in, openings and penetrations for mechanical and electrical items in concrete construction with Divisions 20 through 28.
- F. Coordinate and facilitate floor slab slope and heights of floor drains with Division 22 to assure adequate drainage.

3.02 EXAMINATION

- A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.03 PREPARATION

- A. Verify that forms are clean and free of rust before applying release agent.
- B. Coordinate placement of joint devices with erection of concrete formwork and placement of form accessories.
- C. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.
  - 1. Utilize screed system for slabs with underslab vapor retarder that does not penetrate or damage the vapor retarder.

3.04 FORMWORK

- A. Edge Forms:
  - 1. Construct edge forms and bracing, for slabs on grade, metal floor

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### **Section 03 30 01 – Concrete Floor Slabs**

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- decking and decks with waterproof membrane to achieve design requirements, in accordance with requirements of ACI 301.
- 2. Arrange and assemble forms to permit dismantling and stripping so as to avoid damage to concrete during stripping.
- 3. Apply form release agent on forms in accordance with manufacturer's recommendations.
  - a. Protect reinforcing steel, inserts and bonding surfaces from application of any form release agent.
- B. Screeds: Utilize a screed system to facilitate placement of concrete to a uniform flat plane; with uniform slope where shown or required for drainage
- C. Inserts, Embedded Work and Openings
  - 1. Provide formed openings for work by other trades and items passing through concrete work.
  - 2. Locate and set in place items that will be cast directly into concrete.
  - 3. Coordinate with work of other sections in forming and placing openings, slots, recesses, sleeves, bolts, anchors, other inserts, and components of other work.
  - 4. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.
- D. Install construction joint devices in coordination with floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.

#### **3.05 REINFORCING STEEL PLACEMENT**

- A. Place, support and secure reinforcement against displacement. Do not deviate from required position.
- B. Do not displace or damage underslab vapor retarder.
- C. Accommodate placement of formed openings.
- D. Conform to applicable code for concrete cover over reinforcement.

#### **3.07 CONTROL OF CONCRETE SLAB CONSTRUCTION**

- A. Coordinate and control the installation and protection of the entire concrete slab assembly including the Underslab capillary break, selection of the concrete design mix, water added to concrete on the site, placement of concrete, slab finishing methods, slab curing methods and dry-out of the concrete slabs so as to achieve a crack-free slab and the

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surface finish, vapor emission rate, moisture content and pH level required for and by the floor covering manufacturer(s) for successful application of their products.

- B. Select and provide the equipment and power/fuel required to dry out concrete floor slabs to required moisture content and vapor emission rate required for the successful installation of any floor covering or coating being applied.

#### 3.08 CONSTRUCTION & CONTROL JOINTS

- A. Construction Joint Layout: Coordinate proposed construction joint layout with Architect and Structural Engineer **prior to placement of any concrete within the apparatus bays.**
- B. Construction Joints: Construct full depth keyed form in configuration shown on Drawings or as approved by Architect.
  - 1. Remove temporary forms carefully and protect exposed edge of concrete from damage.
- C. Control Joints:
  - 1. Control Joints – Slabs Exposed To View: Install removable top sealant filled control joint; align straight and true.
  - 2. Sealant specified in Section 07 90 00.
  - 3. Control joint filler specified in Section 03 33 13.
  - 4. Concealed Condition Under Floor Covering: Install T-shaped vinyl control joint in slab with removable top.
- D. Tooled/Scored Control Joints: Tooled joints made in wet concrete, with uniform appearance, straight and true, depth as follows:
  - 1. Joints shall be straight and true.

#### 3.09 TOLERANCES

- A. Floor Slab Surface Tolerances: Floor slabs shall be constructed to achieve the following tolerances when measured in accordance with ACI 302.1R:
  - 1. Maximum Variation of Surface Flatness For Concrete Floors: 1/4 inch in 10 feet.

#### 3.10 PLACING CONCRETE

- A. Place concrete in accordance with ACI 304R.
- B. Place concrete for floor slabs in accordance with ACI 302.1R.
- C. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

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- D. Protect underslab vapor retarder from damage during concrete placement. Repair vapor retarder damaged during placement of concrete reinforcing or concrete. Repair with vapor retarder material; lap over damaged areas minimum 6 inches and seal watertight.
- E. Install construction joint devices in coordination with floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.
- F. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
- G. Place concrete continuously between predetermined expansion, control, and construction joints.
- H. Do not interrupt successive placement; do not permit cold joints to occur.
- I. Place floor slabs with joint locations as shown on the Drawings or, where not shown, as approved by Architect.
- J. Screed floors to a level flat plane, maintaining specified surface flatness.
- K. In areas with floor drains, maintain design floor elevation at walls; slope surfaces uniformly to drains as indicated on Drawings or as directed by Architect (minimum 1/8" per foot nominal). Ponding water around drains is not acceptable.
  - 1. Floors Without Floor Covering: Surface of concrete adjacent to floor drain shall be 1/16" to 3/32" above top of floor drain and shall not pond water, transition slope to edge of floor drain shall be smooth without a sharp edge/drop-off.
  - 2. Floors With Floor Covering: Hold top of concrete below top of grate to allow floor covering to install flush with top of drain grate. Coordinate height of drain grate to match floor covering.
- L. Where there are walls or permanent cabinets with bases to be installed after slab is placed, the floor slope should be started at the wall or cabinet base location.

#### **3.11 FLOOR FINISHING**

- A. General: Finish concrete floor surfaces with bull float, wood/magnesium hand floats and steel trowels in accordance with ACI 301 and ACI 302.1R.
  - 1. Do not dust slab with cement powder while finishing.
- B. Broom finish exterior slab to match existing.

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**3.12 CURING**

- A. Cure concrete slabs in accordance with ACI 308 and the following to properly moisture cure the concrete and to reduce/eliminate uncontrolled shrinkage cracking.
1. Type 1 Curing - Continuous Water Curing or Curing Sheet/Blanket:
    - a. Continuous Water Cure: Set up water spray equipment to maintain concrete slabs in a continuously wet condition for the entire curing period.
      - 1) Install timers or other methods on spray equipment to allow timed spray operation prevent overwatering of the site.
      - 2) Slabs shall not be allowed to dry out for the entire curing period.
    - b. Curing Sheet/Blanket: Place over entire slab in conformance with manufacturer's installation instructions and the following
      - 1) After finishing is complete and prior to slab drying in any area, thoroughly wet the entire slab with a continuous film of water sufficient to completely saturate the backside of the curing membrane when unrolling.
      - 2) Unroll moisture retaining curing sheet continuously over wet slab to trap surface water and maintain slab in damp condition during curing.
      - 3) Overlap sheet edges and ends 4 inches and secure edges with framing lumber to prevent wind from blowing curing sheet off slab.
      - 4) Extend sheet 8 inches beyond perimeter of slab and secure sheet tightly at slab perimeter with framing lumber to prevent wind from blowing curing sheet off slab.
      - 5) Use a roller to remove any air bubbles.
      - 6) Maintain sheet in place in undamaged condition for 7 days minimum and until concrete design strength is achieved; repair any damage to sheet immediately.
  2. Liquid Type Curing/Sealing Compound:
    - a. Apply 2 separate coats of curing and sealing compound to concrete slabs as soon as final finishing operations are complete (immediately after surface water sheen has disappeared) in strict conformance with manufacturer's installation instructions.
    - b. Apply uniformly at manufacturer's recommended application rate for uniform and complete coverage in continuous



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- operation by power spray or roller.
- c. Recoat areas subjected to heavy rainfall within 3 hours after initial application.
- d. Maintain continuity of coating and repair damage during curing period.

**3.13 FIELD QUALITY CONTROL**

- A. Concrete Mix Design: Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.

END OF SECTION

**DIVISION 7 - THERMAL AND MOISTURE PROTECTION**  
**Section 07 62 00- Sheet Metal Flashing and Trim**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions and Division 0 and 1 Specification Sections apply to work of this Section.

1.02 SECTION INCLUDES

- A. Sheet metal flashing and trim
- B. Thru-wall flashing

1.03 REFERENCES

- A. All references shall be the latest adopted edition, except as noted.
- B. ASTM A653 - Standard Specification for Steel Sheets, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
- C. ASTM A792 - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process
- D. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
- E. NRCA (National Roofing Contractors Association)
- F. SMACNA (Sheet Metal and Air Conditioning Contractors' National Association) Architectural Sheet Metal Manual, Fifth Edition

1.04 SUBMITTALS

- A. Refer to Section 01 33 00 for submittal procedures.
- B. Product Data: Submit manufacturer's product data for the following:
  - 1. Pre-Finished Sheet metal
  - 2. Fasteners
  - 3. Sealant
- C. Submit shop drawings for review prior to fabrication, include the following:
  - 1. Roof details showing each flashing condition keyed to the roof plan.
  - 2. Profile and dimensions of each sheet metal item, gauge, type/finish

## **DIVISION 7 - THERMAL AND MOISTURE PROTECTION**

### **Section 07 62 00- Sheet Metal Flashing and Trim**

- of sheet metal, fastener type, location and spacing.
  - 3. Corner and end details for each different flashing type.
  - 4. Fastener material, type and size for each condition.
  - 5. Sealant details showing joint configuration, sealant types and location for each condition.
- D. Color Samples For Prefinished Sheet Metal: Submit two 3" x 4" color samples of each standard color selected in Section 01 84 19 (actual paint finish on sheet metal).
- E. Fastener Samples: Submit samples of each different type of fastener proposed for use, key the fasteners to the fasteners noted in the shop drawings.

#### **1.05 QUALITY ASSURANCE**

- A. Fabricator/Installer Qualifications:
- 1. Minimum of 5 years experience in fabrication and installation of architectural sheet metal similar in material, design, and scope to this project with a record of successful in-service performance.
  - 2. Installer shall employ only skilled, journeyman sheet metal workers to install the work of this section.
- B. Workmanship shall be of the best quality; installed work shall be straight and true with neat corners and terminations, free of any visual defects; installation shall be fabricated and installed to inherently shed water without reliance on sealant and be permanently watertight.

#### **1.06 WARRANTY/GUARANTEE**

- A. 20 Year Pre-finished Sheet Steel Warranty: Warrant coated finish against cracking, peeling, blistering, chalk in excess of 8 units, and fade in excess of 5 NBS points, for a period of 20 years, without reducing or otherwise limiting any other rights to correction which the owner may have under the contract documents. Manufacturer shall also warrant that metal will not fail structurally, perforate, rupture or leak due to corrosion.
- B. 1 Year Installer's Guarantee: The Contractor shall guaranty the sheet metal installation for a period of 1 year against defects in installed materials and workmanship including a 1 year watertight guaranty. Correct any flashing or sheet metal item that is defective, improperly installed or leaking for a period of 3 years.

## **PART 2 - PRODUCTS**

## DIVISION 7 - THERMAL AND MOISTURE PROTECTION

### Section 07 62 00- Sheet Metal Flashing and Trim

#### 2.01 MATERIALS

- A. Pre-Finished Sheet Metal: Steel sheet conforming to ASTM A792 with minimum yield of 40,000 psi and AZ50 (*Zincalume* or *Galvalume*) protective coating.
  - 1. Finish Coating shall be a premium fluoropolymer coating with minimum of 70% *Kynar 500* or *Hylar 5000* base resin, factory-applied, oven baked and applied under controlled condition; 1 mil dry film thickness minimum (exclusive of primer); 20 year warranty.
  - 2. Color: As noted on the Drawings.
  - 3. Protective film: Provide strippable plastic film, applied to finish of coil stock before forming, or plastic interleaf, applied to panel after forming.
  - 4. Manufacturers: Same manufacturer providing preformed metal roofing panels specified in Section 07 40 00.
- B. Stainless Steel Sheet: Conform to ASTM A 666, Type 304, mill finish.
- C. Solder Metal: Conform to ANSI/ASTM B32, provide flux formulated for specific metal to achieve permanent bond to metal substrate.

#### 2.02 ACCESSORIES

- A. Fasteners: All fasteners shall be manufactured in the United States or Canada.
  - 1. Fasteners For Pre-Finished Sheet Metal Fabrications:
    - a. Exposed Condition – Wood or Sheet Metal Substrate: Type 304 stainless steel screws with self-sealing neoprene head.
    - b. Exposed Condition – Masonry/Concrete Substrate: 1/4" diameter Rawl Zamac Nailin expansion anchor with mushroom style head, and body formed of Zamac 7 alloy, Type 304 stainless steel nail; 1-1/2" minimum embedment; seal head with sealant.
      - 1) Powder/power driven fasteners are not permitted.
    - c. Concealed Condition: Hot dipped galvanized nails or screws or expansion anchors as appropriate for the substrate.
      - 1) Powder/power driven fasteners are not permitted.
  - 2. Fasteners For Continuous Cleats (Concealed): Hot dipped galvanized screws, nails or expansion anchors as appropriate for the substrate.
    - 1) Powder/power driven fasteners are not permitted.
- B. Tape For Separation Between Dissimilar Metals: 10 mil PVC adhesive backed tape.
- C. Sealant: Provide sealant and accessories specified in Section 07 90 00.

**DIVISION 7 - THERMAL AND MOISTURE PROTECTION**  
**Section 07 62 00- Sheet Metal Flashing and Trim**

2.03 FABRICATION

A. General:

1. Field measure and verify site conditions prior to fabrication, accommodate field conditions.
2. Fabricate in accordance with SMACNA (Architectural Sheet Metal Manual, Sixth Edition, 2003), NRCA and as required by roofing manufacturer to profiles shown on Drawings (where conflicts exist, the most restrictive requirement shall apply).
3. Form sections true to shape, accurate in size, square, and free from distortion or defects.
4. Furnish in minimum 10' lengths.
5. Hem all exposed edges 1/2 inch on underside.
6. Lap joints shall be fabricated to allow 6 Inches minimum overlap.
7. Fabricate head flashings in walls (at windows, louvers, etc.) with end dams to prevent water running off ends and behind siding.
8. Shop fabricate all items including corners, end terminations and special conditions for neat appearance, field bending and fabrication is not acceptable.
9. Protect pre-finished metal from scratches or damage during fabrication.
10. End conditions, corners, transitions, terminations, and changes in the plane or direction of flashings, copings, cornices, gutters and other sheet metal fabrications shall be custom fit and fabricated to accommodate field conditions and to provide a weatherlapped, watertight assembly and transition. Workmanship and custom fabrications shall conform to similar conditions found in SMACNA Manual and to good sheet metal fabrication practice and shall not rely solely on sealant for their watertight integrity.

B. Reglets & Counter Flashing: Fabricate to match configuration shown on the Drawings from prefinished sheet metal, 24 gauge or as shown on Drawings.

1. Lay out and fabricate for 6 inch lap joints.
2. Fabricate for tight spring action contact to roofing/wall behind; provide wind restraint clips at bottom of counter flashing where tight spring fit cannot be achieved.
3. Counter Flashing Corners: Fabricate watertight with neat appearance, bend at corner and extend past corner at least 12 inches.

C. Miscellaneous Flashings: Fabricate to match profiles/configurations shown on Drawings from 24 gauge factory pre-finished sheet metal.

1. Slope horizontal leg of flashings to provide positive water drainage.

**DIVISION 7 - THERMAL AND MOISTURE PROTECTION**  
**Section 07 62 00- Sheet Metal Flashing and Trim**

2. Provide end dams at all head and sill flashings to prevent water from leaking off ends.
- D. Sheet Metal Fillers and Miscellaneous Fabrications: Fabricate from 22 gauge prefinished galvanized sheet steel to match configuration shown on the Drawings.
  1. Field verify dimensions and connections.

**PART 3 - EXECUTION**

**3.01 COORDINATION**

- A. Review, coordinate and accommodate work of other trades that interface with, affect or are affected by the work of this Section so as to facilitate the execution of the overall Work of this project in a coordinated and efficient manner.
- B. Coordinate installation of sheet metal flashings with Section 07 52 16 for proper sequence and for watertight assembly.

**3.02 PREPARATION**

- A. Field verify that existing conditions and substrate layout are acceptable and comply with Drawing layout.
- B. Report any variations, unacceptable substrates/conditions and potential problems.
- C. Do not start work until unsatisfactory conditions have been corrected.
- D. Start of installation indicates acceptance of substrate and conditions.

**3.03 INSTALLATION - GENERAL**

- A. Installation shall conform to this Section and the Drawings, the roofing manufacturer's requirements, SMACNA Architectural Sheet Metal Manual and NRCA Roofing Manual (where conflicts exist, the most restrictive requirement shall apply).
- B. Protect pre-finished metal from scratches or damage during fabrication.
- C. Separate dissimilar metals with 2 wraps/layers of PVC tape.

**3.04 INSTALLATION - FLASHINGS**

- A. Install flashings to achieve a weathertight, leak-free installation.

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- B. Install flashings straight and true with neat appearance.
- C. Lap Joints: Lap 6 inches minimum and seal with two heavy beads of butyl sealant just prior to making lap;
  - 1. Clean metal surfaces to be sealed thoroughly with solvent just prior to sealant application;
  - 2. Trim off back of hem to allow tight interface and proper fit.
  - 3. Flashing shall fit tight to each other, free of any gaps or misfit.
- D. Fasten flashings to substrate securely using specified fasteners sized to hold flashings securely and as recommended by manufacturer for substrate and condition.
  - 1. Powder/power actuated fasteners are not permitted.
- E. Fasteners shall be concealed wherever possible, seal exposed fasteners watertight.

**3.05 INSTALLATION - SEALANT**

- A. Install sealant as specified in Section 07 90 00.
  - 1. Exposed Sealant Joints: Clean and prime surfaces to be sealed in accordance with sealant manufacturer's instructions. Install backer rod and sealant in accordance with the sealant manufacturer's installation requirements to achieve the proper sealant performance. Install sealant so that width, shape, bonding width and width to depth ratios conform to sealant manufacturer's joint design recommendations based on the amount of movement (expansion/ contraction) anticipated at each joint condition to achieve a permanently watertight joint.
  - 2. Concealed (Lap) Sealant Joints: Clean and prime surfaces to be sealed in accordance with sealant manufacturer's instructions. Install two continuous beads of butyl sealant (primary and secondary) at each lap joint to achieve a watertight connection.
  - 3. Exposed Fastener Heads: Where fastener heads are exposed to the weather and not self-sealing type, install sealant over fastener head and seal to metal surface watertight.

END OF SECTION

**DIVISION 7 - THERMAL AND MOISTURE PROTECTION**  
**Section 07 84 00 – Firestopping/Smoke Seal Systems**

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PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions and Division 0 and 1 Specification Sections apply to work of this Section.

1.02 WORK INCLUDES

- A. Firestopping and Smoke Seal Systems

1.03 SCOPE OF WORK

- A. Provide Firestopping/Smoke Seal System(s) conforming to IBC, ASTM E814 and requirements of the authority having jurisdiction at the following locations:
  - 1. Around structural, mechanical, electrical and other penetrations through fire rated assemblies.
  - 2. At cracks, gaps and openings in fire rated assemblies.
  - 3. At perimeter of fire rated assemblies where there are cracks, gaps, voids or openings.

1.04 REFERENCES

- A. All references shall be the latest adopted edition, except as noted.
- B. ASTM E814 - Standard Test Method for Fire Tests of Through-Penetration Fire Stops
- C. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition
- D. FM P7825 - Approval Guide; Factory Mutual Research Corporation; current edition
- E. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition
- F. IBC – International Building Code, 2009
- G. WH (CERT) - Certification Listings; Warnock Hersey



**DIVISION 7 - THERMAL AND MOISTURE PROTECTION**  
**Section 07 84 00 – Firestopping/Smoke Seal Systems**

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1.05 SUBMITTALS

- A. Refer to Section 01 33 00 for submittal procedures.

1.06 QUALITY ASSURANCE

- A. Fire Testing: Provide firestopping/smoke seal system designs which provide the required fire ratings when tested in accordance with ASTM E814.
1. Listing in the current classification or certification books of UL, FM, or ITS (Warnock Hersey) will be considered as constituting an acceptable test report.
- B. Installer Qualifications: Installer shall have at least 5 years of experience installing firestop systems in buildings of similar construction to that found on this project.
- C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years experience.

1.07 ENVIRONMENTAL REQUIREMENTS

- A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation.

PART 2 - PRODUCTS

2.01 FIRESTOPPING/SMOKE SEAL SYSTEMS

- A. Manufacturers/Product Group and ICC Evaluation Service Report Number:
1. 3M Company, Inc. *Fire Protection Products* – ICC Report NER-243
  2. Tremco, Inc. *Through-Penetration Fire-Stop Systems* – ICC Report ER-3198
  3. United States Gypsum Company *USG Firestop Penetration Systems* - ICC Report ER-5050
  4. W.R. Grace & Company *FlameSafe Products* – ICC Report ESR-1043
- B. Firestopping/Smoke Seal System(s): Provide complete Firestop/Smoke Seal System(s) that conform to the requirements of Chapter 7 of the International Building Code (IBC) and are designed, tested and fire-resistance rated to resist for a prescribed period of time the spread of fire through each different type of penetration, fire rated assembly and construction type found in this Project.

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**Section 07 84 00 – Firestopping/Smoke Seal Systems**

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1. Firestop/Smoke Seal System(s) shall be tested and listed by one of the testing agencies listed in 1.04 above.
  2. The F and T rating criteria for the Firestop/Smoke Seal System(s) shall be in accordance with ASTM E814 and IBC.
  3. Firestopping/Smoke Seal Exposed To View: Firestop/Smoke Seal System must either be concealed from view behind the finish; or have an appearance matching the adjacent finish appearance and be paintable; or have a suitable finished trim or escutcheon to cover the firestopping.
  4. Provide firestopping/smoke seal products from the same manufacturer on any single assembly or condition, do not mix different manufacturer's products.
- C. Rock Wool: Rock wool insulation spun from slab or basalt rock; 2.8 pound density, with formaldehyde-free binder, friction fit, unfaced, conform to ASTM C665; Roxul *AFB* or approved.

**PART 3 - EXECUTION**

**3.01 COORDINATION**

- A. Review, coordinate and accommodate work of other trades that interface with, affect or are affected by the work of this Section so as to facilitate the execution of the overall Work of this project in a coordinated and efficient manner.
- B. Coordinate the timing of when to execute the work of this section with the work of other trades.
- C. Coordinate firestopping/smoke seal at mechanical and electrical penetrations made by Divisions 20 through 28.

**3.02 EXAMINATION**

- A. Verify that all penetrations and openings are completed and ready to receive the work of this section.

**3.03 PREPARATION**

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter that may affect bond of firestopping material in accordance with manufacturer's instructions.
- B. Remove incompatible materials that may affect bond.

**DIVISION 7 - THERMAL AND MOISTURE PROTECTION**  
**Section 07 84 00 – Firestopping/Smoke Seal Systems**

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**3.04 INSTALLATION**

- A. Select the specific firestopping/smoke seal assembly that will provide the specific fire rating required for the type of construction and conditions found and that conforms to the criteria stated in the testing agency listing.
- B. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing cracks/gaps and providing a firestop of each gap/crack in a fire-rated assembly equal to the fire rating of the assembly.
- C. Where firestopping/smoke seal is exposed to view, finish to match adjacent surfaces.

**3.05 CLEANING AND PROTECTION**

- A. Clean adjacent surfaces of firestopping/smoke seal materials.
- B. Protect adjacent surfaces from damage by material installation.

**3.06 FIRESTOPPING LOCATIONS**

- A. Install firestopping/smoke seal in all locations required by the IBC and Authorities Having Jurisdiction.
- B. Install firestopping/smoke seal at cracks, gaps or openings within and around perimeter of fire rated wall, floor or roof assemblies (refer to Drawings for location of rated assemblies).
- C. Install firestopping/smoke seal around penetrations (structural, mechanical and electrical) through fire rated assemblies; coordinate with structural mechanical and electrical work.
- D. Install firestopping/smoke seal wherever noted on Drawings.

END OF SECTION

## **DIVISION 7 - THERMAL AND MOISTURE PROTECTION**

### **Section 07 09 00 – Joint Sealants**

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#### **PART 1 - GENERAL**

##### **1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions and Division 0 and 1 Specification Sections apply to work of this Section.

##### **1.02 SECTION INCLUDES**

- A. Interior joint sealers
- B. Exterior joint sealers

##### **1.03 SUBMITTALS**

- A. Refer to Section 01 33 00 for submittal procedures.

##### **1.04 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum 5 years experience.
- B. Applicator Qualifications: Company specializing in performing the work of this section with minimum 5 years experience.

##### **1.05 ENVIRONMENTAL REQUIREMENTS**

- A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

##### **1.06 COORDINATION**

- A. Coordinate the work with all sections referencing this section.

##### **1.07 GUARANTY**

- A. The Contractor shall guaranty the sealant installation for a period of 5 years against defects in installed materials and workmanship including a 5 year watertight warranty. Correct any sealant that is found to be defective, improperly installed or leaks within a 5 year period at no cost to the Owner.

**DIVISION 7 - THERMAL AND MOISTURE PROTECTION**  
**Section 07 09 00 – Joint Sealants**

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PART 2 - RODUCTS

2.01 SEALANTS

- A. Silicon Exterior Joint Sealant: Silicon; ASTM C920, Type S, Grade NS, Class 50, Uses NT, M, G, A and O; single component.
  - 1. Color: Color as selected to match adjacent material, selected from manufacturer's full range of available colors.
  - 2. Product: Dow Corning 790 or 795 *Silicone Building Sealant*, Sonneborn Building Products, Vulkem, Sikaflex or approved
  - 3. Applications: Use for:
    - a. Joints between window frames and concrete – (match frame color).
    - b. Joints between door and louver frames or concrete.
    - c. Exposed joints in prefinished metal panels
  
- B. Polyurethane Exterior Joint Sealant: Polyurethane; ASTM C920, Type S, Grade NS, Class 25, Uses NT, M, G, A and O.
  - 1. Color: Color as selected to match adjacent material, selected from manufacturer's full range of available colors.
  - 2. Product: *Dynatrol I XL* single component or *Dynatrol II* two component (as required to achieve required color) manufactured by Pecora, Sonneborn Building Products, Vulkem, Sikaflex or approved.
  - 3. Applications: Use for:
    - a. Sealant for sheet metal flashing installation/joints.
    - b. Exterior locations requiring painted finish over sealant.
    - c. Other exterior joints for which no other sealant is indicated.
  
- C. Exterior Metal Lap Joint Sealant: Butyl rubber, nondrying, nonskinning, noncuring.
  - 1. Product: *BC-158 Butyl Rubber Sealant* manufactured by Pecora, Sonneborn Building Products, Vulkem, Sikaflex or approved.
  - 2. Applications: Use for:
    - a. Concealed sealant bead in lap joints for sheet metal work.
    - b. Concealed sealant bead in lap joints in prefinished wall and roof panels
    - c. Sealant for bedding door thresholds.
    - d. Do not use in any location exposed to view or exposed to the sun.
  
- D. General Purpose Interior Sealant: Siliconized acrylic emulsion latex; ASTM C834, single component, paintable.
  - 1. Product: *AC-20+Silicone* manufactured by Pecora or similar by Tremco, Sonneborn Building Products, Bostix Chem-Calk or approved.

## DIVISION 7 - THERMAL AND MOISTURE PROTECTION

### Section 07 09 00 – Joint Sealants

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2. Color: Match color of adjacent materials; or as selected by Architect.
  3. Applications: Use for:
    - a. Interior wall and ceiling control joints.
    - b. Joints between interior door/relite frame and wall surfaces.
    - c. Joints between interior side of window frames and wall surfaces.
    - d. Between GWB and other materials.
    - e. Joints between counter backsplash and wall.
    - f. Other interior joints for which no other type of sealant is indicated.
- E. Plumbing Fixture/Tile Sealant: Neutral-curing silicone; ASTM C920, Class 50; single component, mildew resistant.
1. Product: 898 Sanitary Mildew Resistant Silicone Sealant manufactured by Pecora , Dow Corning or approved.
  2. Color: Match color of plumbing fixture or adjacent materials as approved by Architect.
  3. Applications: Use for:
    - a. Joints between plumbing fixtures and counter, floor and wall surfaces.
    - b. Interior joints in stone and ceramic tile or between tile and adjacent materials.
- F. Foam Sealant: Pre-formed, self-expanding foam sealant with pressure sensitive adhesive, supplied in pre-compressed rolls.
1. Product: Emseal *Backerseal (Greyflex)*; size as recommended by manufacturer to accommodate joint size.
  2. Install as a concealed secondary seal on interior side of doors frames, window frames and louver frames to stop air and moisture intrusion.

#### 2.02 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit substrate and application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: Round foam rod compatible with sealant of type recommended by sealant manufacturer for type of sealant; ASTM D1667, oversized as recommended by sealant manufacturer.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

**DIVISION 7 - THERMAL AND MOISTURE PROTECTION**  
**Section 07 09 00 – Joint Sealants**

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**PART 3 - EXECUTION**

**3.01 COORDINATION**

- A. Review, coordinate and accommodate work of other trades that interface with, affect or are affected by the work of this Section so as to facilitate the execution of the overall Work of this project in a coordinated and efficient manner.
- B. Coordinate work sequence and installation with work of other trades to provide a weathertight installation at exterior applications.

**3.02 EXAMINATION**

- A. Inspect the substrate surfaces and joint openings and confirm they are ready to receive sealant work.
- B. Confirm that joint size, configuration and conditions conform to sealant manufacturer's requirements so as to achieve manufacturer's published sealant performance.
- C. Verify that joint backing and release tapes are recommended for use by sealant manufacturer with the specified sealant.
- D. Do not start sealant installation until substrate surfaces and joint openings conform to sealant manufacturer's requirements.
- E. Start of sealant installation indicates installer's acceptance and confirmation that substrate, joint openings and conditions are in conformance with sealant manufacturer's requirements.

**3.03 PREPARATION**

- A. Thoroughly clean and prepare joint substrate surfaces in accordance with sealant manufacturer's instructions to achieve published sealant performance.
- B. Remove loose materials and foreign matter which might impair adhesion of sealant.
- C. Clean and prime joint bonding surfaces in accordance with manufacturer's instructions.
- D. Protect elements surrounding the work of this section from damage or disfigurement.

## **DIVISION 7 - THERMAL AND MOISTURE PROTECTION**

### **Section 07 09 00 – Joint Sealants**

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#### **3.04 INSTALLATION**

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions to achieve published sealant performance.
- B. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer.
- C. Install bond breaker where joint backing is not used.
- D. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- E. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- F. Tool joints concave.

#### **3.05 CLEANING/PROTECTION**

- A. Clean adjacent soiled surfaces. Protect sealants until cured.

END OF SECTION



**DIVISION 8 - DOORS AND WINDOWS**  
**Section 08 11 00 – Hollow Metal Doors and Frames**

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PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and Supplementary Conditions and Division 0 and 1 Specification Sections apply to work of this Section.

1.02 SECTION INCLUDES

- A. Exterior Hollow Metal Doors And Frames

1.03 REFERENCES

- A. All references shall be the latest adopted edition (except where edition date is specifically noted).
- B. ANSI/SDI A250.4 – Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frame Anchors and Hardware Reinforcing.
- C. ANSI/SDI A250.6 – Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
- D. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
- E. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
- F. ASTM A568 - Standard Specification for Steel, Sheet, Carbon, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for.
- G. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- H. ASTM A879 - Specification for Steel Sheet, Zinc Coated by the Electrolytic Process for Applications Requiring Designation of the Coating Mass on Each Surface.
- I. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.

**DIVISION 8 - DOORS AND WINDOWS**  
**Section 08 11 00 – Hollow Metal Doors and Frames**

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- J. ASTM A1008 - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
- K. ASTM A1011 - Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability
- L. ASTM D3359 – Standard Test Methods For Measuring Adhesion By Tape Test
- M. DHI A115.1G - Installation Guide for Doors and Hardware; Door and Hardware Institute.
- N. IBC – International Building Code, 2009 Edition
- O. SDI 111-D – Door, Frame And Hardware Schedule For Standard Steel Doors And Frames.
- P. UL 1784 - Standard for Air Leakage Tests of Door Assemblies.

**1.04 SUBMITTALS**

- A. Refer to Section 01 33 00 for submittal procedures.
- B. Product Data: Provide manufacturer's product literature and standard details.
  - 1. Provide manufacturer's technical data sheet on each different type of anchor and hardware reinforcement required.
- C. Shop Drawings: Provide elevation and details of each different frame and door type, including frame anchors, glass stops, vision panels, and special conditions.
- D. Door Schedule: Provide door, frame, and hardware schedule on format matching SDI 111-D in accordance with Door Schedule included on Drawings.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Provide all products from a single manufacturer who is a member of the Steel Door Institute.

**1.06 DELIVERY, STORAGE AND HANDLING**

**DIVISION 8 - DOORS AND WINDOWS**  
**Section 08 11 00 – Hollow Metal Doors and Frames**

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- A. Protect products from moisture, construction traffic, and damage.
- B. Store vertically under cover. Do not use non-vented plastic or canvas shelters. Should wrappers become wet, remove immediately.
- C. Place units on 4 inch high wood sills or in a manner that will prevent rust or damage. Provide 1/4 inch space between doors to promote air circulation.

**PART 2 - PRODUCTS**

**2.01 MATERIALS**

- A. Manufacturers: Member of Steel Door Institute with products conforming to these specifications. Acceptable manufacturers include:
  - 1. Ceco Corporation
  - 2. Republic Builders Products
  - 3. Steelcraft Manufacturing Company
  - 4. Substitutions: See Section 01 60 00 Product Requirements
- B. Steel Sheet for Doors and Frames:
  - 1. Cold Rolled Steel: ASTM A1008 and ASTM A586.
  - 2. Hot Rolled Steel: Pickled and oiled, ASTM A1011 and ASTM A586.
  - 3. Galvanized Steel: ASTM A924 and A653; hot-dipped zinc-coated steel.
- C. Steel Sheet for Anchors and Accessories: Electrolytically deposited zinc coated steel; ASTM A879, coating 40Z (12G), minimum.
- D. Grout/Mortar Fill:
  - 1. Exterior Frames, Frames In Masonry walls, and Frames at overhead doors: mortar used for brick veneer specified in Section 04 21 13; or grout complying with ASTM C 476, or non-corrosive, pre-mixed pourable grout with minimum 3,000 psi compressive strength.
  - 2. Interior Frames: Spray Foam.

**2.02 HOLLOW METAL (HM) DOORS AND FRAMES**

- A. Frames: ANSI/SDI A250.8 Level 3 is the minimum performance standard; provide the following special requirements that exceed this minimum standard:
  - 1. Regular Use Frames: 16 gauge steel sheet, fabricated to size, profile and configuration shown on Drawings.

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### Section 08 11 00 – Hollow Metal Doors and Frames

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2. All Exterior Door Frames: 14 gauge steel sheet, fabricated to size, profile and configuration shown on Drawings.
  3. Corner Construction: Face weld corners, grind welds flush and smooth.
  4. Provide temporary removable spreader bars on bottom of each frame.
  5. Reinforcement For Hardware: Conform to ANSI/SDI A250.6 and the following special requirements:
    - a. Hinge Reinforcement: Provide 7 gauge hinge reinforcement in doors, full width of frame (lesser gauge with equivalent threads is not acceptable). Weld reinforcement securely to frame.
    - b. Floor Anchors: Provide 14 gauge floor anchors on all frames, full width of frame, securely welded to foot of each frame leg, with 2 holes in each anchor for attachment to floor.
    - c. Closer: Provide reinforcement sleeve full width of frame, formed to match frame profile.
  6. Holes For Silencers: Drill stops to receive rubber silencers on frames not scheduled for weatherstripping or smoke gasket.
  7. Glazed Lights in Frames: Provide rolled steel channel shape glazing stops prepared for countersunk oval head screws and butted corners.
  8. Exterior Frames: Galvanized steel.
  9. Frames In Concrete/Masonry Walls: Coat interior surfaces of frame with waterproof, shop-applied fibrated asphalt mastic 1/6 inch thick.
    - a. Provide grout guards at hardware locations.
- B. Doors: ANSI/SDI A250.8 Level 2 – Heavy-Duty, Model 2 – Seamless is the minimum performance standard; provide the following special requirements that exceed this minimum standard:
1. Regular Use Doors: 18 gauge sheet steel, fabricated to size and configuration shown on Drawings.
  2. Hardware Reinforcement: Conform to ANSI/SDI A250.6.
  3. Door Construction:
    - a. Face: Full flush, no seams.
    - b. Edge Seam: Seamless, continuous welded and ground smooth.
    - c. Edge Bevel: Bevel strike side.
    - d. Hinge Cutouts: Provide handed hinge cutouts for door swing (non-handed doors with hinge fillers are not allowed).
    - e. Edge Reinforcement Channels: Provide doors with full height 14 gauge steel lock channels (rails) and 12 gauge steel hinge channels (rails) concealed in construction of door and securely welded to both faces.

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**Section 08 11 00 – Hollow Metal Doors and Frames**

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4. Door Core:
  - a. Interior Doors: Honeycomb cores.
  - b. Exterior Doors: Insulated core with U-value of at least 0.60 when tested in accordance with SDI 113.
5. Exterior Door Tops: Invert reinforcement channel to prevent place for water to collect and seal the top of door watertight.
6. Door Undercuts: Provide undercuts to accommodate door hardware provided by Section 08 71 00 and as required by applicable codes.
7. Door Vision Panels Frames: Fabricated steel frame with mitered corners designed to securely hold glazing and meet fire door requirements, prime painted, countersunk oval head screws.
8. Exterior Doors: Galvanized steel.

**2.03 FABRICATION**

- A. Confirm field conditions and coordinate depth of each frame throat to match thickness of wall or other configuration shown on Drawings.
- B. Fabricate steel doors and frames to sizes and profiles shown on the Drawings in conformance to the requirements of this Section, ANSI/SDI A250.6, ANSI/SDI A250.8 and fire listing requirements.
- C. Prepare and reinforce steel doors and frames to receive door hardware specified in Section 08 71 00.
- D. Finish:
  1. Factory Prime Paint Finish: Prime paint all surfaces of doors and frames under controlled conditions at the factory.
    - a. Doors and frames shall be thoroughly cleaned, and chemically treated to insure maximum paint adhesion.
    - b. All surfaces of the door and frame exposed to view shall receive a factory applied coat of rust inhibiting primer, either air-dried or baked-on.
    - c. The finish shall meet the requirements for acceptance stated in ANSI/SDI A250.10.
  2. Shop Prime Paint Touch-Up: Repair any factory applied prime paint damaged by shipping or by shop modifications to doors/frames.
    - a. Surface preparation, prime paint and application shall conform to factory finishing standards and be compatible with field painting specified in Section 09 90 00.
    - b. The finish shall meet the requirements for acceptance stated in ANSI/SDI A250.10.
  3. Performance Requirement: Primer bond to steel substrate shall

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pass adhesion field testing per ASTM D3359, Type A Cross Hatch.

2.04 DOOR AND FRAME CLEARANCES

- A. Door and frame clearances shall conform to ANSI/SDI A250.8, 2.06.

2.05 SPRAY FOAM

- A. Spray Foam: Single component polyurethane foam sealant which expands to take the shape of cracks and voids and permanently seals to substrate surfaces.
1. Code Approval: ICC Evaluation Service, Inc. ES Report ESR-1961.
  2. Fire Performance:
    - a. Flame Spread Index Per ASTM E84: 25 or less
    - b. Smoke Developed Index Per ASTM E84: 450 or less
  3. Thermal Barrier: None required when tested in accordance with UL 1715.
  4. Manufacturer/Product: Dow Chemical Company "Great Stuff"
    - a. Select the specific Great Stuff product and canister size to best fit the application and site conditions.
    - b. Use the Great Stuff Pro Window & Door minimal expanding, low pressure spray foam to prevent displacement or deflection of frames.
  5. Installation: Use Dow foam dispensing guns for installing spray foam, do not install with the disposable plastic straw provided.

PART 3 - EXECUTION

3.01 COORDINATION

- A. Review, coordinate and accommodate work of other trades that interface with, affect or are affected by the work of this Section so as to facilitate the execution of the overall Work of this project in a coordinated and efficient manner.
- B. Coordinate the size and layout of reinforcement and preparation for door hardware with Section 08 71 00.
- C. Coordinate installation of hollow metal door frames located in masonry walls prior to masonry wall construction so that frames are solid grouted with mortar as masonry wall is laid up.
- D. Coordinate installation of glazing with Section 08 80 00.

**DIVISION 8 - DOORS AND WINDOWS**  
**Section 08 11 00 – Hollow Metal Doors and Frames**

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3.02 EXAMINATION

- A. Verify that substrate and project conditions are suitable before beginning installation of frames.
- B. Correct unsatisfactory condition before proceeding with installation.
- C. Start of installation indicates acceptance of substrate and conditions.

3.03 PREPARATION

- A. Solid Grouted Frames:
  - 1. Install foam blockouts inside frames at surface mounted hardware locations to permit drilling and tapping for screw installation after frames are installed and grouted.
  - 2. Confirm that grout guards at hardware locations will not leak mortar; install tape over any guards with openings.
  - 3. Plug any holes in the steel framing where grout could leak through.

3.04 SOLID GROUTING FRAMES

- A. Frames in Masonry walls, and Frames at overhead doors: Install frames prior to masonry wall construction and overhead door placement to allow solid grouting frames with mortar. Use consistency at time of placement that will completely fill space intended to receive grout. Grout frames as masonry walls are constructed.
- B. Interior Frames: Fill with Spray Foam.

3.05 INSTALLATION

- A. Install frames plumb, level, rigid, and in true alignment as recommended in ANSI/SDI 250.11, NFPA 80, DHI A115.1G and in accordance with fire labeling requirements on fire rated openings.
- B. Secure floor anchors to floor with steel anchors/screw of size, length and type appropriate for permanently secure attachment to substrate material, 2 anchors per jamb anchor.
- C. Screw jamb anchors securely to wall framing/structure using method recommended by manufacturer for permanently secure installation.
- D. Exposed Jamb Anchor Screws: Grind head of screw flush with frame and fill with polyester patching/filling compound (body filler) and sand surface flush and smooth to conceal screw and dimple.

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**Section 08 11 00 – Hollow Metal Doors and Frames**

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- E. Coordinate installation of glazing, stops and vision panel frames by Section 08 80 00.
- F. Install doors plumb and in true alignment and fasten to achieve the maximum operational effectiveness and appearance of the unit. Maintain clearances specified In ANSI/SDI 250.8.

**3.06 ADJUST AND CLEAN**

- A. Adjust doors for proper operation, free from binding or other defects.
- B. Clean and restore soiled surfaces. Remove scraps and debris, and leave site and a clean condition.

**3.07 SCHEDULE – REFER TO DRAWINGS**

END OF SECTION



**DIVISION 8 - DOORS AND WINDOWS**  
**Section 08 36 00 – Overhead Sectional Door Operators**

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PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and Supplementary Conditions and Division 0 and 1 Specification Sections apply to work of this Section.

1.02 WORK INCLUDED

- A. Overhead Sectional Steel Doors

1.03 REFERENCES

- A. All references shall be the latest adopted edition.
- B. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- C. DASMA 102 - American National Standard Specifications for Sectional Overhead Type Doors; Door & Access Systems Manufacturers' Association, International.
- D. IBC - 2009 International Building Code.
- E. NFPA 70 - National Electrical Code; National Fire Protection Association.

1.04 SUBMITTALS

- A. Refer to Section 01 33 00 for submittal procedures.
- B. Product Data: Provide component construction, anchorage method, hardware, etc.
- C. Shop Drawings: Indicate opening dimensions and required tolerances, connection details, anchorage spacing, hardware locations, installation details.

1.05 QUALITY ASSURANCE

- A. Conform to the requirements of DASMA 102, conform to the requirements of this specification where they exceed DASMA 102.

## **DIVISION 8 - DOORS AND WINDOWS**

### **Section 08 36 00 – Overhead Sectional Door Operators**

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- B. Installer: Company specializing in performing the work of this section with minimum 5 years of experience.

#### **PART 2 - PRODUCTS**

##### **2.01 OVERHEAD SECTIONAL DOOR OPERATORS AND WEATHERSTRIPING**

- A. Operation: Provide auto opener doors with open, stop, close functions with electric sensing edge. Pneumatic is not acceptable. Provide low voltage wiring to door operator and sensing edge.
- B. Operation: RSX-with brake, side mount trolley 1/2 HP, 115volt commercial operator.  
Provide with safety bottom fixtures and w/ 2 wire bottom sensing edge full width of door. Provide reflector photo eyes with reversing edge. Operator: Provide with limit switches and relays with Dry Form 'C' contacts for interface with lights, heaters, fans and other misc. equipment for sequence of control.  
Operation: Provide auto opener doors with open, stop, close functions with electric sensing edge. Pneumatic is not acceptable. Provide low voltage wiring to door operator and sensing edge. Coordinate low voltage wiring with Mechanical and Electrical Sections.
- C. Weatherstripping:
  - 1. Head And Jambs: Flexible PVC to seal door perimeter.
  - 2. Bottom: EPDM rubber bulb type strip, oversized bulb seal to provide better seal.
- D. Provide all accessories, mounting brackets, fasteners, etc. for a complete and properly functioning unit meeting the requirements of this section.
- E. Provide (2) radio controlled hand held transmitters for each door opening with an auto-opener. Provide each opener with a co-axial cable connected to an exterior mounted co-axial antenna. (1) per each opening typical.

#### **PART 3 – EXECUTION**

##### **3.01 COORDINATION**

- A. Review, coordinate and accommodate work of other trades that interface with, affect or are affected by the work of this Section so as to facilitate the execution of the overall Work of this project in a coordinated and efficient manner.

##### **3.02 EXAMINATION**

## **DIVISION 8 - DOORS AND WINDOWS**

### **Section 08 36 00 – Overhead Sectional Door Operators**

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- A. Verify that wall openings are ready to receive work and opening dimensions and tolerances are within specified limits.
- B. Start of door installation indicates installer acceptance of wall opening and conditions.

#### **3.03 INSTALLATION**

- A. Install motors and controls per manufacturers recommendations.

#### **3.05 ADJUSTING**

- A. Adjust door assembly for smooth operation.
- B. Adjust door assembly for full contact with weatherstripping.

END OF SECTION

**DIVISION 8 - DOORS AND WINDOWS**  
**Section 08 70 00 – Finish Hardware**

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PART 1 GENERAL

1.1 SECTION INCLUDES

Hardware for swinging, sliding, and folding doors except special types of unique and non-matching hardware specified in other sections.

1.2 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturer: Manufacturers named in Part 2 of this section with not less than 5 years experience in manufacturing commercial door hardware of the type indicated.
2. Hardware Supplier:
  - a. A recognized architectural finish hardware supplier who has been furnishing hardware in the same state as the project for a period of not less than 5 years.
  - b. Hardware supplier's organization shall include an experienced Architectural Hardware Consultant (AHC), certified by the Door and Hardware Institute (DHI), who is physically available, at reasonable times during the course of the work, for consultation about project's hardware requirements, to Owner, Architect and Contractor. Mail or telephone correspondence is not acceptable.
  - c. Hardware supplier shall have local warehousing facilities and shall maintain an adequate parts inventory of items supplied for future service to the owner. Supplier will be a factory authorized distributor of all hardware specified.
3. Installer: Company specializing in installing work of this section with not less than 3 years experience and acceptable to the manufacturer and the hardware supplier. The hardware installer shall meet with the representative of the hardware supplier to jointly inventory all hardware items. Upon satisfactory inventory of products, the hardware installer accepts responsibility for all hardware items inventoried.

B. Regulatory Requirements:

1. Provide hardware for openings, whether specified or not, in compliance with NFPA Standard No. 80, IBC 2013 and local building code requirements. Provide only hardware which has been tested and listed by UL or WHI for types and sizes of doors required and complies with requirements of door and door frame labels.
2. Provide hardware which meets or exceeds handicap accessibility per local building code requirements. Conform to the Americans with Disabilities Act (ADA) of 1990.

**DIVISION 8 - DOORS AND WINDOWS**  
**Section 08 70 00 – Finish Hardware**

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1.3 SUBMITTALS

- A. Under provisions of Section 01340, submit the following:
1. Product information: Manufacturer's published technical product data for all specified door hardware items indicating compliance with the requirements.
  2. Hardware Schedule:
    - a. Hardware schedules are intended for the Contractor's coordination of the work. Review and acceptance by the Architect or Owner does not relieve the Contractor of his exclusive responsibility to fulfill the requirements as shown and specified.
    - b. Submit hardware schedule in the manner and format as suggested by the Door and Hardware Institute (DHI) complying with the actual construction progress schedule requirements for each draft.
  3. Templates: Hardware supplier will furnish hardware templates to the Contractor for each fabricator of doors, frames, and other work to be shop prepared or factory prepared for the installation of hardware.
  4. Warranty: Provide the manufacturer's standard warranty for each product, not to be less than one year after acceptance of the building by the owner. Door closers shall not be warranted for less than ten years.

PART 2 PRODUCTS

2.1 MATERIALS AND FABRICATION

- A. General:
1. Provide all door hardware for complete work, in accordance with the drawings and as specified herein.
  2. Quantities listed, in any instance, are for the Contractor's convenience only and are not guaranteed.
  3. Provide items and quantities not specifically mentioned to ensure a proper and complete operational installation. Match the quality and finish of items specified.
  4. Provide miscellaneous hardware as listed in hardware groups.

2.2 HINGES

- A. Manufacturer:
1. Listed in Door Hardware Schedule: STANLEY
- B. Number of Hinges: Provide number of hinges indicated, but not less than 3 hinges per door leaf for doors 90" or less in height and one additional hinge for each 30" of additional height.

2.3 LOCKSETS, LATCHSETS, PRIVACY SETS AND CYLINDERS:

## **DIVISION 8 - DOORS AND WINDOWS**

### **Section 08 70 00 – Finish Hardware**

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- A. Manufacturer:
  - 1. Listed in Door Hardware Schedule: BEST
- B. Lock Throw: Provide 3/4" minimum throw of mortise type latches and deadbolts used. Cylindrical latches will be 1/2" minimum. Comply with UL requirements for throw of bolts and latch bolts on rated fire openings.

#### **2.4 KEYS, KEYING, AND KEY CONTROL**

- A. Keys:
  - 1. Quantities: These quantities are to establish a maximum allowable quantity of cut keys to service the project and may not necessarily be assigned as noted. A lesser quantity of cut keys required will not result in any credits, nor a quantity of uncut keys to be issued unless noted otherwise.
    - a. 3 change keys per each cylinder unit.
    - b. 5 master keys per master.
    - c. 10 construction keys.
  - 2. Deliver keys to the Owner's representative: Send masterkeys to Owner via U.S. registered mail direct from hardware supplier.
- B. Keying:
  - 1. Comply with Owner's written instructions for masterkeying and, except as otherwise indicated, provide individual change keys for each lock which is not designated to be keyed alike with a group of related locks.

#### **2.5 EXIT DEVICES AND MULLIONS**

- A. Manufacturer:
  - 1. Listed in Door Hardware Schedule: NONE USED
- B. Provide risers, as needed, to prevent interference with door glazing kits.
- C. Spacers as needed for proper application of removable mullions on narrow stop type frames shall be an integral part of the frame and supplied by the frame manufacturer.

#### **2.6 CLOSERS:**

- A. Manufacturer:
  - 1. Listed in Door Hardware Schedule: STANLEY
- B. Provide parallel arms for all overhead closers, except as otherwise indicated. Provide drop plates as needed to prevent glazing interference.

#### **2.7 OVERHEAD STOPS**

- A. Manufacturer:
  - 1. Listed in Door Hardware Schedule: NONE USED

## **DIVISION 8 - DOORS AND WINDOWS**

### **Section 08 70 00 – Finish Hardware**

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- B. Mount stops to the maximum degree of opening available before conflict with adjacent structures, or, if adjacent structures are not considered, to the maximum allowable by stop manufacturer's template.

#### **2.8 WALL AND FLOOR STOPS**

- A. Manufacturers:
  - 1. Listed in Door Hardware Schedule: ROCKWOOD
- B. General: Except as otherwise indicated, provide stops (wall, floor or overhead) at each leaf of every swinging door leaf.

#### **2.9 PROTECTION PLATES**

- A. Manufacturers:
  - 1. Listed in Door Hardware Schedule: ROCKWOOD
- B. Sizes: Fabricate protection plates (armor, kick or mop) not more than 2" less than door width on stop side and not more than 1" less than door width on pull side, x the height indicated.
- C. Metal Plates: Stainless Steel, 18 gauge (0.050) thick. Satin finish (US32D, 630), bevelled four edges (B4E).

#### **2.10 GASKETS AND SWEEPS**

- A. Manufacturer:
  - 1. Listed in Door Hardware Schedule: PEMKO
- B. General: Except as otherwise indicated, provide continuous weatherstripping at each edge of every exterior door leaf. Provide type, sizes and profiles indicated as drawn or scheduled.

#### **2.11 THRESHOLDS**

- A. Manufacturer:
  - 1. Listed in Door Hardware Schedule: PEMKO
- B. Where there is conflict between scheduled thresholds and details, details shall have precedence. Revise details only if necessary to comply with handicap accessibility requirements. Notify the Architect of such required modifications.

#### **2.12 ELECTRIC STRIKES, SMART PACKS**

- A. Manufacturers:
  - 1. Listed in Door Hardware Schedule: HES

#### **2.13 FINISHES**

## DIVISION 8 - DOORS AND WINDOWS

### Section 08 70 00 – Finish Hardware

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- A. Exposed surfaces of hardware shall be Brushed Chrome (US26D, 626), unless otherwise indicated.

#### PART 3 EXECUTION

##### 3.1 INSTALLATION

1. Install each hardware item in compliance with the manufacturer's instructions, requirements of NFPA 80, UBC, ADA, and Washington State Rules and Regulations for Barrier Free Facilities and recommendations of the DHI.
2. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
3. Where not factory machined, machine cut for hardware per template, as required.

##### 3.2 ADJUSTING

A. Initial Adjustment:

1. Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit.
2. Replace units which cannot be adjusted to operate freely and smoothly as intended for the application made.

- B. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

##### 3.3 HARDWARE SCHEDULE

Hardware Group #1 – Doors #1, 3, 4

1 ea. Storeroom Lockset	93K7D15DS3626
1 ea. Electric Strike	1006CS 630
1 ea. Smart Pac	2005M
1 ea. Card Access Reader/Key FOB	By Access Control Contractor
1 ea. Power Supply	By Access Control Contractor

Reuse Balance of existing Hardware

Hardware Group #2 – Doors #2, 5



**DIVISION 8 - DOORS AND WINDOWS**  
**Section 08 70 00 – Finish Hardware**

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3 ea. Hinges	FBB191NRP 4.5 x 4.5 US32D
1 ea. Storeroom Lockset	93K7D15DS3626
1 ea. Closer	D4550EDA 6389
1 ea. Kick Plate	K1050 10" x 2" LTDW 4BE 630
1 ea. Stop	482
1 ea. Threshold	172A
1 ea. Door Bottom	315CN
1 ea. Weather Strip	S88D (Head & Jambs)
1 ea. Rain Drip	346C

Hardware Group #3 – Doors #6, 7, 8, E  
No Work in this specification section.

END OF SECTION

## **DIVISION 9 - FINISHES**

### **Section 09 11 00 – Non-Load Bearing Wall Framing**

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#### **PART 1 - GENERAL**

##### **1.1 REFERENCES**

- A. American Society for Testing and Materials (ASTM).
  - 1. C 645 - "Specification for Non-Load (Axial) Bearing Steel Studs, Runners (Track), and Rigid Furring Channels for Screw Application of Gypsum Board."
  - 2. C 754 - "Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Wallboard, Backing Board, or Water-Resistant Backing Board."
- B. American Welding Society (AWS).
  - 1. D1.3 - "Specification for Welding Sheet Steel in Structures."
- C. Metal Lath/Steel Framing Association (MLSFA).
  - 1. "Specification for Metal Lath and Furring."

#### **PART 2 - PRODUCTS**

##### **2.1 MATERIALS**

- A. All supplied by one manufacturer, U.S. Gypsum Co., Western Metal Lath, Angeles Metal System unless otherwise specified.
- B. Materials shall comply with ASTM C 645.
- C. Metal Studs: 30 mil minimum galvanized steel, non-bearing, with punched webs and perforated flanges to receive screws.
- D. Wide Flange Studs: 54 mil galvanized steel, with punched webs and perforated flanges to receive screws; paint with rust inhibitive primer.
- E. C-Studs: 54 mil galvanized steel, with punched webs and perforated flanges to receive screws.
- F. Runner Tracks: 30 mil galvanized steel, un-punched minimum.
- G. Backing Plates: Steel sheet or plate of gages or thickness required or scheduled, galvanized or painted with rust inhibitive primer.
- H. Channels: 54 mil steel, 3/4 inch furring channels and 1-1/2 inch runner channels, painted.
- I. Metal Furring: Roll formed 18 mil galvanized steel, hat shaped channels.

## DIVISION 9 - FINISHES

### Section 09 11 00 – Non-Load Bearing Wall Framing

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- J. Fasteners: To suit stud, track, or channel gage.
  - 1. Sheet Metal Screws:
    - a. 3/8 inch Type S pan head for fastening 30 mil material.
    - b. 1/2 inch Type S-16 pan head cadmium plated for fastening wide flange studs to door frame clips, and similar 54 mil material.
  - 2. Powder-Actuated Devices: 1/4 inch diameter with 1-1/2 inch concrete penetration as specified in Section 05500.
  - 3. Concrete Nails: Case hardened stub nails 3/4 inch long.
  
- K. Wire:
  - 1. 18 gage soft annealed galvanized steel tie wire.
  - 2. 10 gage soft annealed galvanized steel hanger wire.
  - 3. 8 gage soft annealed galvanized steel hanger wire.
  
- L. Welding Electrodes: AWS low hydrogen type, as required.
  
- M. Miscellaneous Accessories: Manufacturer's standard, suitable for the intended use.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install Work in accordance with applicable requirements of MLSFA, AWS, and ASTM C 754.
  
- B. Limit tolerance for bow and alignment to 1/8 inch in 10 feet.
  
- C. Use wide flange studs at partitions supporting plywood, at electric panels, backing plates, fire extinguisher cabinets, and free ends of partitions.
  
- D. Use metal studs at interior partition framing supporting gypsum board not requiring wide flange studs.
  
- E. Use wide flange studs at heads and jambs of door frames and at borrowed light openings. Stiffen as shown.
  
- F. Furred Spaces: Provide metal furring or furring channels at 16 inch centers vertically or as shown. Fasten at top and bottom, and tie to horizontal furring channels at 4 foot centers. Fasten furring brackets to concrete with powder actuated devices or concrete nails.

## DIVISION 9 - FINISHES

### Section 09 11 00 – Non-Load Bearing Wall Framing

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- G. Partition Stiffeners: Partition Stiffeners: Provide horizontal furring channel stiffeners at 5 foot centers maximum vertically at all metal stud load bearing walls and in non-load bearing walls that have sheathing on one side only.
- H. Provide backing plates as scheduled and detailed, of sufficient length to fasten each end to metal framing. Provide backing plate support for each point of fastening of any unit to be anchored.
- I. Fasten runner tracks at 2 foot intervals and 6 inches from ends.
  - 1. To Concrete Slab: With powder actuated devices or concrete nails.
  - 2. To Steel Framing: By welding.
- J. Secure studs to runner tracks with sheet metal screws to suit stud gage.
- K. Provide welded, bolted, or screwed connections as shown or required.
- L. Partition Bracing: For partitions exceeding 10 feet in length provide two 10 gage wires, one each way perpendicular to plane of partition, at 5 foot centers maximum. Splay at 45 degrees vertically.
- M. Install accessories and miscellaneous specialties to plumb, true, and level lines, including other materials furnished and located as part of the Work of other Sections.
- N. Ceiling Furring:
  - 1. Space hanger wires at 4 feet maximum centers connected to wood framing with 3/8 inch by 3 inch long tie wire screw eyes. Space runner channels at 4 foot centers and saddle tie hanger wire top and bottom with 2 loops secured with no less than 3 turns around itself.
  - 2. Provide hangers within 6 inches of ends of runner channels. Provide runner channels within 6 inches of walls and partitions to support ends of metal furring.
  - 3. Lay out runner channels transverse to direction of joists where spacing permits.
  - 4. Space metal furring for gypsum board at 16 inch centers. Saddle tie to runner channels with 2 loops of tie wire secured with no less than 3 turns around itself.

END OF SECTION

**DIVISION 9 - FINISHES**  
**Section 09 25 00 – Gypsum Board**

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PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and Supplementary Conditions and Division 0 and 1 Specification Sections apply to work of this Section.

1.02 SECTION INCLUDES

- A. Interior Gypsum Board (GWB)
- B. Water Resistant Panels (GWB-WR)
- C. Tile Backer Board (TBB)
- D. Finishing Gypsum Board

1.03 REFERENCES

- A. All references shall be the latest adopted edition.
- B. ASTM C475 - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board
- C. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board
- D. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs
- E. ASTM C1177 - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing
- F. ASTM C1178 - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel
- G. ASTM C1278 - Standard Specification for Fiber-Reinforced Gypsum Panel
- H. ASTM C1280 - Standard Specification for Application of Gypsum Sheathing
- I. ASTM C1396 – Standard Specification for Gypsum Board

**DIVISION 9 - FINISHES**  
**Section 09 25 00 – Gypsum Board**

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- J. ASTM D3273 – Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
- K. GA-214 - Recommended Levels of Gypsum Board Finish; Gypsum Association

1.04 QUALITY ASSURANCE

- A. Applicator Qualifications: Company specializing in performing the work of this section with minimum 5 years of consecutive successful experience.

1.05 REGULATORY REQUIREMENTS

- A. Conform to applicable codes and installation requirements for fire rated assemblies indicated on drawings.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in original and unopened packages, containers, or bundles, with brand names and manufacturer's labels intact and legible.
- B. Store materials in dry location, fully protected from weather and direct exposure to sunlight.
- C. Stack gypsum board products flat and level, properly supported to prevent sagging or damage to ends and edges.
- D. Store corner bead and other metal and plastic accessories to prevent bending, sagging, distortion, or other mechanical damage.

1.07 PROJECT CONDITIONS

- A. Environmental Conditions: Establish and maintain environmental conditions for applying and finishing gypsum board to comply with ASTM C840 requirements or gypsum board manufacturer's recommendations, whichever are more stringent.
- B. Ventilation: Provide controlled ventilation during joint finishing operations, to eliminate excessive moisture. Avoid drafts during hot, dry weather to prevent finishing materials from drying too quickly.

PART 2 - PRODUCTS

2.01 GYPSUM BOARD MATERIALS (GWB)

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- A. Interior Gypsum Board (GWB): ASTM C1396; Type X, fire rated, UL or WH tested and listed; sizes to minimize joints in place; ends square cut.
  - 1. Thickness: 5/8 inch.
  - 2. Edges: Tapered.
  - 3. Length: Longest lengths possible for least number of butt joints.
  - 4. Radius/Curved Walls: Use any thickness gypsum board that will bend to the required radius.
    - a. Single Layer Minimum Thickness: 5/8-inch.
    - b. 1/4-inch thick board requires 3 layers.
    - c. 3/8-inch thick board requires 2 layers.
  
- B. Water Resistant Panels (GWB-WR):
  - 1. Manufacturer/Product: USG *Fiberock Brand Aqua-Tough Interior Panels* or approved.
  - 2. Thickness: 5/8-inch
  - 3. Edges: Tapered
  - 4. Size: Largest size practicable to minimize joints in place.
  - 5. Ends: Square cut
  - 6. Standards: Conform to ASTM C1278 and physical property requirements of ASTM C1396 and C1178.
  
- C. Tile Backer Board (TBB):
  - 1. Manufacturer/Product: G-P Gypsum *DensShield Tile Backer* or approved.
  - 2. Thickness: 5/8"
  - 3. Edges: Tapered
  - 4. Size: Largest size practicable to minimize joints in place.
  - 5. Ends: Square cut
  - 6. Standards: Conform to ASTM C1278 and physical property requirements of ASTM C630 and C1178.

**2.02 ACCESSORIES**

- A. Acoustic Sealant: Non-hardening, non-skinning, for use in conjunction with gypsum board; USG *Sheetrock Acoustical Sealant* or similar.
  
- B. Outside Square Corners: Galvanized metal corner bead factory clad with paper tape; Beadex *Microbead* or approved.
  
- C. Angled Corners: Beadex *B1 Flex 100' Tape-On Flexible Corner Bead*, or approved.
  
- D. J-Mold (Where GWB Abuts Dissimilar Material And Is Exposed To View): Galvanized metal J-shaped trim factory clad with paper; Beadex *B9J Tape-On "J" Trim* or approved.

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1. **GWB Abuts Windows:** Provide temporary heavy weight cardboard strip 3 inches wide between trim and face of window frame to protect frame from dirt and damage.
- E. **Control Joint:** GA 216; roll-formed metal control joint with removable strip, similar to USG No. 93, or approved.
- F. **Joint Materials:** Provide products by manufacturer of gypsum board. Conform to ASTM C475 and as recommended by gypsum board manufacturer for project conditions.
  1. **Interior Applications:** Ready-mixed vinyl-based joint compound
    - a. **Taping Compound:** Type specifically formulated for embedding tape and accessories and for pre-filling.
    - b. **Topping Compound:** Type specifically formulated for finishing drywall over taping compound.
    - c. **Joint Tape:** Manufacturer's standard paper reinforcing tape.
  2. **Water Resistant Panels:** *Sheetrock Brand Durabond Setting-Type Joint Compound* or *Sheetrock Brand Easy Sand Joint Compound* manufactured by U.S. Gypsum.
    - a. **Joint Tape:** Paper tape, *Sheetrock Brand Joint Tape* manufactured by U.S. Gypsum
  3. **Tile Backer Board (With Tile Finish):**
    - a. **Joint and Taping Compound (Thin Set Cement Mortar):** Specified in Section 09 30 00.
    - b. **Joint Tape (Glass Fiber Mesh):** Specified in Section 09 30 00.
- G. **Primer/Surfacer:** *Sheetrock Brand Primer-Surfacer Tuff-Hide* manufactured by U.S. Gypsum.
- H. **Acoustical Insulation:** Owens-Corning, *Noise Barrier Batts*, ASTM C 665, 3 1/2" thick.
- I. **Screws:**
  1. **Interior Application:** Conform to ASTM C1002; bugle-head steel, self-drilling type, black phosphate finish.
  2. **Exterior Application and Tile Backer Board:** Conform to ASTM C1002; bugle-head steel, self-drilling type, provide with yellow zinc corrosion resistant coating.

## PART 3 - EXECUTION

### 3.01 COORDINATION

- A. Review, coordinate and accommodate work of other trades that interface



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with, affect or are affected by the work of this Section so as to facilitate the execution of the overall Work of this project in a coordinated and efficient manner.

- B. Coordinate location of framing and backing for supporting ends of GWB and control joints with Section 06 10 00.
- C. Inspect finished surfaces with Section 09 90 00 painting applicator and project superintendent, mark areas that require additional finishing.

**3.02 EXAMINATION**

- A. Verify that project conditions are appropriate for work of this section to commence.
- B. Confirm that the framing is straight, is within specified tolerances and meets minimum allowable deflection requirements.
- C. Confirm that utility rough-in fits properly within framing width and will not prevent GWB from fitting tight to face of framing members.
- D. Confirm that there is adequate temporary heat and light.
- E. Beginning of installation indicates acceptance of framing and conditions.

**3.03 FLOOR PROTECTION**

- A. Protect concrete floors from contact with GWB dust, taping mud and primer/surfacer using heavy paper or other method.

**3.04 GYPSUM BOARD INSTALLATION**

- A. Install GWB in conformance with ASTM C840, C1280, GA-216, and manufacturer's installation instructions.
  - 1. Install in longest lengths possible for minimum number of joints.
  - 2. Install to minimize butt end joints, especially in highly visible locations.
  - 3. Comply with the installation requirements of fire rated assemblies listed on the Drawings.
  - 4. Water Resistant Panels: Use stainless steel screws.
  - 5. Tile Backer Board: Use corrosion resistant screws, locate cut edges at top of walls only, screw spacing as recommended by manufacturer.
  - 6. Install shaftwall in conformance with manufacturer's installation instructions and fire listing requirements.

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7. Exterior Gypsum (GWB) Sheathing Board: Use corrosive resistant screws. Fit joints tight as recommended by manufacturer.
- B. Install full width panels with cut pieces only at top of wall (no "belly bands").
- C. Place wrapped edges adjacent to one another; do not place cut edges or butt ends adjacent to wrapped edges.
- D. Maintain 1/4 inch maximum gap between bottom of gypsum board and floor.
- E. Double-Layer Installation: Use gypsum backing board for first layer, placed perpendicular to framing or furring members. Place second layer parallel to first layer. Offset joints of second layer from joints of first layer.
- F. Acoustic Sealant: Install at perimeter of all sound walls in accordance with manufacturer's instructions and as follows:
  1. Place continuous bead at perimeter of each layer of gypsum board.
  2. Seal around all penetrations by conduit, pipe, ducts, rough-in boxes, and at other similar penetrations.
- G. Run gypsum board full depth behind steel door and relight frames.

**3.05 INSTALLATION OF TRIM AND ACCESSORIES**

- A. Corner Beads: Install at external corners in a single full length piece free of butt joints, using longest practical lengths, no short pieces; place into a solid bed of soft joint compound for secure installation.
  1. Align bead straight and plumb.
  2. Align juncture with other corner bead flush.
- B. J-Shaped Edge Trim: Install at any exposed to view location where gypsum board abuts any dissimilar material or ends with exposed edge (around window frames, exposed structure, etc.).
  1. Install heavy cardboard continuous at window perimeter to protect frame from dirt and damage.
- C. Control Joints: Place control joints consistent with lines of building spaces and as follows:
  1. As determined by installer to avoid cracking in finished surfaces, generally not more than 30 feet apart on walls and ceilings over 50 feet long. Location and layout subject to Architect's approval; review with Architect prior to starting installation.

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**3.06 JOINT TREATMENT**

- A. Finish gypsum board (whether exposed to view or not) in accordance with GA-214 to the following minimum level of finish:
  - 1. Painted Finish Exposed To View: Level 4, substitute a coat of Primer/Surfacer (15 – 20 wet mil thickness) in lieu of skim coating with joint compound; sand surface of Primer-Surfacer smooth.
- 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.

**3.07 APPLICATION – PRIMER/SURFACER**

- A. Apply Primer/Surfacer to all surfaces exposed to view in accordance with manufacturer's installation instructions and at recommended application rate to achieve GA-214 Level 4 appearance, free of visible tape joint lines after finish painting is completed.
  - 1. Spray-apply Primer/Surfacer to 15 - 20 mil wet film thickness applied in two separate passes at 90 degrees to each other for proper coverage.
  - 2. Sand surface of Primer/Sealer lightly after it has dried to eliminate any unwanted stipple pattern or texture.
- B. After application of Primer/Sealer, carefully inspect walls and mark any defects in surface finish.
  - 1. Fill/sand defective areas in surface finish and recoat with primer/surfacer.

**3.08 INSPECTION WITH PAINTER AND PROJECT SUPERINTENDENT**

- A. Coordinate an inspection walkthrough of all finished GWB surfaces with the painter and project superintendent; mark any defects in the surface finish.
  - 1. Fill/sand defective areas in surface finish and recoat with primer/surfacer.

**3.09 TOLERANCES**

- A. Gap Between Bottom Of GWB and Floor: 1/4 inch Maximum.
- B. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.
- C. Butt Joint Finishing: Not readily visible under the normal lighting

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conditions found for any given area/surface.

- D. Finishing Tolerances: All exposed surfaces shall be smooth and free from visible ridges, waves, ripples, holes, defects, delamination, roughness, depressions, screw pops, etc. Taped joints shall not be visible after finish paint application.

**3.10 CLEAN UP**

- A. Remove all excess gypsum board and finishing materials from the site.
- B. Remove gypsum board scraps and dust from all concealed spaces including interior spaces of wall framing.
- C. Remove gypsum dust, taping mud and primer/sealer completely from window frames, door frames, subfloor surfaces and any surface/material exposed to view.
  - 1. Subfloor cleanliness/condition shall conform to floor covering installation requirements.

**3.11 WORKMANSHIP**

- A. Gypsum wallboard shall be installed and finished using the best workmanship, including the following:
  - 1. No damaged board or paper face.
  - 2. Ends centered on framing.
  - 3. GWB tucked full depth behind hollow metal door frames.
  - 4. Gap at bottom of GWB 1/4 inch or less.
  - 5. Cut-outs for outlets and devices cut neatly with saw or router.
  - 6. GWB fastened tight to face of studs to eliminate screw pops.
  - 7. Acoustic sealant consistently applied to all openings and perimeters.
  - 8. All screws that do not engage framing removed.
  - 9. Taped joints full bedded in taping compound and free of air pockets.
  - 10. Butt joints finished with minimal thickness and tapered out for flat appearance.
  - 11. Taped joints smooth and flat so as to disappear after painting.
  - 12. Paper face not roughened by sanding.
  - 13. Bottom of GWB behind rubber base and coved base properly finish smooth and free of roughness.
- B. Gypsum wallboard installed and finished with improper or poor workmanship shall be removed and replaced at Contractor's expense.

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3.12 FIELD QUALITY CONTROL

- A. Contractor Quality Control: Employ/assign quality control personnel to monitor the work of this section for conformance to the requirements of this section and to good construction practices.
  - 1. Contractor is solely responsible for managing and controlling the quality of the work and conformance with the requirements of this Section.
  
- B. Schedule of Required Inspections by Contractor; confirm installation and workmanship are as shown/specified:
  - 1. Inspect framing for conformance to specified surface tolerances.
  - 2. Confirm that batt insulation and sound insulation are installed in the proper locations and conform to specification requirements.
  - 3. Inspect GWB installation.
  - 4. Inspect trim installation.
  - 5. Inspect taping and finish application.
  - 6. Inspect finish on bottom of walls with rubber base and coved base.
  - 7. Inspect finished GWB surfaces after primer is applied with painter and GWB finisher to identify any finishing defects requiring correction prior to painting.

END OF SECTION

**DIVISION 9 - FINISHES**  
**Section 09 67 23 – Resinous Flooring**

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**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

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

**1.2 SUMMARY**

- A. Section Includes:
  - 1. Sparta-Guard™ Solid Color Industrial Resinous Flooring System
- B. Related Sections:
  - 1. Section 07 90 00 "Joint Sealants" for sealants installed at joints in resinous flooring systems.

**1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated. Include manufacturer's technical data, application instructions, and recommendations for each resinous flooring component required.
- B. Samples for Initial Selection: For each type of exposed finish required.
- C. Samples for Verification: For each resinous flooring system required, 6 inches (150 mm) square, applied to a rigid backing by Installer for this Project.
- D. Product Schedule: For resinous flooring.

**1.4 INFORMATIONAL SUBMITTALS**

- A. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.
- B. Material Certificates: For each resinous flooring component, from manufacturer.
- C. Material Test Reports: For each resinous flooring system.

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1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For resinous flooring to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of flooring systems required for this Project.
  - 1. Engage an installer who is certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.
- B. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, from single source from single manufacturer. Provide secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from source recommended by manufacturer of primary materials.
- C. Mockups: Apply mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Apply full-thickness mockups on 48-inch- (1200-mm-) square floor area selected by Architect.
    - a. Include 48-inch (1200-mm) length of integral cove base with inside and outside corner.
  - 2. Simulate finished lighting conditions for Architect's review of mockups.
  - 3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- D. Pre-installation Conference: Conduct conference at:

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.

1.8 PROJECT CONDITIONS

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### **Section 09 67 23 – Resinous Flooring**

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- A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application.
- B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application.
- C. Close spaces to traffic during resinous flooring application and for not less than 24 hours after application unless manufacturer recommends a longer period.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Basis-of-Design Product: Subject to compliance with requirements, provide HP Spartacote product named or comparable product:
  - 1. Resinous flooring product to be manufactured under US Patents: 6,833,424 & 7,169,876
  - 2. Not all manufacturers produce all categories and types of resinous flooring systems; verify availability and revise list below to suit Project. Insert manufacturer'

### **2.2 HIGH-PERFORMANCE RESINOUS FLOORING**

- A. Resinous Flooring: Abrasion-, impact- and chemical-resistant, high-performance, resin-based, monolithic floor surfacing designed to produce a seamless floor and integral cove base.
  - 1. Basis-of-Design Product: HP Spartacote, Sparta-Guard™ Solid Color Industrial Flooring
- B. System Characteristics:
  - 1. Color and Pattern: As selected by Architect from manufacturer's full range
  - 2. Wearing Surface: Textured for slip resistance
  - 3. Overall System Thickness: 9 mils.
- C. Primer / Body Coats:
  - 1. Name: SpartaFlex™ Pigmented
  - 2. Resin: Polyaspartic Aliphatic Polyurea
  - 3. Formulation Description: 72 percent solids.
  - 4. Application Method: Roller, Squeegee or Broom.
    - a. Thickness of Coats: 3 Mils. DFT



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b. Number of Coats: One.

D. Mid-Coat:

1. Name: Sparta-Flex® Pigmented
2. Resin: Polyaspartic Aliphatic Polyurea
3. Formulation Description: 72% Solids
4. Application Method: Roller, Squeegee, Broom

a. Thickness of Coats: 3 mils

b. Number of Coats: One

E. Top-Coat:

1. Name: Sparta-Flex® Clear
2. Resin: Polyaspartic Aliphatic Polyurea
3. Formulation Description: 72% Solids
4. Application Method: Roller, Squeegee, Broom

a. Thickness of Coats: 3 mils

b. Number of Coats: One

5. Aggregates: Incorporate Sparta-Grip™ traction additive as needed for increased traction COF

6. Diamond-Topp™ Additive: For heavy-duty applications, incorporate Diamond-Topp™ wear coat additive to increase abrasion resistance. Diamond-Topp™ will leave a lightly textured matte finish.

F. System Physical Properties: Provide resinous flooring system with the following minimum physical property requirements when tested according to test methods indicated:

1. Adhesion: 400+ concrete fracture per ASTM D 4541.
2. Tensile Strength: 4,500-5,000 per ASTM D 638.
3. Impact Direct/Reverse: 160/160 per ASTM D 2794 Inch Pounds.
4. Abrasion Resistance: 22-28 maximum weight loss per ASTM D 4060.
5. Flammability: Self-extinguishing per ASTM D 635.
6. Hardness: 84, Shore D per ASTM D 2240.

G. System Chemical Resistance: As per manufacturer's chemical resistance chart

### 2.3 ACCESSORIES

A. Waterproofing Membrane: HP Spartacote Hydro-Shield SL™ for concrete slabs exhibiting elevated moisture vapor emission rates (> 3 lbs over 1000 sq ft in 24 hours).

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1. Formulation Description: 100% Solids Chemically Enhanced Epoxy
- B. Patching and Fill Material: HP Spartacote Fast Fix™ or resinous product of or approved by resinous flooring manufacturer and recommended by manufacturer for application indicated.
- C. Joint Filler Material: HP Spartacote Joint-Flex® flexible polyuria joint filler or similar product.
- D. Traction Additive: Sparta-Grip™ traction additive from HP Spartacote or similar material available in 40,60 and 100 mesh sizes
- E. Wear Coat Additive: Diamond-Topp™ additive from HP Spartacote or similar material.

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

- A. General: Prepare and clean substrates according to resinous flooring manufacturer's written instructions for substrate indicated. Provide clean, dry substrate for resinous flooring application.
- B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.
  1. Roughen concrete substrates as follows:
    - a. Mechanically profile surfaces with an apparatus that abrades the concrete surface to a profile as specified by system application guide.
    - b. Comply with ASTM C 811 requirements unless manufacturer's written instructions are more stringent.
  2. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written instructions.
  3. Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions.
    - a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with application of resinous flooring only after substrates have

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### **Section 09 67 23 – Resinous Flooring**

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maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) slab area in 24 hours.

- b. Perform plastic sheet test, ASTM D 4263. Proceed with application only after testing indicates absence of moisture in substrates.
  - c. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
4. Alkalinity and Adhesion Testing: Verify that concrete substrates have pH within acceptable range. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.
- C. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.
- D. Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.
- E. Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written instructions.

#### **3.2 APPLICATION**

- A. General: Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.
1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum inter-coat adhesion.
  2. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
  3. At substrate expansion and isolation joints, comply with resinous flooring manufacturer's written instructions.
- B. Apply waterproofing membrane, where indicated, in manufacturer's recommended thickness.
1. Apply waterproofing membrane to integral cove base substrates.
- C. Integral Cove Base: Where indicated, Apply cove base mix to wall surfaces before applying flooring. Apply according to manufacturer's written instructions and details including those for taping, mixing, priming, troweling, sanding, and topcoating of cove base. Round internal and external corners.

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1. Integral Cove Base: 4 inches high.

D. Apply primer and body coats in thickness indicated for flooring system.

E. Apply topcoats in number indicated for flooring system and at spreading rates recommended in writing by manufacturer.

**3.3 FIELD QUALITY CONTROL**

A. Core Sampling: At the direction of Owner and at locations designated by Owner, take one core sample per 1000 sq. ft. (92.9 sq. m) of resinous flooring, or portion of, to verify thickness. For each sample that fails to comply with requirements, take two additional samples. Repair damage caused by coring and correct deficiencies.

B. Material Sampling: Owner may at any time and any number of times during resinous flooring application require material samples for testing for compliance with requirements.

**3.4 PROTECTION**

A. Protect resinous flooring from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by resinous flooring manufacturer.

END OF SECTION

**DIVISION 9 - FINISHES**  
**Section 09 90 00 – Paints and Coatings**

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PART 1 - GENERAL

1.1 SUMMARY

- A. Unless otherwise shown or specified paint all surfaces exposed in the finished Work.
- B. Surfaces Not to be Painted: Materials with factory applied finish or integral color, hardware, finished metals, glass, plastic laminate, tile, resilient flooring, lighting fixtures, Code-Required labels.

1.2 SUBMITTALS

- A. Product Data: Complete material list showing product name, number, manufacturer's name, intended use and function on the Project.
- B. Samples: 8-1/2 by 11 inches in size of each color and finish required, upon materials corresponding with those to be finished on the Project. Approved samples shall constitute standards for color and finish for acceptance or rejection of completed Work.

1.3 QUALITY ASSURANCE

- A. Qualifications: Preparation and painting Work shall conform with recommended practices and quality standards of the ASM.

1.4 PROJECT CONDITIONS

- A. Environmental Requirements: Comply with manufacturers' recommendations for environmental conditions under which paint and painting systems shall be applied.
- B. Do not allow rags to accumulate. At the end of each day's Work remove from Site rags and papers used for painting or cleanup operations. During the day's Work keep used rags in approved closed metal containers.

1.5 MAINTENANCE

- A. Extra Materials: Furnish extra stock at the rate of one gallon for each body color or type used, and one gallon of each accent color or type used.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

**DIVISION 9 - FINISHES**  
**Section 09 90 00 – Paints and Coatings**

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- A. Paint Acceptable Manufacturers: Benjamin Moore & Company, Sherwin Williams, Parker Paint / Comex Group, Kelly Moore no other substitutions.
- B. Stain/Oils/Waterborne Urethanes Acceptable Manufacturers: Sikkens, Benjamin Moore & Company, Cabots, , Dalys, Duckback, or approved substitutions.

**2.2 MATERIALS**

- A. Paints: Comply with finish systems specified.
- B. Putty: Conform to FS TT-P-791A(3), colored to match paint and stain finishes, as applicable.
- C. Cementitious Filler: Nonshrink formulation, white Portland cement with fine silicate aggregate, zinc- oxide pigment, and reinforcing chemical binder as approved.
- D. Spackling Compound: Standard gypsum board compound.
- E. Unspecified materials such as turpentine, linseed oil, or mineral spirits shall be products of reputable manufacturers and as recommended by paint manufacturers.
- F. Materials for Undercoats and Finish Coats: Ready mixed, and shall not be changed, except thinning of undercoats (when required), reinforcing, or coloring, all of which shall be performed in accordance with manufacturers' recommendations.

**2.3 PAINTING SYSTEMS**

- A. General:
  - 1. Finish systems specified shall be Manufacturer's Premium Grade finishes unless otherwise noted.
  - 2. Each system establishes procedure, quality, and number of coats. All coats listed are in addition to shop prime coats. Additional coats maybe required for interior or exterior accent colors. See finish schedule for details.
  - 3. Specified coats for any one paint system shall be products of the same manufacturer.
- B. Mechanical and Electrical:
  - 1. Exposed HVAC ducts, conduit and uncovered piping in finished spaces: Waterborne, 3 coats.
    - (1) One coat galvanized primer.
    - (2) Two coats acrylic enamel, satin.

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### Section 09 90 00 – Paints and Coatings

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2. Pipe and duct covering: Waterborne, 4 coats.  
One coat drywall joint compound thinned with latex sealer to working consistency.
    - (1) One coat PVA primer sealer.
    - (2) Two coats acrylic latex, satin.
  3. Inside of ducts, visible from finished space.
    - (1) One coat galvanized metal primer.
    - (1) One coat dull black paint.
  4. Miscellaneous:  
Finish registers, grilles, exposed conduit, electrical cabinets, and similar items to match adjacent surfaces.
- C. Exterior:
1. Galvanized metal: Solvent base, 3 coats.
    - (1) One coat galvanized metal primer.
    - (2) Two coats alkyd enamel. (Semi-gloss)
  2. Cedar trim: Acrylic Latex over Alkyd Wood Primer, 3 coats.
    - (1) One coat alkyd wood primer.
    - (2) Two coats acrylic enamel. (Semi-gloss or Satin as noted).
  3. Cedar siding and ACX plywood soffit and battons:
    - (2) Two coats solid body stain.
  4. Cedar Wood T&G Soffiting:
    - (2) Two coats clear sealer.
  5. Cementitious Panels and Siding: Acrylic Latex
    - (1) Two coats acrylic latex, satin.
  6. Cast in Place Concrete: Acrylic Latex
    - (1) One coat acrylic concrete primer/sealer
    - (2) Two coats acrylic latex, satin.
  7. Concrete Masonry Units: Acrylic Latex
    - (1) One coat Block Filler
    - (2) Two coats acrylic latex, satin.
- D. Interior:
1. Gypsum board, typical: Waterborne, 4 coats.
    - (1) One coat latex PVA primer sealer (apply before application of texture coat).
    - (1) One coat latex primer (apply after application of texture coat).
    - (2) Two coats acrylic enamel. (Finish eggshell)
  2. Exposed wood: Waterborne Polyurethane, 3 coats.
    - (3) Three coats waterborne polyurethane, satin.
  3. Exposed Glu Lam Beams: Waterborne Polyurethane, 3 coats.
    - (3) Three coats waterborne polyurethane, satin.
  4. Hollow Metal Doors and Frames: Solvent base, 3 coats.
    - (1) One coat rust-inhibitive primer.

## **DIVISION 9 - FINISHES**

### **Section 09 90 00 – Paints and Coatings**

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- (2) Two coats alkyd enamel. (Semi-gloss)
5. Ferrous Metal (Not Galvanized): Solvent base, 3 coats.
  - (1) One coat rust-inhibitive primer.
  - (2) Two coats alkyd enamel. (Semi-gloss)
6. Galvanized Metal: Solvent base, 3 coats.
  - (1) One coat galvanized metal primer.
  - (2) Two coats alkyd enamel. (Semi-gloss)
7. Wood Doors: Waterborne Polyurethane, 3 coats.
  - (3) Three coats waterborne polyurethane, satin.
8. Exposed Structural Steel, Joists, Decking: Waterborne, 2 coats:
  - (1) One coat acrylic metal primer.
  - (2) One coat latex dryfall, flat.
9. Concrete, Cast in Place Concrete: Waterborne, 3 coats:
  - (1) One coat acrylic concrete/masonry sealer
  - (2) Two coats acrylic latex, satin
10. Concrete Masonry Units: Waterborne, 3 coats:
  - (1) Once coat block filler
  - (2) Two coats acrylic latex, satin

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

- A. Rooms and spaces shall be broom clean before commencing painting Work.
- B. Prepare surfaces in accordance with materials manufacturers' recommendations. Clean, remove foreign matter, patch holes, cracks, and imperfections with compound recommended by manufacturer of paint to be applied to these surfaces. All areas to be painted shall be brought to true, even surfaces.
- C. Remove hardware, nameplates, switchplates, and other items which are not to be painted. Protect by masking or other means those items which cannot be removed.
- D. Mix paints only over a removable surface in well ventilated areas and in accordance with manufacturers' instructions.

### **3.2 APPLICATION**

- A. Apply material evenly, free from sags, runs, crawls, holidays, or defects. Mix to proper consistency, brush out smooth, leaving minimum of brush marks; material shall be flowed on. Avoid lapping material on adjacent surfaces.



**DIVISION 9 - FINISHES**  
**Section 09 90 00 – Paints and Coatings**

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- B. Apply paint by brushes, roller and back brush, or spray and back brush; sheepskin daubers may be used to reach surfaces, which are inaccessible to paint brushes.
- C. On smooth surfaces carefully sand all finishes for good adhesion of subsequent coats.
- D. Apply putty, caulk, or spackle after surfaces are primed and primer is dry. Spot prime areas as required.
- E. Tint all pigmented undercoats to approximately same shade as final coat. Noticeably decrease depth of shade in successive coats.
- F. Shop primed metal surfaces of all mechanical and electrical equipment shall receive 2 finish coats of paint to match adjoining wall or ceiling surfaces.
- G. At completion of Work of other Sections, touch up damaged finishes as required.

**3.3 PATCHING**

- A. Repaint entire surface of patched surfaces to nearest change in plane.

**3.4 CLEANING**

- A. Clean up spilled and splattered paint daily.
- B. On completion carefully clean all glass, hardware, and similar surfaces to remove all misplaced paint and stain spots or spills. Leave Work in condition acceptable to Architect. Leave premises in a clean and orderly condition.

END OF SECTION

**DIVISION 10 - SPECIALTIES**  
**Section 10 20 00 – Louvers and Vents**

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PART 1 - GENERAL

1.1 SUBMITTALS

- A. Manufacturer's information on materials, fabrication, finishes, and installation.
- B. Shop Drawings showing details of fabrication and installation.

1.3 RELATED SECTIONS

- A. See Division 15 - Mechanical for information on exterior louvers and vents.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle in accordance with manufacturer's instructions.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Stationary Louvers: Greenheck or approved substitution.
  - 1. Frame: 16 gage galvanized steel, 4 inches deep.
  - 2. Blades: 16 gage galvanized steel, positioned at approximately 45 degree angle, on approximately 4 inch centers.
  - 3. Birdscreen: 1/2 inch by 1/2 inch mesh, 19 gage galvanized, in removable frame, mounted on inside.
  - 4. Finish: Mill galvanized, with manufacturer's premium or mica Kynar coating in color as selected.
  - 5. Sizes as shown on the Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that openings to receive louvers are satisfactory for their installation. Review Mechanical drawings for location and coordinate with Architectural drawings, Coordinate conflicts all conflicts with any Architectural, electrical or Structural items.

3.2 INSTALLATION

- A. Install plumb and true in accordance with manufacturer's instructions, reviewed Shop Drawings, and as shown and specified.
- B. Apply continuous bead of sealant around exterior frames. Sealant is specified in Section 07900.

END OF SECTION

**DIVISION 10 - SPECIALTIES**  
**Section 10 40 00 – Identification Devices**

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**PART 1 - GENERAL**

**1.1 SUBMITTALS**

- A. Product Data, Shop Drawings and Samples, and installation details.

**1.2 QUALITY ASSURANCE**

- A. Comply with governing codes and regulations. Provide products of acceptable manufacturers which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

- A. Garnett/AccuBraille, ADA Signs; Vomar Products, 100 Series; or approved; unframed acrylic plaques with 1/4 inch radius at corners. Letter style and color, and plaque color as selected from manufacturer's standards.
- B. Provide interior signage in compliance with ADA/ANSI 117.1 standards and as scheduled.
- C. Interior mounted standard type face building number decals.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Install signs in accordance with manufacturer's instructions and approved submittals. Install in proper relation with adjacent construction and with uniform appearance. Coordinate with work of other Sections.
- B. Restore damaged finishes. Clean and protect work from damage.
- C. Apply building number decals to interior face of glass, to be readable from the exterior. Locate 4" below bottom of storefront header mullion, adjacent to entrance door, either side.

**3.2 SCHEDULE**

- A. Electrical Room(s) (Type A materials)
- B. Mechanical Room(s) (Type A materials) (Include "Fire Alarm Panel Location" beneath Mech/Elec. Storage Rm.)

**DIVISION 10 - SPECIALTIES**  
**Section 10 40 00 – Identification Devices**

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- C. Sprinkler Room (Exterior Sign) (Type A materials) (include “Sprinkler Riser Location” beneath Mech/Elec/Sprinkler Rm.)

END OF SECTION

**DIVISION 10 - SPECIALTIES**  
**Section 10 44 00 – Fire Extinguishers and Cabinets**

---

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and Supplementary Conditions and Division 0 and 1 Specification Sections apply to work of this Section.

1.02 SECTION INCLUDES

- A. Fire Extinguisher Cabinets
- B. Fire Extinguishers

1.03 REFERENCES

- A. All references shall be the latest adopted edition.
- B. NFPA 10 - Standard for Portable Fire Extinguishers; National Fire Protection Association.
- C. UL (FPED) - Fire Protection Equipment Directory; Underwriters Laboratories Inc.; current edition.

1.04 SUBMITTALS

- A. Refer to Section 01 33 00 for submittal procedures.
- B. Product Data: Manufacturer's descriptive literature for specified products; indicate compliance to specified requirements.

PART 2 - PRODUCTS

2.02 MANUFACTURERS

- A. Available Manufacturers: Subject to conformance with the requirements of this Section, manufacturers offering products that may be provided for this project include, but are not limited to, the following:
  - 1. J.L. Industries, Inc. (specified)
  - 2. Larsen's Manufacturing Company
  - 3. Potter-Roemer
  - 4. Substitutions: Refer to requirements in Section 01 60 00.

## DIVISION 10 - SPECIALTIES

### Section 10 44 00 – Fire Extinguishers and Cabinets

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#### 2.03 FIRE EXTINGUISHER CABINETS

- A. Fire Extinguisher Cabinets: J.L. Industries, Inc. “*Cosmopolitan*” Series, sized to accommodate 2A10BC Fire Extinguisher, recessed maximum amount allowed by wall framing.
1. Cabinet: Cold-rolled steel with factory-applied baked primer coating.
    - a. Provide maximum recessment allowed by depth of wall framing.
    - b. Where Fire Extinguisher Cabinets can be mounted within wall framing this shall be the chosen method. Surface mounted must be approved by Architect/Owner.
  2. Door & Frame: Extruded aluminum, clear anodized finish.
    - a. Projection: Flush with face of cabinet.
    - b. Configuration: Half door glazing.
    - c. Glazing: Clear Acrylic
    - d. Trim style: 1-1/2” square
  3. Door hardware:
    - a. Continuous hinge, allowing 180-degree door swing.
    - b. Chrome handle pull.
    - c. Lock: J.L. Industries *SAF-T-LOK*
  4. Lettering: Die cut vinyl letters.
    - a. Legend: "FIRE EXTINGUISHER".
    - b. Lettering Color: Black, or as required by Authority Having Jurisdiction.
    - c. Placement: Vertical, on hinge side of door glazing, place on interior side of glazing to be read from exterior side; comply with all requirements of authorities having jurisdiction.
- B. Extinguisher Mounting Bracket: Plated steel bracket for mounting either on wall or in cabinet, with quick release metal retaining strap to hold extinguisher securely to bracket. Provide for all extinguishers.

#### 2.04 FIRE EXTINGUISHERS

- A. Fire Extinguishers: 2A10BC capacity.

**DIVISION 10 - SPECIALTIES**  
**Section 10 44 00 – Fire Extinguishers and Cabinets**

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EXECUTION

3.02 COORDINATION

- A. Review, coordinate and accommodate work of other trades that interface with, affect or are affected by the work of this Section so as to facilitate the execution of the overall Work of this project in a coordinated and efficient manner.
- B. Coordinate size and location of recessed openings in framed walls.

3.03 EXAMINATION

- A. Verify that wall openings are correct size and in correct locations.

3.04 INSTALLATION

- A. Install cabinets securely to wall framing in accordance with manufacturer's instructions and as required by local Code Authority.
  - 1. Install Extinguisher Mounting Bracket centered in cabinet (or on wall as noted on Drawings) for each fire extinguisher.

3.05 ADJUSTING

- A. Immediately prior to project completion, ensure extinguishers (provided by others) are fully charged and bear tag recording date of charging and signature of verifying entity.

3.06 PROTECTION

- A. Protect exposed finishes of cabinets from damage by subsequent construction activities
- B. Repair minor damage to finishes in accordance with manufacturer's recommendations; replace components which cannot be repaired to Owner's satisfaction.

END OF SECTION

**DIVISION 11 - EQUIPMENT**  
**Section 11 00 00 – Owner Supplied Equipment**

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PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and Supplementary Conditions and Division 0 and 1 Specification Sections apply to work of this Section.

1.02 SECTION INCLUDES

- A. Owner supplied ground mounted package HVAC units
- B. Existing on-site Electrical gear

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- 1. See list of owner supplied equipment and manufacturers.

PART 3 - EXECUTION

3.01 COORDINATION

- A. Review, coordinate and accommodate work of other trades that interface with, affect or are affected by the work of this Section so as to facilitate the execution of the overall Work of this project in a coordinated and efficient manner.
- B. Coordinate size and location of recessed openings in framed walls.

3.02 EXAMINATION

- A. Verify that wall openings are correct size and in correct locations.

3.03 INSTALLATION

- A. Install all owner supplied equipment as per manufacturers recommendations.

3.04 ADJUSTING

- A. Immediately prior to project completion, adjust and verify all owner supplied equipment is in working order.



**DIVISION 11 - EQUIPMENT**  
**Section 11 00 00 – Owner Supplied Equipment**

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3.05 PROTECTION

- A. Protect equipment from damage during construction. Contractor assumes all responsibility for damaged equipment once it is received on site and transferred from the Owner to the Contractor.

END OF SECTION

## **DIVISION 23 - MECHANICAL**

### **Section 23 05 00 – Common Work Results for HVAC**

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#### **PART 1 - GENERAL**

##### **1.1 RELATED DOCUMENTS**

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

##### **1.2 SUMMARY**

- A. This Section includes the following to complement other Division 23 Sections:
  - 1. Submittals.
  - 2. Coordination Drawings.
  - 3. Record Documents.
  - 4. Maintenance Manuals.
  - 5. Piping materials and installation instructions common to most piping systems.
  - 6. Concrete base construction requirements.
  - 7. Escutcheons.
  - 8. Dielectric fittings.
  - 9. Flexible connectors.
  - 10. Mechanical sleeve seals.
  - 11. Nonshrink grout for equipment installations.
  - 12. Field-fabricated metal equipment supports.
  - 13. Installation requirements common to equipment specification sections.
  - 14. Rough-ins.
  - 15. Mechanical demolition.
  - 16. Mechanical Installations.
  - 17. Cutting and patching.
  - 18. Touchup painting and finishing.

##### **1.3 GENERAL REQUIREMENTS**

- A. Intent:
  - 1. The intent of the Contract Documents is for the Contractor to include all work necessary for the complete mechanical systems, tested and ready for operation.
  - 2. By submitting a proposal, the Contractor represents that it has made a thorough examination of the site, of the work, and all existing conditions and limitations, and that it has examined the Contract Documents in complete detail and has determined beyond doubt that the drawings, specifica-

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### **Section 23 05 00 – Common Work Results for HVAC**

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tions, and existing conditions are sufficient, adequate and satisfactory for the construction of the work under the Contract.

3. Where minor adjustments of the work are necessary for purposes of fabrication or installation of items, or resolution of conflicts between items within the intent of the Contract Documents, the Contractor shall make such adjustments with no added compensation. Where such adjustments affect functional or aesthetic design of the work, they shall first be submitted to the Architect for review and approval.

**B. Conditions:**

1. Conform to all Bidding Requirements, General Conditions and Amendments to the General Conditions, Supplementary Conditions and Special Conditions and General Requirements, Division 01, which govern the work specified herein.
2. The Contractor is obligated to comply with the above in addition to the requirements of this Section.
3. Modifications by this Section do not nullify any other portions of the above referenced conditions.

**C. Make complete mechanical installation, connecting to all equipment shown on the plans, or called for in the specifications. Mechanical contractor to provide any additional extra dampers and valves not shown on plans to obtain design criteria as required by the balancing contractor.**

**D. Plans and Specifications: Plans and specifications shall be taken together.**

1. Contractor shall provide all equipment, materials and work shown on the plans and/or called for in these specifications.
2. Provide work specified and not indicated on plans, or work indicated on plans and not specified, as though mentioned in both.
3. When discrepancies or conflicts occur within the documents, the Architect shall determine which takes precedence and the Contractor shall perform the selected requirement without additional cost.

**E. Mechanical Drawings:**

1. Mechanical drawings do not attempt to show all aspects of building construction, which will affect the installation of mechanical systems. The mechanical drawings are diagrammatic and do not intend to show all offsets and fittings that may be required for a complete installation. Locations of equipment, pipes, valves, traps, ductwork, etc. shown on the drawings, shall be followed as closely as conditions will permit. Review all project drawings, including, but not limited to, architectural, structural and electrical drawings; and coordinate with all trades involved so there is no

## **DIVISION 23 - MECHANICAL**

### **Section 23 05 00 – Common Work Results for HVAC**

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- conflict with work of other trades and so Owner secures best arrangement of work consistent with use of space.
2. Verify exact distances between points shown of drawings by actual measurement at site, as no extra cost will be allowed for differences between actual measurements and scaled measurements.
  3. Changes in design, configuration, or location of equipment, piping, or ductwork, advisable in the opinion of Contractor, shall be submitted to Architect for approval before proceeding with work, with written assurance from other trades that such changes will not interfere with their installation, nor cause any extra cost on their part. Such changes shall be made at no additional cost to Owner.
  4. Check location of all work of all trades and avoid interferences. Special attention is called to the following items; conflicts shall be reported to Architect for decision and direction:
    - a. Exact location of outlets shown on architectural details.
    - b. Location of suspended ceilings.
    - c. Location of ducts, grilles, pipes, and other mechanical equipment so electrical outlets are clear of these items and in proper relation to same.

#### **1.4 DEFINITIONS AND ABBREVIATIONS**

- A. **Finished Spaces:** Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawl spaces, and tunnels.
- B. **Exposed, Interior Installations:** Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. **Exposed, Exterior Installations:** Exposed to view outdoors, or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. **Concealed, Interior Installations:** Concealed from view and protected from physical contact by building occupants. Examples include spaces above hard or lay-in type ceilings and in duct shafts.
- E. **Concealed, Exterior Installations:** Concealed from view and protected from weather conditions and physical contact by building occupants, but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
- F. The word "provide," as used in Division 23, means "furnish and install."

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- G. The word "approved," as used in these specifications, means acceptance by the Architect.
- H. Indicated: The term "indicated" refers to graphic representations, notes, or schedules on the drawings, or other paragraphs or schedules in the specifications, and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the reader locate the reference. Location is not limited.
- I. Directed: Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted," mean directed by the Architect, requested by the Architect, and similar phrases.
- J. Mechanical Systems - Including but not limited to:
  - 1. Heating, Ventilation and Air Conditioning Systems.
  - 2. Temperature Controls System.
- K. Abbreviations:

AMCA	Air Moving and Conditioning Association
ANSI	American National Standards Institute
ARI	Air Conditioning and Refrigeration Institute
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society of Testing Materials
AWWA	American Water Works Association
AWS	American Welding Society
CISPI	Cast Iron Soil Pipe Institute
FM	Factory Mutual Engineering Corporation
IBC	International Building Code
IMC	International Mechanical Code
NEBB	National Environmental Balancing Bureau
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NREC	Washington State Non-Residential Energy Code
OSHA	Occupational Safety and Health Administration
SMACNA	Sheet Metal and Air Conditioning Contractors National Association, Inc.
UPC	Uniform Plumbing Code
UL	Underwriters Laboratories

## **DIVISION 23 - MECHANICAL**

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#### **1.5 CODES, PERMITS AND INSPECTIONS**

- A. Codes: Work shall be installed as a minimum in conformity with applicable local ordinances and statutes. Standards and sizes, which exceed preceding requirements, shall be installed as drawn or specified. Nothing in the specifications shall be construed to permit deviation to less than the requirements of governing codes. Contractor is not relieved from furnishing and installing work shown or specified which may be beyond requirements of ordinances, laws, regulations, and codes.
- B. Codes and Standards: Applicable codes and standards shall include, but not necessarily be limited to:
1. Uniform Plumbing Code, by International Association of Plumbing and Mechanical Officials.
  2. International Mechanical Code, by International Code Council.
  3. International Building Code, by International Code Council.
  4. Requirements of OSHA, EPA and WISHA.
  5. National Fire Protection Association Codes.
  6. ASME codes for boiler and pressure vessels.
  7. SMACNA HVAC Duct Construction Standards, latest edition.
  8. All local and state amendments.
  9. Requirements of all agencies have jurisdictional authority over installation of mechanical systems.
- C. Permits, Fees and Inspections:
1. Contractor shall arrange and pay for all permits, fees and inspections required in connection with this installation. The Contractor shall present the Owner with properly signed certificates of final inspection before the work will be accepted.
  2. Contractor shall call for all inspections by local building official(s) when they become due, and shall not cover any work until approved by these governing authorities.
  3. Contractor shall make all arrangements with utility companies for water, steam, gas and drainage services, etc., associated with the work and include required payments for meters, piping, services, connection charges and materials furnished and installed by utility companies. Work and materials shall be in strict accordance with rules of respective authorities.
- D. Underwriters Laboratory Approval: Where Underwriters Laboratories (UL) standards exist, all items of electrical equipment or items partially composed of electrical equipment shall carry Underwriters Laboratories (UL) label either for the entire unit or for the electrical portion of the equipment. If UL standards do not exist, equipment shall be provided that has been labeled by an independent testing agency that is recognized by the authority having jurisdiction.

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### **Section 23 05 00 – Common Work Results for HVAC**

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- E. ASME Code Stamp: ASME code stamp required on all pressure vessels and relief valves. Certificate required from the Boiler Inspector showing approval of the equipment and its installation.

#### **1.6 WORK INCLUDED**

- A. Work under this division shall include providing all materials, labor, equipment, tools, appliances, hoisting, scaffolding, supervision and overhead for the proper execution and completion of the mechanical work.
- B. Should these specifications or references made therein fail to specify adequately an item of equipment or material required for proper completion of the work in accordance with present day practice, this deficiency shall not relieve Contractor from furnishing and installing same. Call such omissions to attention of Architect and use such equipment or material as approved by Architect.
- C. All new equipment and products as noted in Part 2 of each section shall be installed as per manufacturer's recommendations.
- D. Provide all additional piping, ducts, caps and valves not shown on drawings, to maintain fully operational systems during the project at no additional cost to the owner.

#### **1.7 WORKMANSHIP**

- A. This Contractor shall provide completed systems with a neat and finished appearance. If, in the judgment of the Architect, any portion of the work has not been performed in a workmanlike manner or is left in a rough, unfinished state, this Contractor will be required to remove, reinstall or replace same and patch and paint surrounding surfaces in a manner acceptable to the Architect, without increase in cost to the Owner.

#### **1.8 SUBMITTALS, GENERAL REQUIREMENTS**

- A. General: Follow the procedures for submittals or as described herein and specified in Division 01.
- B. General Requirements for Division 23 Submittals: Provide the following submittals as indicated in each Division 23 section. Additional submittal requirements may be included in the individual sections.
  - 1. Product Data: Submit manufacturer's product data for the items listed in the individual Division 23 sections. Product data shall demonstrate compliance with all specified features and requirements. Submittals for

## **DIVISION 23 - MECHANICAL**

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equipment shall include, but not be limited to, data indicating equipment capacity meets the indicated values at specified conditions, equipment drawings indicating all dimensions, connection information, service space requirements, recommended piping and/or wiring diagrams, installation details and extended warranties either offered by equipment manufacturer or required by specifications.

2. Shop Drawings: Submit Contractor prepared drawings of Contractor fabricated mechanical systems. Drawings shall be prepared at ¼" scale using Computer Aided Design (CAD) software unless indicated otherwise. Drawings shall show exact location of equipment, piping and ductwork, each section of shop fabricated duct or pipe and location of field joints, supports and building attachments, and seismic restraint locations.
  3. Reports and Certificates: Indicate and interpret test results for compliance with performance requirements. Provide performance certificates.
  4. Operation and Maintenance Data: Submit proposed Division 23 Operation and Maintenance materials for approval prior to inclusion in the comprehensive final bound edition. See Article in this section on Operation and Maintenance Manuals for materials required to be included.
- C. Number of Copies: Provide one additional copy of mechanical shop drawings and product data submitted over the number required in 01 Submittals, to allow for one copy of each submittal to be retained by the Mechanical Engineer. Additional copies may be required by individual sections of these Specifications.
- D. Format: Provide submittals arranged with numerical index and tabs in 3-ring notebook containing the total volume of material. All product data shall be submitted complete by system, partial submittals are not acceptable and may be returned unreviewed. Systems are defined here as plumbing systems (Division 22), fire suppression system (Division 21) HVAC system, and HVAC control system. Reference submittals, including title and location of project, Architect, Contractor, submission date, and specification paragraph number to indicate clearly the location, service, equipment identification numbers as shown on drawings, and function of each particular item. Where manufacturers' catalogs, pamphlets, or data sheets are submitted in lieu of prepared shop drawings, such submissions shall indicate specifically the item for which approval is required in red ink, and submissions showing general information only are not acceptable.
- E. Submittals not in conformance to above paragraphs will be returned unreviewed.



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#### 1.9 SUBMITTALS, BASIC MECHANICAL MATERIALS

- A. General: See Article in this section, Submittals, General Requirements for general requirements of Product Data, Shop Drawings, Reports and Certificates, and Operation and Maintenance data submittals.
- B. Product Data: Provide submittals of the following:
  - 1. Dielectric Unions
  - 2. Dielectric Flanges
  - 3. Dielectric Couplings
  - 4. Dielectric Nipples
  - 5. Braided Flexible Hose Connectors
  - 6. Rubber Flexible Connectors
  - 7. Flexible Expansion Loops
- C. Shop Drawings: None required.
- D. Reports and Certificates: None required.

#### 1.10 COORDINATION DRAWINGS

- A. Detail major elements, components, and systems of mechanical equipment and materials in relationship with other systems, installations, and building components. Show space requirements for installation and access. Indicate if sequence and coordination of installations are important to efficient flow of the Work. Include the following:
  - 1. Planned piping layout, including valve and specialty locations and valve-stem movement.
  - 2. Planned duct layout, including fan, coil, filter, duct silencer, and damper location.
  - 3. Clearances for installing and maintaining insulation.
  - 4. Clearances for servicing and maintaining equipment, accessories, and specialties, including space for disassembly required for periodic maintenance.
  - 5. Equipment and accessory service connections and support details.
  - 6. Other systems installed in same space as mechanical systems.
  - 7. Exterior wall and foundation penetrations.
  - 8. Fire-rated wall and floor penetrations.
  - 9. Ceiling and wall-mounted access doors and panels required to provide access to dampers and other operating devices.
  - 10. Sizes and location of required concrete pads and bases.
  - 11. Scheduling, sequencing, movement, and positioning of large equipment into building during construction.

## **DIVISION 23 - MECHANICAL**

### **Section 23 05 00 – Common Work Results for HVAC**

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12. Floor plans, elevations, and details to indicate penetrations in floors, walls, and ceilings and their relationship to other penetrations and installations.
13. Reflected ceiling plans to coordinate and integrate installation of air outlets and inlets, light fixtures, communication system components, sprinklers, and other ceiling-mounted items.

#### **1.11 SUBSTITUTIONS**

- A. Substitutions will only be considered after project award. No substitutions will be considered during bid and/or negotiation periods.
- B. In all cases in this specification where an article is followed by the words "or equal," the Engineer is the sole judge of the quality of the proposed substitution.
- C. When the Engineer approves a substitution, the approval is given with the understanding that the Contractor guarantees the article or material substituted to be equal to or better in every respect than the article or material specified. The Contractor shall also assume complete responsibility that the article or material will fit the job as far as space, access and servicing requirements.
- D. Where several materials are specified by name for one use, select for use any of those so specified subject to compliance with specified requirements.
- E. Whenever item or class of material is specified exclusively by detail specification, trade name, manufacturer's name or by catalog reference, use only such item, unless written approval is given. Submit written requests in accordance with Division 01 substitution requirements.
- F. Make no substitutions for materials, articles or process required under contract unless written approval is obtained. See the Division 01 for project substitution requirements.

#### **1.12 RECORD DOCUMENTS**

- A. Prepare record documents in accordance with the requirements in Division 01. In addition to the requirements specified in Division 01, indicate the following installed conditions:
  1. Ductwork mains and branches, size and location, for both exterior and interior, locations of dampers and other control devices; filters, boxes, and terminal units requiring periodic maintenance or repair.
  2. Mains and branches of piping systems, with valves and control devices located and numbered, concealed unions located, and with items requiring maintenance located (i.e., traps, strainers, expansion compensators,

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- tanks, etc.). Valve location diagrams, complete with valve tag chart. Indicate actual inverts and horizontal locations of underground piping.
3. Record drawings shall incorporate all accepted change orders and RFIs; reference number on drawings is not acceptable.
  4. Equipment locations (exposed and concealed), dimensioned from prominent building lines.
  5. Approved substitutions, Contract Modifications, and actual equipment and materials installed.
  6. Contract Modifications, actual equipment and materials installed.
  7. Record the locations and invert elevations of underground installations.

#### **1.13 OPERATION AND MAINTENANCE MANUALS**

- A. Prepare maintenance manuals in accordance with Division 01 and the following requirements. Division 23 manuals shall be hard cover, 3-post binder, and indexed by systems. Pages shall be same size, with exception of allowable fold-out pages for control and flow diagrams. Cover shall be inscribed with name of project, Owner, description of contents, Architect, General Contractor, Mechanical Contractor, and date. In addition to the requirements specified in Division 01, include the following information in Division 23 materials:

1. Product Data of all Division 15 equipment provided by the project as indicated in submittal requirements.
2. Manufacturer's Equipment Installation and Start-Up Manuals for all equipment provided by the project. Manufacturer's printed operating procedures to include start-up, break-in, and routine and normal operating instructions; regulation, control, stopping, shutdown, and emergency instructions; and summer and winter operating instructions.
3. Manufacturer's Equipment Service Manuals for all equipment provided by the project, including parts list, troubleshooting list and maintenance procedures for routine preventative maintenance. Include disassembly, repair, and reassembly; aligning and adjusting instructions; servicing instructions and lubrication charts and schedules
4. Reports and Certificates of all Division 23 systems and equipment as required by specifications.
5. Material Safety Data Sheets (MSDS) for all applicable materials used for Division 23 installations.
6. Warranty Certificates for all equipment where extended warranties are either offered or required; provide supplier contact information.

#### **1.14 QUALITY ASSURANCE**

- A. Equipment Selection: Equipment allowed by the specifications but with different electrical characteristics, physical dimensions, capacities, and/or ratings than

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what is shown on the drawings may be furnished, provided such proposed equipment is approved in writing and connecting mechanical and electrical services, such as pipe and/or duct connection sizes, circuit breakers, conduit, motors, bases, and equipment spaces are revised to accommodate such equipment. All expenses shall be borne by the Contractor. Specified minimum energy ratings and/or equipment efficiencies must meet design and commissioning requirements.

#### **1.15 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and prevent entrance of dirt, debris, and moisture.
- B. Protect stored mechanical equipment, ducts, pipes and tubes and other materials from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor, if stored inside.
- C. Pipes, ducts, mechanical equipment, and other materials that are damaged due to improper storage shall be replaced at the Contractor's expense.

#### **1.16 SEQUENCING AND SCHEDULING**

- A. Coordinate mechanical equipment installation with other building components.
- B. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction to allow for mechanical installations.
- C. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components, as they are constructed.
- D. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Coordinate installation of large equipment requiring positioning before closing in building.
- E. Some equipment may require temporary installation during one phase and require relocation to final location under another phase. Provide all associated labor and materials to accommodate this phasing.
- F. Coordinate connection of mechanical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies.

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- G. Coordinate requirements for access panels and doors if mechanical items requiring access are concealed behind finished surfaces. Access panels and doors are specified in Division 08.
- H. Use of the building HVAC systems, including those being provided under this contract, for temporary heating, ventilation or cooling during construction is prohibited. When system installation is complete and ready for start-up, approval to operate the system shall be obtained from the Owner or designated Owner's representative.

#### **1.17 COMMISSIONING SUPPORT**

- A. Provide the following support for project commissioning:
  - 1. Attend commissioning scoping meetings. At a minimum, the Mechanical, TAB, and Controls Contractors shall participate. Equipment vendor representatives shall also attend upon request of the Commissioning Agent and Test Engineer. These meetings shall further define the testing requirements and participation of each contractor and sub-contractors for each commissioning activity.
  - 2. Provide Commissioning Authority and Test Engineer additional requested data, prior to normal O&M Manual submittal, in a timely manner for the development of the startup plan and the functional performance testing procedures.
  - 3. Provide startup forms and clearly document all completed startup activities. The DDC system startup forms shall include detailed checkout forms with descriptions for each controlled device. All forms shall be submitted for review by the Test Engineer and Commissioning Authority prior to use.
  - 4. During the normal submittal processes, provide an additional copy of all equipment submittals, startup forms, field static testing reports (duct static pressure test reports, pipe static pressure test reports, chemical treatment reports, etc.), and TAB reports to the Commissioning Authority and Test Engineer for review.
  - 5. Provide skilled technicians, including equipment vendor representatives, equipment, and materials to perform startup and execute functional performance tests. DDC system sub-contractor shall provide skilled technicians, familiar with the project, for both startup (Owner-witnessed point-to-point testing) and functional performance testing. Commissioning functional performance testing participation from the controls contractor shall be required in addition to the point-to-point testing.
  - 6. Submit startup documentation to General Contractor, Test Engineer, and Commissioning Authority to verify functional testing prerequisite requirements are fulfilled before functional testing for the associated equipment or system is scheduled to start. Refer to Section 23 08 00 – Commissioning of HVAC Systems, for commissioning procedure. Startup documenta-

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- tion (point-to-point testing) shall also be required from the controls contractor as a prerequisite to functional performance testing.
7. Correct deficiencies found during startup and functional performance testing in a timely manner to facilitate retesting activities within the commissioning schedule.
  8. TAB sub-contractor shall report any deficiencies found in a timely manner. These deficiencies shall be corrected in a timely manner to facilitate functional performance testing within the commissioning schedule.
  9. TAB sub-contractor shall coordinate all setpoint value requirements for input into the controls system, including minimum outside air damper positions, return/supply fan VFD speed mapping, pumping loop differential pressure setpoints, duct system static pressure setpoints, air terminal unit flow sensor calibration factors, etc.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  1. Dielectric Unions:
    - a. Capitol Manufacturing Co.
    - b. Eclipse, Inc.; Rockford-Eclipse Div.
    - c. Epco Sales Inc.
    - d. Hart Industries International, Inc.
    - e. Watts Industries, Inc.; Water Products Div.
    - f. Zurn Industries, Inc.; Wilkins Div.
  2. Dielectric Flanges:
    - a. Capitol Manufacturing Co.
    - b. Central Plastics Co.
    - c. Epco Sales Inc.
    - d. Watts Industries, Inc.; Water Products Div.
  3. Dielectric Couplings:
    - a. Calpico, Inc.
    - b. Lochinvar Corp.
  4. Dielectric Nipples:

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- a. Grinnell Corp.; Grinnell Supply Sales Co.
  - b. Victaulic Co. of America.
5. Braided Hose Flexible Connectors:
- a. Flex-Hose Co, Inc.
  - b. Hyspan Precision Products, Inc.
  - c. Mason.
  - d. Mercer Rubber Co.
  - e. Metraflex Co.
6. Rubber Flexible Connectors:
- a. General Rubber Corp.
  - b. Flex-Hose Co., Inc.
  - c. Mercer Rubber Co.
  - d. Metraflex Co.
  - e. Mason.
7. Flexible Expansion Loops:
- a. Metraflex Co.
  - b. Flex-Hose.
8. Mechanical Sleeve Seals:
- a. Calpico, Inc.
  - b. Metraflex Co.
  - c. Thunderline/Link-Seal.
  - d. Innerlynx

#### **2.2 PIPE AND PIPE FITTINGS**

- A. Refer to individual Division 23 piping Sections for pipe and fitting materials and joining methods.
- B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

#### **2.3 JOINING MATERIALS**

- A. Refer to individual Division 23 piping Sections for special joining materials not listed below.
- B. Pipe-Flange Gasket Materials: Suitable for fluid type, temperature and pressure of piping system.

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1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness, unless indicated otherwise.
    - a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
    - b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
  2. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
- C. Solder Filler Metals: ASTM B 32.
1. Alloy Sn95 or Alloy Sn94: Approximately 95 percent tin and 5 percent silver, with 0.10 percent lead content.
  2. Alloy E: Approximately 95 percent tin and 5 percent copper, with 0.10 percent maximum lead content.
- D. Brazing Filler Metals: AWS A5.8.
1. BCuP Series: Copper-phosphorus alloys.
  2. BAg1: Silver alloy.
- E. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
- F. Flanged, Ductile-Iron Pipe Gasket, Bolts, and Nuts: AWWA C110, rubber gasket, carbon-steel bolts and nuts.
- G. Couplings: Iron-body sleeve assembly, fabricated to match OD of plain-end, pressure pipes.
1. Sleeve: ASTM A 126, Class B, gray iron.
  2. Followers: ASTM A 47 malleable iron or ASTM A 536 ductile iron.
  3. Gaskets: Rubber.
  4. Bolts and Nuts: AWWA C111.
  5. Finish: Enamel paint.
- 2.4 DIELECTRIC FITTINGS
- A. General: Assembly or fitting with insulating material isolating joined dissimilar metals, to prevent galvanic action and stop corrosion.
  - B. Description: Combination of copper alloy and ferrous; threaded, solder, plain, and weld-neck end types and matching piping system materials.



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- C. Insulating Material: Suitable for system fluid, pressure, and temperature.
- D. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig minimum working pressure at 180 deg F.
- E. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150- or 300-psig minimum working pressure as required to suit system pressures.
- F. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300-psig minimum working pressure at 225 deg F.
- G. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig minimum working pressure at 225 deg F.

#### **2.5 FLEXIBLE CONNECTORS**

- A. Braided Hose Flexible Connectors: Stainless steel bellows with woven, flexible, wire-reinforcing protective jacket; 150-psig minimum working pressure and 250 deg F maximum operating temperature. Connectors shall have flanged or threaded-end connections to match equipment connected and shall be capable of 3/4-inch misalignment. Bronze braiding for copper tubing applications and stainless steel braiding for steel pipe applications.
- B. Rubber Flexible Connectors: Mason SFU for 3/4 to 2-inch NPS or equal by other specified manufacturers; Mason SFDEJ for 2-1/2-inch NPS and larger or equal by other specified manufacturers. Fiber-reinforced EPDM rubber body; capable of handling operating temperatures up to 250 deg F and pressures up to 150 psig. Joint type to match system specification.
- C. Flexible Expansion Loops: Stainless steel flexible hose and braid consisting of two flexible sections, two 90 degree elbows and one 180 degree return bend. Pipe connection material and joint type to match system specification, see application section of individual sections. Bronze braiding for copper tubing applications and stainless steel braiding for steel pipe applications. Provide pipe guides as recommended by manufacturer. Loops installed hanging down shall have a drain plug. Units shall be [single][double] braided. Movement and/or loop lengths are indicated.
- D. Flexible Expansion Loops: Three equal length sections of annular corrugated stainless steel hose and braid, Provide with four 90 degree elbows and support per manufacturer's recommendations. Ends flanged, screwed, welded, sweat, or grooved. Suitable for operating temperatures up to 850 F. Designed for pressure testing to 1.5 times their maximum rated working pressure with a min-

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imum 4 to 1 (burst to working) safety factor. Factory tested using air-under-water and hydrostatic pressure. Manufacturer: Flex-Hose Company.

#### **2.6 MECHANICAL SLEEVE SEALS**

- A. Description: Modular design, with interlocking EPDM rubber links shaped to continuously fill annular space between pipe and sleeve. Stainless steel connecting bolts and composite pressure plates.

#### **2.7 PIPING SPECIALTIES**

- A. Sleeves: The following materials are for wall, floor, slab, and roof penetrations:
  - 1. Steel Sheet Metal: 0.0239-inch minimum thickness, galvanized, round tube closed with welded longitudinal joint.
  - 2. Steel Pipe: ASTM A 53, Type E, Grade A, Schedule 40, galvanized, plain ends.
  - 3. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
  - 4. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
    - a. Underdeck Clamp: Clamping ring with set screws.
- B. Escutcheons: Manufactured wall, ceiling, and floor plates; deep-pattern type if required to conceal protruding fittings and sleeves.
  - 1. ID: Closely fit around pipe, tube, and insulation of insulated piping.
  - 2. OD: Completely cover opening.
  - 3. Cast Brass: One piece, with set screw.
    - a. Finish: Rough brass.
    - b. Finish: Polished chrome-plate.
  - 4. Cast-Iron Floor Plate: One-piece casting.

#### **2.8 GROUT**

- A. Nonshrink, Nonmetallic Grout: ASTM C 1107, Grade B.
  - 1. Characteristics: Post-hardening, volume-adjusting, dry, hydraulic-cement grout, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.

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2. Design Mix: 5000-psi, 28-day compressive strength.

## **PART 3 - EXECUTION**

### **3.1 GENERAL MECHANICAL INSTALLATIONS**

- A. General: Sequence, coordinate, and integrate the various elements of mechanical systems, materials, and equipment. Comply with the following requirements:
  1. Coordinate mechanical systems, equipment, and materials installation with other building components.
  2. Verify all dimensions by field measurements.
  3. Arrange for chases, slots, and openings in other building components during progress of construction, to allow for mechanical installations.
  4. Coordinate the installation of required supporting devices and sleeves to be set in poured-in-place concrete and other structural components, as they are constructed.
  5. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the work. Give particular attention to large equipment requiring positioning prior to closing in the building.
  6. Where mounting heights are not detailed or dimensioned, install systems, materials, and equipment to provide the maximum headroom possible.
  7. Coordinate connection of mechanical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.
  8. Install systems, materials, and equipment to conform with approved submittal data, including coordination drawings, to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the work are shown only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to the Architect.
  9. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components, where installed exposed in finished spaces.
  10. Install mechanical equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations. Extend grease fittings to an accessible location.
  11. Install access panel or doors where units are concealed behind finished surfaces. Notify General Contractor on the number, location and size of access panels or doors.

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12. Install systems, materials, and equipment giving right-of-way priority to systems required to be installed at a specified slope.
13. Replace all air filters with new filters upon Owner taking occupancy of the building or at a time mutually agreed upon between the Owner and Contractor.
14. Do not install ductwork in elevator machine rooms, electrical and/or communication rooms unless it directly services that room.

- B. Locate wall, floor and ceiling fire ratings from architectural drawings for appropriate hourly rating of combination fire/smoke dampers or fire dampers shown on mechanical drawings.

#### **3.2 PIPING SYSTEMS - COMMON REQUIREMENTS**

- A. General: Install piping as described below, unless piping Sections specify otherwise. Individual Division 23 piping Sections specify unique piping installation requirements.
- B. General Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated, unless deviations to layout are approved on Coordination Drawings.
- C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Locate groups of pipes parallel to each other, spaced to permit valve servicing.
- G. Install piping free of sags and bends.
- H. Install fittings for changes in direction and branch connections.
- I. Install piping to allow application of insulation plus 1-inch clearance around insulation.
- J. Select system components with pressure rating equal to or greater than system operating pressure.

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- K. Install piping tight to slabs, beams, joists, columns, walls, and other building elements. Allow sufficient space above removable ceiling panels to allow for ceiling panel removal.
- L. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.
- M. Install flexible connectors according to manufacturer's written instructions where indicated and specified in other Division 23 sections.
- N. Install couplings according to manufacturer's written instructions.
- O. Install Portable Instrument Connections in all piping systems where DDC temperature and/or pressure sensors and thermometers and/or pressure gauges are located.
- P. Do not route piping through elevator equipment rooms, unless specifically allowed by local authority.
- Q. Do not route piping over electrical panels, transformers, switchgear or other electrical equipment.
- R. Install pipe escutcheons for pipe penetrations of concrete and masonry walls, wall board partitions, and suspended ceilings according to the following:
  - 1. Uninsulated Piping Wall Escutcheons: Cast brass or stamped steel, with set screw.
  - 2. Uninsulated Piping Floor Plates in Utility Areas: Cast-iron floor plates.
  - 3. Insulated Piping: Cast brass or stamped steel; with concealed hinge, spring clips, and chrome-plated finish.
  - 4. Piping in Utility Areas: Cast brass or stamped steel, with set-screw or spring clips.
- S. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.
  - 1. Cut sleeves to length for mounting flush with both surfaces.
    - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
  - 2. Build sleeves into new walls and slabs as work progresses.
  - 3. Install sleeves large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:

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- a. Steel Pipe Sleeves: For pipes smaller than 6-inch NPS.
- b. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level. Refer to Division 07 Section "Sheet Metal Flashing and Trim" for flashing.
  - 1) Seal space outside of sleeve fittings with nonshrink, nonmetallic grout.
- 4. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using elastomeric joint sealants. Use Type S, Grade NS, Class 25, Use O, neutral-curing silicone sealant, unless otherwise indicated.
- T. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestopping materials. Refer to Division 07 Section "Penetration Firestopping" for materials.
- U. Verify final equipment locations for roughing-in.
- V. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

#### **3.3 PIPING JOINT CONSTRUCTION**

- A. Join pipe and fittings as follows and as specifically required in individual piping specification Sections:
  - B. Ream ends of pipes and tubes and remove burrs.
  - C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
  - D. Soldered Joints: Construct joints according to AWS's "Soldering Manual," Chapter "The Soldering of Pipe and Tube"; or CDA's "Copper Tube Handbook."
  - E. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
    - 1. Note internal length of threads in fittings or valve ends, and proximity of internal seat or wall, to determine how far pipe should be threaded into joint.
    - 2. Apply appropriate tape or thread compound to external pipe threads, unless dry seal threading is specified.
    - 3. Align threads at point of assembly.

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4. Tighten joint with wrench. Apply wrench to valve end into which pipe is being threaded.
5. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

- F. Flanged Joints: Align flange surfaces parallel. Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Assemble joints by sequencing bolt tightening to make initial contact of flanges and gaskets as flat and parallel as possible. Use suitable lubricants on bolt threads. Tighten bolts gradually and uniformly using torque wrench to recommended torque values.

#### **3.4 PIPING CONNECTIONS**

- A. Make connections according to the following, unless otherwise indicated:
1. Install unions, in piping 2-inch NPS and smaller, adjacent to each valve and at final connection to each piece of equipment with 2-inch NPS or smaller threaded pipe connection.
  2. Install flanges, in piping 2-1/2-inch NPS and larger, adjacent to flanged valves and at final connection to each piece of equipment with flanged pipe connection.
  3. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

#### **3.5 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS**

- A. Install equipment to provide maximum possible headroom, if mounting heights are not indicated.
- B. Install equipment according to approved submittal data.
- C. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- D. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- E. Install equipment giving right of way to piping installed at required slope.

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#### **3.6 PAINTING AND FINISHING**

- A. Refer to Division 09 for paint materials, surface preparation, and application of paint.
- B. Apply paint to exposed piping, ductwork and supports according to the following, unless otherwise indicated:
  - 1. Interior, Ferrous Supports: Use semigloss, acrylic-enamel finish. Include finish coat over enamel undercoat and primer. Paint not required on interior galvanized supports.
  - 2. Exterior, Ferrous Piping and ductwork: Use semigloss, acrylic-enamel finish. Include two finish coats over rust-inhibitive metal primer.
  - 3. Exterior, Ferrous Supports: Use semigloss, acrylic-enamel finish. Include two finish coats over rust-inhibitive metal primer.
- C. Do not paint piping specialties with factory-applied finish.
- D. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

#### **3.7 CONCRETE BASES**

- A. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions for all floor-supported units. Follow supported equipment manufacturer's setting templates for anchor bolt and tie locations. Concrete and reinforcement as specified in Division 03.

#### **3.8 ERECTION OF METAL SUPPORTS AND ANCHORAGE**

- A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor mechanical materials and equipment.
- B. Field Welding: Comply with AWS D1.1, "Structural Welding Code--Steel."

#### **3.9 DEMOLITION**

- A. Perform all demolition or interface work required in the existing building for the removal of, or interface with, existing mechanical equipment, ductwork, tubing, or piping. Relocate or modify the existing piping, tubing and ductwork as required by any general construction alterations or by the installation of new ductwork, tubing, or piping in the existing building.



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- B. Existing Materials, Removal and Disposition:
  - 1. Scope: For mechanical items that remain the property of the Owner, refer to drawings.
  - 2. In coordination with the Owner's Representatives, these materials shall be made available for their inspection and decision as to whether the Owner will retain possession. Items selected for retention shall be delivered to a location on the premises selected by the Owner and turned over to them. Take reasonable care to avoid damage to this material.
  - 3. All material not selected for retention by the Owner and debris shall be disposed of by the Contractor.
- C. If pipe, ductwork, insulation, or equipment to remain is damaged or disturbed, remove damaged portions and install new products of equal capacity and quality.
- D. Work Abandoned in Place: Cut and remove underground pipe a minimum of 2 inches beyond face of adjacent construction. Cap and patch surface to match existing finish.
- E. Reuse of Materials: Reuse of materials is prohibited unless specifically indicated or approved by Architect.
- F. Notify Architect in discovery of any hazardous materials.
- G. Temporary Disconnection: Remove, store, clean, reinstall, reconnect, and make operational equipment indicated for relocation.

#### **3.10 CUTTING AND PATCHING**

- A. General: Perform cutting and patching in accordance with Division 01. In addition to the requirements specified in Division 01, the following requirements apply:
  - 1. Protection of Installed Work: During cutting and patching operations, protect adjacent installations.
- B. Perform cutting, fitting, and patching of mechanical equipment and materials required to:
  - 1. Uncover Work to provide for installation of ill-timed Work.
  - 2. Remove and replace defective Work.
  - 3. Remove and replace Work not conforming to requirements of the Contract Documents.
  - 4. Remove samples of installed Work as specified for testing.
  - 5. Install equipment and materials in existing structures.

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6. Upon written instructions from the Architect, uncover and restore Work to provide for Architect/Engineer observation of concealed Work.
- C. Cut, remove and legally dispose off-site of selected mechanical equipment, components, and materials, including but not limited to removal of mechanical piping, heating units, plumbing fixtures and trim, and other mechanical items made obsolete by the new Work.
- D. Protect the structure, furnishings, finishes, and adjacent materials not indicated or scheduled to be removed.
- E. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces necessary for mechanical installations. Perform cutting by skilled mechanics of trades involved.
- F. Repair cut surfaces to match adjacent surfaces.

#### **3.11 GROUTING**

- A. Install nonmetallic, nonshrink, grout for mechanical equipment base bearing surfaces, pump and other equipment base plates, and anchors. Mix grout according to manufacturer's written instructions.
- B. Clean surfaces that will come into contact with grout.
- C. Provide forms as required for placement of grout.
- D. Avoid air entrapment during placing of grout.
- E. Place grout, completely filling equipment bases.
- F. Place grout on concrete bases to provide smooth bearing surface for equipment.
- G. Place grout around anchors.
- H. Cure placed grout according to manufacturer's written instructions.

#### **3.12 EARTHWORK**

- A. General: Perform earthwork required for installation of mechanical work below grade in accordance with Division 2.
- B. Excavate trenches to uniform widths to provide a working clearance on each side of the pipe or conduit. Excavate trench walls vertically from trench bottom

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to 12 inches higher than top of pipe or conduit, unless otherwise indicated. Grade trench bottoms to provide uniform bearing and support for each section of pipe. Form holes and depressions for joints after trench bottom has been graded. Provide temporary pumping equipment to keep excavation free from water. Install pipe bedding in rock excavation consisting of not less than 6 inch of sand or equivalent material.

- C. Provide bracing and shoring as necessary.
- D. Backfill trenches only after completion of pressure tests and inspection. Carefully compact material under pipe and bring backfill evenly up on both sides and along the full length of piping or conduit. Cover to 12-inch thickness over top of pipe. Fill and tamp remainder of backfill material in 6-inch layers. Provide backfill materials generally consisting of clean earth or sand relatively free of clods or stones. For sewer and water piping, use pea gravel. For gas piping, use sand. Backfill under, around, and to 6 inch above top of piping. [In addition, wherever paving or future paving is indicated over backfill, provide remainder of backfill with satisfactory soil, ASTM D 2487 soil classification groups GW, GP, GM, SW, SP and SM or a combination of these.]
- E. Compact soil to 6-inch layer (maximum) loose thickness of backfill. Where roadway or parking area surfaces will be placed over backfill, provide moisture conditions, which will produce compacted density of 95 percent of maximum density. Elsewhere, 90 percent. Test in accordance with Divisions 1 and 2.
- F. Take special care in compacting under services where they enter building to prevent settling. Contractor fully responsible for damage to piping and property as a result of settling around service piping.
- G. Dispose surplus materials off-site in a suitable location.
- H. Place and maintain barricades, construction signs, torches, lanterns, and guards as required during periods of open excavation to protect persons from injury and to avoid property damage.
- I. Leave premises thoroughly clean at completion of earthwork.
- J. Wherever piping is to be installed in areas, which have been excavated below pipe inverts, for any purpose, install piping to prevent subsequent settlement. Do not install piping until backfill is to full compaction, completed to minimum 18 inch above installed pipe. Install piping in re-excavated trenches and backfill as previously specified.

END OF SECTION

## **DIVISION 23 - MECHANICAL**

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#### **PART 1 - GENERAL**

##### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Related Sections include the following:
  - 1. Testing and adjusting requirements unique to particular systems and equipment are included in the Sections that specify those systems and equipment.
  - 2. Field quality-control testing to verify that workmanship quality for system and equipment installation is specified in system and equipment Sections.

##### **1.2 SUMMARY**

- A. This Section includes testing, adjusting, and balancing HVAC systems to produce design objectives, including the following:
  - 1. Balancing airflow and water flow within distribution systems, including submains, branches, and terminals, to indicated quantities according to specified tolerances.
  - 2. Adjusting total HVAC systems to provide indicated quantities.
  - 3. Measuring electrical performance of HVAC equipment.
  - 4. Setting quantitative performance of HVAC equipment.
  - 5. Verifying that automatic control devices are functioning properly.
  - 6. Measuring sound and vibration.
  - 7. Reporting results of the activities and procedures specified in this Section.

##### **1.3 DEFINITIONS**

- A. **Adjust:** To regulate fluid flow rate and air patterns at the terminal equipment, such as to modify fan speed or adjust a damper.
- B. **Balance:** To proportion flows within the distribution system, including submains, branches, and terminals, according to design quantities.
- C. **Draft:** A current of air, when referring to localized effect caused by one or more factors of high air velocity, low ambient temperature, or direction of airflow, whereby more heat is withdrawn from a person's skin than is normally dissipated.

## **DIVISION 23 - MECHANICAL**

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- D. Procedure: An approach to and execution of a sequence of work operations to yield repeatable results.
- E. Report Forms: Test data sheets for recording test data in logical order.
- F. Static Head: The pressure due to the weight of the fluid above the point of measurement. In a closed system, static head is equal on both sides of the pump.
- G. Suction Head: The height of fluid surface above the centerline of the pump on the suction side.
- H. System Effect: A phenomenon that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
- I. System Effect Factors: Allowances used to calculate a reduction of the performance ratings of a fan when installed under conditions different from those presented when the fan was performance tested.
- J. Terminal: A point where the controlled medium, such as fluid or energy, enters or leaves the distribution system.
- K. Test: A procedure to determine quantitative performance of a system or equipment.
- L. Testing, Adjusting, and Balancing Agent: The entity responsible for performing and reporting the testing, adjusting, and balancing procedures.
- M. AMCA: Air Movement and Control Association.
- N. CTI: Cooling Tower Institute.
- O. NEBB: National Environmental Balancing Bureau.
- P. SMACNA: Sheet Metal and Air Conditioning Contractors' National Association.
- Q. TAB: Testing, Balancing, and Adjusting.

#### **1.4 ACCEPTABLE CONTRACTORS**

- A. Neudorfer Engineers, Inc.
- B. Hardin and Sons, Inc.
- C. National Indoor Air Care.

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D. Airtest Co., Inc.

#### 1.5 SUBMITTALS

- A. Quality-Assurance Submittals: Within 30 days from the Contractor's Notice to Proceed, submit 2 copies of evidence that the testing, adjusting, and balancing Agent and this Project's testing, adjusting, and balancing team members meet the qualifications specified in the "Quality Assurance" Article below.
- B. Contract Documents Examination Report: Within 45 days from the Contractor's Notice to Proceed, submit 2 copies of the Contract Documents review report as specified in Part 3 of this Section.
- C. Strategies and Procedures Plan: Within 60 days from the Contractor's Notice to Proceed, submit 2 copies of the testing, adjusting, and balancing strategies and step-by-step procedures as specified in Part 3 "Preparation" Article below. Include a complete set of report forms intended for use on this Project.
- D. Report Forms: Submit 2 copies of reports prepared, as specified in this Section, on approved forms certified by the testing, adjusting, and balancing Agent.
- E. Warranty: Submit 2 copies of special warranty specified in the "Warranty" Article below.
- F. Balancing Report:
  - 1. Comply with Section 23 05 00, paragraph "Submittals," subparagraph A, regarding format of TAB report, except title "Balancing Report."
  - 2. Submit completed Balancing Report as indicated, including the following:
    - a. System Diagrams/Floor Plans.
    - b. Air Apparatus Test Reports.
    - c. Apparatus Coil Test Reports.
    - d. Gas/Oil Fired Heat Apparatus Test Reports.
    - e. Electric Coil/Duct Heater Test Reports.
    - f. Fan Test Reports.
    - g. Rectangular and Round Duct Traverse Reports.
    - h. Air Outlet Test Reports.
    - i. Terminal Unit Coil Check Reports.
    - j. Packaged Chiller Test Reports.
    - k. Package Rooftop/Heat Pump/Air Conditioning Unit Test Reports.
    - l. Compressor and/or Condenser Test Reports.
    - m. Cooling Tower or Evaporative Condenser Test Reports.
    - n. Heat Exchanger/Converter Test Reports.
    - o. Pump Test Reports.

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- p. Boiler Test Reports.
- q. Instrument Calibration Report.

#### **1.6 SEQUENCING/SCHEDULING**

- A. Phase in properly with Construction Schedule.

#### **1.7 QUALITY ASSURANCE**

- A. Regulatory Requirements:

- 1. Comply with all applicable city, county, and state codes and ordinances. In case of conflict with drawings or specifications, the codes and ordinances govern.

- 2. Basis:

- a. International Building Code.
- b. International Plumbing Code.
- c. International Mechanical Code.
- d. NFPA-90A.
- e. NFPA 101.

- B. Agent Qualifications: Engage a testing, adjusting, and balancing agent certified by NEBB, not affiliated with mechanical contractor. Certified agent shall be a full time employee of the TAB contractor.

- C. Experience: Minimum 5 years on projects of similar scope and complexity.

- D. Testing, Adjusting, and Balancing Conference: Meet with the Owner's and the Architect's representatives on approval of the testing, adjusting, and balancing strategies and procedures plan to develop a mutual understanding of the details. Ensure the participation of testing, adjusting, and balancing team members, equipment manufacturers' authorized service representatives, HVAC controls installer, and other support personnel. Provide 7 days' advance notice of scheduled meeting time and location.

- 1. Agenda Items: Include at least the following:

- a. Submittal distribution requirements.
- b. Contract Documents examination report.
- c. Testing, adjusting, and balancing plan.
- d. Work schedule and Project site access requirements.
- e. Coordination and cooperation of trades and subcontractors.
- f. Coordination of documentation and communication flow.

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- E. Certification of Testing, Adjusting, and Balancing Reports: Certify the testing, adjusting, and balancing field data reports. This certification includes the following:
  - 1. Review field data reports to validate accuracy of data and to prepare certified testing, adjusting, and balancing reports.
  - 2. Certify that the testing, adjusting, and balancing team complied with the approved testing, adjusting, and balancing plan and the procedures specified and referenced in this Specification.
- F. Testing, Adjusting, and Balancing Reports: Use standard forms from NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems."
- G. Instrumentation Type, Quantity, and Accuracy: As described in NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems," Section II, "Required Instrumentation for NEBB Certification."
- H. Instrumentation Calibration: Calibrate instruments as required by NEBB certification or more frequently if required by the instrument manufacturer.

#### **1.8 PROJECT CONDITIONS**

- A. Partial Owner Occupancy: The Owner may occupy completed areas of the building before Substantial Completion. Cooperate with the Owner during testing, adjusting, and balancing operations to minimize conflicts with the Owner's operations.

#### **1.9 COORDINATION**

- A. Coordinate the efforts of factory-authorized service representatives for systems and equipment, HVAC controls installers, and other mechanics to operate HVAC systems and equipment to support and assist testing, adjusting, and balancing activities.
- B. Notice: Provide 7 days' advance notice for each test. Include scheduled test dates and times.
- C. Perform testing, adjusting, and balancing after leakage and pressure tests on air and water distribution systems have been satisfactorily completed.



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#### 1.10 WARRANTY

- A. General Warranty: The special performance guarantee specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- B. Special Guarantee: Provide a guarantee on NEBB forms stating that NEBB will assist in completing the requirements of the Contract Documents if the testing, adjusting, and balancing Agent fails to comply with the Contract Documents. Guarantee includes the following provisions:
  - 1. The certified Agent has tested and balanced systems according to the Contract Documents.
  - 2. Systems are balanced to optimum performance capabilities within design and installation limits.

#### PART 2 - PRODUCTS

##### 2.1 GENERAL

- A. Comply with "Quality Assurance" provisions, specifications, and manufacturer's data. Where these may be in conflict, the more stringent requirements govern.

##### 2.2 TAB INSTRUMENTATION

- A. Furnish materials and equipment necessary to properly measure system capacities, electrical voltage and current, fan speeds, static pressures, air velocities, water pressure drops, refrigeration pressures, and other readings necessary to evaluate system performance and adjust quantities to those indicated. TAB Contractor retains possession of materials and equipment after project is completed.
- B. Instrumentation shall be accurate, with calibration histories available for examination upon request.
- C. Instrumentation shall be used in accordance with manufacturer instructions.

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#### **PART 3 - EXECUTION**

##### **3.1 INSPECTION**

- A. Verify installation conditions as satisfactory to receive work of this Section. Do not begin work until any unsatisfactory conditions are corrected..

##### **3.2 EXAMINATION**

- A. Examine Contract Documents to become familiar with project requirements and to discover conditions in systems' designs that may preclude proper testing, adjusting, and balancing of systems and equipment.
  - 1. Contract Documents are defined in the General and Supplementary Conditions of the Contract.
  - 2. Verify that balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers, are required by the Contract Documents. Verify that quantities and locations of these balancing devices are accessible and appropriate for effective balancing and for efficient system and equipment operation.
- B. Examine approved submittal data of HVAC systems and equipment.
- C. Examine project record documents described in Division 01 Section "Project Record Documents."
- D. Examine equipment performance data, including fan and pump curves. Relate performance data to project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
- E. Examine system and equipment installations to verify that they are complete and that testing, cleaning, adjusting, and commissioning specified in individual Specification Sections have been performed.
- F. Examine system and equipment test reports.
- G. Examine systems for functional deficiencies that cannot be corrected by adjusting and balancing.
- H. Examine air-handling equipment to ensure clean filters have been installed, bearings are greased, belts are aligned and tight, and equipment with function-controls is ready for operation.

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- I. Examine terminal units, such as variable-air-volume boxes and mixing boxes, to verify that they are accessible and their controls are connected and functioning.
- J. Examine strainers for clean screens and proper perforations.
- K. Examine 3-way valves for proper installation for their intended function of diverting or mixing fluid flows.
- L. Examine heat-transfer coils for correct piping connections and for clean and straight fins.
- M. Examine open-piping-system pumps to ensure absence of entrained air in the suction piping.
- N. Examine equipment for installation and for properly operating safety interlocks and controls.
- O. Examine automatic temperature system components to verify the following:
  - 1. Dampers, valves, and other controlled devices operate by the intended controller.
  - 2. Dampers and valves are in the position indicated by the controller.
  - 3. Integrity of valves and dampers for free and full operation and for tightness of fully closed and fully open positions. This includes dampers in multi-zone units, mixing boxes, and variable-air-volume terminals.
  - 4. Automatic modulating and shutoff valves, including 2-way valves and 3-way mixing and diverting valves, are properly connected.
  - 5. Thermostats and humidistats are located to avoid adverse effects of sunlight, drafts, and cold walls.
  - 6. Sensors are located to sense only the intended conditions.
  - 7. Sequence of operation for control modes is according to the Contract Documents.
  - 8. Controller set points are set at design values. Observe and record system reactions to changes in conditions. Record default set points if different from design values.
  - 9. Interlocked systems are operating.
  - 10. Changeover from heating to cooling mode occurs according to design values.
  - 11. Verify minimum outdoor supply air setting.
- P. Report deficiencies discovered before and during performance of testing, adjusting, and balancing procedures.

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#### **3.3 PREPARATION**

- A. Field verify locations of new and existing work prior to commencing work of this Section.
- B. Protect surrounding areas and surfaces to preclude damage from work of this Section.
- C. Prepare a testing, adjusting, and balancing plan that includes strategies and step-by-step procedures.
- D. Complete system readiness checks and prepare system readiness reports. Verify the following:
  - 1. Permanent electrical power wiring is complete.
  - 2. Hydronic systems are filled, clean, and free of air.
  - 3. Automatic temperature-control systems are operational.
  - 4. Equipment and duct access doors are securely closed.
  - 5. Manual volume dampers, smoke, fire, and combination fire/smoke dampers are open.
  - 6. Isolating and balancing valves are open and control valves are operational.
  - 7. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
  - 8. Windows and doors can be closed so design conditions for system operations can be met.
  - 9. Building construction is sealed in areas where specified pressurization of an area is designated on contract documents.

#### **3.4 GENERAL TESTING AND BALANCING PROCEDURES**

- A. Perform testing and balancing procedures on each system according to the procedures contained in NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems" and this Section.
- B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary to allow adequate performance of procedures. After testing and balancing, close probe holes and patch insulation with new materials identical to those removed. Restore vapor barrier and finish according to the insulation Specifications for this Project.
- C. Mark equipment settings with paint or other suitable, permanent identification material, including damper-control positions, valve indicators, fan-speed-control levers, and similar controls and devices, to show final settings.

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- D. Set automatic stops on metering balancing valves and butterfly valves with memory, and ensure volume damper locking mechanisms are tightened down in the balanced position.

#### **3.5 FUNDAMENTAL AIR SYSTEMS' BALANCING PROCEDURES**

- A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.
- B. Prepare schematic diagrams of systems' "as-built" duct layouts.
- C. For variable-air-volume systems, develop a plan to simulate diversity.
- D. Determine the best locations in main and branch ducts for accurate duct airflow measurements.
- E. Check the airflow patterns from the outside-air louvers and dampers and the return- and exhaust-air dampers, through the supply-fan discharge and mixing dampers.
- F. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
- G. Verify that motor starters are equipped with properly sized thermal protection.
- H. Check dampers for proper position to achieve desired airflow path.
- I. Check for airflow blockages.
- J. Check condensate drains for proper connections and functioning.
- K. Check for proper sealing of air-handling unit components.

#### **3.6 TOLERANCES**

- A. Set HVAC system airflow and water flow rates within the following tolerances:
  - 1. Supply, Return, and Exhaust Fans: Plus 5 to plus 10 percent.
  - 2. Air Outlets and Inlets: 0 to minus 10 percent.
  - 3. Heating-Water Flow Rate: 0 to minus 10 percent.
  - 4. Cooling-Water Flow Rate: 0 to minus 5 percent.

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#### **3.7 REPORTING**

- A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article above, prepare a report on the adequacy of design for systems' balancing devices. Recommend changes and additions to systems' balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.
- B. Status Reports: As Work progresses, prepare reports to describe completed procedures, procedures in progress, and scheduled procedures. Include a list of deficiencies and problems found in systems being tested and balanced. Prepare a separate report for each system and each building floor for systems serving multiple floors.

#### **3.8 FINAL REPORT**

- A. General: Typewritten, or computer printout in letter-quality font, on standard bond paper, in 3-ring binder, tabulated and divided into sections by tested and balanced systems.
- B. Include a certification sheet in front of binder signed and sealed by the certified testing and balancing engineer.
  - 1. Include a list of the instruments used for procedures, along with proof of calibration.
- C. Final Report Contents: In addition to the certified field report data, include the following:
  - 1. Pump curves.
  - 2. Fan curves.
  - 3. Manufacturers' test data.
  - 4. Field test reports prepared by system and equipment installers.
  - 5. Other information relative to equipment performance, but do not include approved Shop Drawings and Product Data.
- D. General Report Data: In addition to the form titles and entries, include the following data in the final report, as applicable:
  - 1. Title page.
  - 2. Name and address of testing, adjusting, and balancing Agent.
  - 3. Project name.
  - 4. Project location.

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5. Architect's name and address.
  6. Engineer's name and address.
  7. Contractor's name and address.
  8. Report date.
  9. Signature of testing, adjusting, and balancing Agent who certifies the report.
  10. Summary of contents, including the following:
    - a. Design versus final performance.
    - b. Notable characteristics of systems.
    - c. Description of system operation sequence if it varies from the Contract Documents.
  11. Nomenclature sheets for each item of equipment.
  12. Data for terminal units, including manufacturer, type size, and fittings.
  13. Notes to explain why certain final data in the body of reports vary from design values.
  14. Test conditions for fans and pump performance forms, including the following:
    - a. Settings for outside-, return-, and exhaust-air dampers.
    - b. Conditions of filters.
    - c. Cooling coil, wet- and dry-bulb conditions.
    - d. Face and bypass damper settings at coils.
    - e. Fan drive settings, including settings and percentage of maximum pitch diameter.
    - f. Inlet vane settings for variable-air-volume systems.
    - g. Settings for supply-air, static-pressure controller.
    - h. Other system operating conditions that affect performance.
- E. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present with single-line diagrams and include the following:
1. Quantities of outside, supply, return, and exhaust airflows.
  2. Water and steam flow rates.
  3. Duct, outlet, and inlet sizes.
  4. Pipe and valve sizes and locations.
  5. Terminal units.
  6. Balancing stations.
- F. Air-Handling Unit Test Reports: For air-handling units with coils, include the following:
1. Unit Data: Include the following:
    - a. Unit identification.

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- b. Location.
  - c. Make and type.
  - d. Model number and unit size.
  - e. Manufacturer's serial number.
  - f. Unit arrangement and class.
  - g. Discharge arrangement.
  - h. Sheave make, size in inches, and bore.
  - i. Sheave dimensions, center-to-center and amount of adjustments in inches.
  - j. Number of belts, make, and size.
  - k. Number of filters, type, and size.
2. Motor Data: Include the following:
- a. Make and frame type and size.
  - b. Horsepower and rpm.
  - c. Volts, phase, and hertz.
  - d. Full-load amperage and service factor.
  - e. Sheave make, size in inches, and bore.
  - f. Sheave dimensions, center-to-center and amount of adjustments in inches.
3. Test Data: Include design and actual values for the following:
- a. Total airflow rate in cfm.
  - b. Total system static pressure in inches wg.
  - c. Fan rpm.
  - d. Discharge static pressure in inches wg.
  - e. Filter static-pressure differential in inches wg.
  - f. Preheat coil static-pressure differential in inches wg.
  - g. Cooling coil static-pressure differential in inches wg.
  - h. Heating coil static-pressure differential in inches wg.
  - i. Outside airflow in cfm.
  - j. Return airflow in cfm.
  - k. Outside-air damper position.
  - l. Return-air damper position.
  - m. Vortex damper position.
- G. Apparatus-Coil Test Reports: For apparatus coils, include the following:
1. Coil Data: Include the following:
- a. System identification.
  - b. Location.
  - c. Coil type.
  - d. Number of rows.



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- e. Fin spacing in fins per inch.
  - f. Make and model number.
  - g. Face area in sq. ft..
  - h. Tube size in NPS.
  - i. Tube and fin materials.
  - j. Circuiting arrangement.
2. Test Data: Include design and actual values for the following:
    - a. Airflow rate in cfm.
    - b. Average face velocity in fpm.
    - c. Air pressure drop in inches wg.
    - d. Outside-air, wet- and dry-bulb temperatures in deg F.
    - e. Return-air, wet- and dry-bulb temperatures in deg F.
    - f. Entering-air, wet- and dry-bulb temperatures in deg F.
    - g. Leaving-air, wet- and dry-bulb temperatures in deg F.
    - h. Water flow rate in gpm.
    - i. Water pressure differential in feet of head or psig.
    - j. Entering-water temperature in deg F.
    - k. Leaving-water temperature in deg F.
    - l. Refrigerant expansion valve and refrigerant types.
    - m. Refrigerant suction pressure in psig.
    - n. Refrigerant suction temperature in deg F.
    - o. Inlet steam pressure in psig.
- H. Gas- and Oil-Fired Heat Apparatus Test Reports: In addition to the manufacturer's factory startup equipment reports, include the following:
1. Unit Data: Include the following:
    - a. System identification.
    - b. Location.
    - c. Make and type.
    - d. Model number and unit size.
    - e. Manufacturer's serial number.
    - f. Fuel type in input data.
    - g. Output capacity in Btuh.
    - h. Ignition type.
    - i. Burner-control types.
    - j. Motor horsepower and rpm.
    - k. Motor volts, phase, and hertz.
    - l. Motor full-load amperage and service factor.
    - m. Sheave make, size in inches, and bore.
    - n. Sheave dimensions, center-to-center and amount of adjustments in inches.

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2. Test Data: Include design and actual values for the following:
  - a. Total airflow rate in cfm.
  - b. Entering-air temperature in deg F.
  - c. Leaving-air temperature in deg F.
  - d. Air temperature differential in deg F.
  - e. Entering-air static pressure in inches wg.
  - f. Leaving-air static pressure in inches wg.
  - g. Air static-pressure differential in inches wg.
  - h. Low-fire fuel input in Btuh.
  - i. High-fire fuel input in Btuh.
  - j. Manifold pressure in psig.
  - k. High-temperature-limit setting in deg F.
  - l. Operating set point in Btuh.
  - m. Motor voltage at each connection.
  - n. Motor amperage for each phase.
  - o. Heating value of fuel in Btuh.
  
- I. Electric-Coil Test Reports: For electric furnaces, duct coils, and electric coils installed in central-station air-handling units, include the following:
  1. Unit Data: Include the following:
    - a. System identification.
    - b. Location.
    - c. Coil identification.
    - d. Capacity in Btuh.
    - e. Number of stages.
    - f. Connected volts, phase, and hertz.
    - g. Rated amperage.
    - h. Airflow rate in cfm.
    - i. Face area in sq. ft..
    - j. Minimum face velocity in fpm.
  
  2. Test Data: Include design and actual values for the following:
    - a. Heat output in Btuh.
    - b. Airflow rate in cfm.
    - c. Air velocity in fpm.
    - d. Entering-air temperature in deg F.
    - e. Leaving-air temperature in deg F.
    - f. Voltage at each connection.
    - g. Amperage for each phase.
  
- J. Fan Test Reports: For supply, return, and exhaust fans, include the following:

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1. Fan Data: Include the following:
  - a. System identification.
  - b. Location.
  - c. Make and type.
  - d. Model number and size.
  - e. Manufacturer's serial number.
  - f. Arrangement and class.
  - g. Sheave make, size in inches, and bore.
  - h. Sheave dimensions, center-to-center and amount of adjustments in inches.
  
2. Motor Data: Include the following:
  - a. Make and frame type and size.
  - b. Horsepower and rpm.
  - c. Volts, phase, and hertz.
  - d. Full-load amperage and service factor.
  - e. Sheave make, size in inches, and bore.
  - f. Sheave dimensions, center-to-center and amount of adjustments in inches.
  - g. Number of belts, make, and size.
  
3. Test Data: Include design and actual values for the following:
  - a. Total airflow rate in cfm.
  - b. Total system static pressure in inches wg.
  - c. Fan rpm.
  - d. Discharge static pressure in inches wg.
  - e. Suction static pressure in inches wg.
  
- K. Round, Flat-Oval, and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:
  1. Report Data: Include the following:
    - a. System and air-handling unit number.
    - b. Location and zone.
    - c. Traverse air temperature in deg F.
    - d. Duct static pressure in inches wg.
    - e. Duct size in inches.
    - f. Duct area in sq. ft..
    - g. Design airflow rate in cfm.
    - h. Design velocity in fpm.
    - i. Actual airflow rate in cfm.
    - j. Actual average velocity in fpm.

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- k. Barometric pressure in psig.
- L. Air-Terminal-Device Reports: For terminal units, include the following:
  - 1. Unit Data: Include the following:
    - a. System and air-handling unit identification.
    - b. Location and zone.
    - c. Test apparatus used.
    - d. Area served.
    - e. Air-terminal-device make.
    - f. Air-terminal-device number from system diagram.
    - g. Air-terminal-device type and model number.
    - h. Air-terminal-device size.
    - i. Air-terminal-device effective area in sq. ft..
  - 2. Test Data: Include design and actual values for the following:
    - a. Airflow rate in cfm.
    - b. Air velocity in fpm.
    - c. Preliminary airflow rate as needed in cfm.
    - d. Preliminary velocity as needed in fpm.
    - e. Final airflow rate in cfm.
    - f. Final velocity in fpm.
    - g. Space temperature in deg F.
- M. System-Coil Reports: For reheat coils and water coils of terminal units, include the following:
  - 1. Unit Data: Include the following:
    - a. System and air-handling unit identification.
    - b. Location and zone.
    - c. Room or riser served.
    - d. Coil make and size.
    - e. Flowmeter type.
  - 2. Test Data: Include design and actual values for the following:
    - a. Airflow rate in cfm.
    - b. Entering-water temperature in deg F.
    - c. Leaving-water temperature in deg F.
    - d. Water pressure drop in feet of head or psig.
    - e. Entering-air temperature in deg F.
    - f. Leaving-air temperature in deg F.

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- N. Packaged Chiller Reports: For each chiller, include the following:
1. Unit Data: Include the following:
    - a. Unit identification.
    - b. Make and model number.
    - c. Manufacturer's serial number.
    - d. Refrigerant type and capacity in gal..
    - e. Starter type and size.
    - f. Starter thermal protection size.
  2. Condenser Test Data: Include design and actual values for the following:
    - a. Refrigerant pressure in psig.
    - b. Refrigerant temperature in deg F.
    - c. Entering-water temperature in deg F.
    - d. Leaving-water temperature in deg F.
    - e. Entering-water pressure in feet of head or psig.
    - f. Water pressure differential in feet of head or psig.
  3. Evaporator Test Reports: Include design and actual values for the following:
    - a. Refrigerant pressure in psig.
    - b. Refrigerant temperature in deg F.
    - c. Entering-water temperature in deg F.
    - d. Leaving-water temperature in deg F.
    - e. Entering-water pressure in feet of head or psig.
    - f. Water pressure differential in feet of head or psig.
  4. Compressor Test Data: Include design and actual values for the following:
    - a. Make and model number.
    - b. Manufacturer's serial number.
    - c. Suction pressure in psig.
    - d. Suction temperature in deg F.
    - e. Discharge pressure in psig.
    - f. Discharge temperature in deg F.
    - g. Oil pressure in psig.
    - h. Oil temperature in deg F.
    - i. Voltage at each connection.
    - j. Amperage for each phase.
    - k. The kW input.
    - l. Crankcase heater kW.
    - m. Chilled water control set point in deg F.
    - n. Condenser water control set point in deg F.

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- o. Refrigerant low-pressure-cutoff set point in psig.
      - p. Refrigerant high-pressure-cutoff set point in psig.
  - 5. Refrigerant Test Data: Include design and actual values for the following:
    - a. Oil level.
    - b. Refrigerant level.
    - c. Relief valve setting in psig.
    - d. Unloader set points in psig.
    - e. Percentage of cylinders unloaded.
    - f. Bearing temperatures in deg F.
    - g. Vane position.
    - h. Low-temperature-cutoff set point in deg F.
- O. Compressor and Condenser Reports: For refrigerant side of unitary systems, stand-alone refrigerant compressors, air-cooled condensing units, or water-cooled condensing units, include the following:
  - 1. Unit Data: Include the following:
    - a. Unit identification.
    - b. Location.
    - c. Unit make and model number.
    - d. Manufacturer's compressor serial numbers.
    - e. Compressor make.
    - f. Compressor model and serial numbers.
    - g. Refrigerant weight in lb.
    - h. Low ambient temperature cutoff in deg F.
  - 2. Test Data: Include design and actual values for the following:
    - a. Inlet-duct static pressure in inches wg.
    - b. Outlet-duct static pressure in inches wg.
    - c. Entering-air, dry-bulb temperature in deg F.
    - d. Leaving-air, dry-bulb temperature in deg F.
    - e. Condenser entering-water temperature in deg F.
    - f. Condenser leaving-water temperature in deg F.
    - g. Condenser water temperature differential in deg F.
    - h. Condenser entering-water pressure in feet of head or psig.
    - i. Condenser leaving-water pressure in feet of head or psig.
    - j. Condenser water pressure differential in feet of head or psig.
    - k. Control settings.
    - l. Unloader set points.
    - m. Low-pressure-cutout set point in psig.
    - n. High-pressure-cutout set point in psig.
    - o. Suction pressure in psig.

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- p. Suction temperature in deg F.
  - q. Condenser refrigerant pressure in psig.
  - r. Condenser refrigerant temperature in deg F.
  - s. Oil pressure in psig.
  - t. Oil temperature in deg F.
  - u. Voltage at each connection.
  - v. Amperage for each phase.
  - w. The kW input.
  - x. Crankcase heater kW.
  - y. Number of fans.
  - z. Condenser fan rpm.
  - aa. Condenser fan airflow rate in cfm.
  - bb. Condenser fan motor make, frame size, rpm, and horsepower.
  - cc. Condenser fan motor voltage at each connection.
  - dd. Condenser fan motor amperage for each phase.
- P. Cooling Tower or Condenser Test Reports: For cooling towers or condensers, include the following:
- 1. Unit Data: Include the following:
    - a. Unit identification.
    - b. Make and type.
    - c. Model and serial numbers.
    - d. Nominal cooling capacity in tons.
    - e. Refrigerant type and weight in lb.
    - f. Water-treatment chemical feeder and chemical.
    - g. Number and type of fans.
    - h. Fan motor make, frame size, rpm, and horsepower.
    - i. Fan motor voltage at each connection.
    - j. Sheave make, size in inches, and bore.
    - k. Sheave dimensions, center-to-center and amount of adjustments in inches.
    - l. Number of belts, make, and size.
  - 2. Pump Test Data: Include design and actual values for the following:
    - a. Make and model number.
    - b. Manufacturer's serial number.
    - c. Motor make and frame size.
    - d. Motor horsepower and rpm.
    - e. Voltage at each connection.
    - f. Amperage for each phase.
    - g. Water flow rate in gpm.
  - 3. Water Test Data: Include design and actual values for the following:

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- a. Entering-water temperature in deg F.
  - b. Leaving-water temperature in deg F.
  - c. Water temperature differential in deg F.
  - d. Entering-water pressure in feet of head or psig.
  - e. Leaving-water pressure in feet of head or psig.
  - f. Water pressure differential in feet of head or psig.
  - g. Water flow rate in gpm.
  - h. Bleed water flow rate in gpm.
4. Air Data: Include design and actual values for the following:
- a. Duct airflow rate in cfm.
  - b. Inlet-duct static pressure in inches wg.
  - c. Outlet-duct static pressure in inches wg.
  - d. Average entering-air, wet-bulb temperature in deg F.
  - e. Average leaving-air, wet-bulb temperature in deg F.
  - f. Ambient wet-bulb temperature in deg F.
- Q. Heat-Exchanger/Converter Test Reports: For steam and hot-water heat exchangers, include the following:
1. Unit Data: Include the following:
    - a. Unit identification.
    - b. Location.
    - c. Service.
    - d. Make and type.
    - e. Model and serial numbers.
    - f. Ratings.
  2. Steam Test Data: Include design and actual values for the following:
    - a. Inlet pressure in psig.
    - b. Condensate flow rate in lb/h.
  3. Primary Water Test Data: Include design and actual values for the following:
    - a. Entering-water temperature in deg F.
    - b. Leaving-water temperature in deg F.
    - c. Entering-water pressure in feet of head or psig.
    - d. Water pressure differential in feet of head or psig.
    - e. Water flow rate in gpm.
  4. Secondary Water Test Data: Include design and actual values for the following:



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- a. Entering-water temperature in deg F.
  - b. Leaving-water temperature in deg F.
  - c. Entering-water pressure in feet of head or psig.
  - d. Water pressure differential in feet of head or psig.
  - e. Water flow rate in gpm.
- R. Pump Test Reports: For pumps, include the following data. Calculate impeller size by plotting the shutoff head on pump curves.
- 1. Unit Data: Include the following:
    - a. Unit identification.
    - b. Location.
    - c. Service.
    - d. Make and size.
    - e. Model and serial numbers.
    - f. Water flow rate in gpm.
    - g. Water pressure differential in feet of head or psig.
    - h. Required net positive suction head in feet of head or psig.
    - i. Pump rpm.
    - j. Impeller diameter in inches.
    - k. Motor make and frame size.
    - l. Motor horsepower and rpm.
    - m. Voltage at each connection.
    - n. Amperage for each phase.
    - o. Full-load amperage and service factor.
    - p. Seal type.
  - 2. Test Data: Include design and actual values for the following:
    - a. Static head in feet of head or psig.
    - b. Pump shutoff pressure in feet of head or psig.
    - c. Actual impeller size in inches.
    - d. Full-open flow rate in gpm.
    - e. Full-open pressure in feet of head or psig.
    - f. Final discharge pressure in feet of head or psig.
    - g. Final suction pressure in feet of head or psig.
    - h. Final total pressure in feet of head or psig.
    - i. Final water flow rate in gpm.
    - j. Voltage at each connection.
    - k. Amperage for each phase.
- S. Boiler Test Reports: For boilers, include the following:
- 1. Unit Data: Include the following:

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- a. Unit identification.
  - b. Location.
  - c. Service.
  - d. Make and type.
  - e. Model and serial numbers.
  - f. Fuel type and input in Btuh.
  - g. Number of passes.
  - h. Ignition type.
  - i. Burner-control types.
  - j. Voltage at each connection.
  - k. Amperage for each phase.
2. Test Data: Include design and actual values for the following:
- a. Operating pressure in psig.
  - b. Operating temperature in deg F.
  - c. Entering-water temperature in deg F.
  - d. Leaving-water temperature in deg F.
  - e. Number of safety valves and sizes in NPS.
  - f. Safety valve settings in psig.
  - g. High-limit setting in psig.
  - h. Operating-control setting.
  - i. High-fire set point.
  - j. Low-fire set point.
  - k. Voltage at each connection.
  - l. Amperage for each phase.
  - m. Draft fan voltage at each connection.
  - n. Draft fan amperage for each phase.
  - o. Manifold pressure in psig.
- T. Instrument Calibration Reports: For instrument calibration, include the following:
1. Report Data: Include the following:
    - a. Instrument type and make.
    - b. Serial number.
    - c. Application.
    - d. Dates of use.
    - e. Dates of calibration.

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3.9 ADDITIONAL TESTS

- A. Within 90 days of completing testing, adjusting, and balancing, perform additional testing and balancing to verify that balanced conditions are being maintained throughout and to correct unusual conditions.
- B. Seasonal Periods: If initial testing, adjusting, and balancing procedures were not performed during near-peak summer and winter conditions, perform additional inspections, testing, and adjusting during near-peak summer and winter conditions.

END OF SECTION

## **DIVISION 23 - MECHANICAL**

### **Section 23 07 19- Duct Insulation for Mechanical Systems**

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#### **PART 1 - GENERAL**

##### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Related Sections include the following:
  - 1. Division 07 for firestopping materials and requirements for penetrations through fire and smoke barriers.
  - 2. Division 23 Section "Pipe Insulation for Mechanical Systems" for insulation for piping systems.
  - 3. Division 23 Section "Metal Ducts" for duct liner.
  - 4. Division 23 Section "Hangers and Supports for Mechanical Piping and Equipment."
  - 5. Division 23 Section "Air Duct Accessories."

##### **1.2 SUMMARY**

- A. This Section includes semirigid and flexible duct and plenum, insulation; insulating cements; field-applied jackets; accessories and attachments; and sealing compounds.

##### **1.3 SUBMITTALS**

- A. General: See Section 230500 for general requirements of Product Data, Shop Drawings, Reports and Certificates, and Operation and Maintenance data submittals.
- B. Product Data: Provide submittals of the following:
  - 1. Mineral Fiber Board Insulation.
  - 2. Mineral Fiber Blanket Insulation.
  - 3. Aluminum Jackets.
  - 4. Fire Barrier Duct Wrap with UL classification documentation.
- C. Shop Drawings: None required.
- D. Reports and Certificates: None required.

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### **Section 23 07 19- Duct Insulation for Mechanical Systems**

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#### 1.4 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: As determined by testing materials identical to those specified in this Section according to ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory labeled insulation and jacket materials and sealer and cement material containers with appropriate markings of applicable testing and inspecting agency.
  - 1. Insulation Installed Indoors: Flame-spread rating of 25 or less, and smoke-developed rating of 50 or less.
  - 2. Insulation Installed Outdoors: Flame-spread rating of 75 or less, and smoke-developed rating of 150 or less.
- B. Underwriters Laboratories Inc (UL)
  - 1. UL 723, surface burning characteristic per ASTM E 84
  - 2. UL 1978, Standards for Grease Ducts
  - 3. UL 1479, Through-Penetration firestop test.
- C. National Fire Code: NFPA 96: Ventilation Control and Fire Protection of Commercial Cooking Operations
- D. American Society for Testing and Materials (ASTM):
  - 1. ASTM E119, Standard Method of Fire Tests of Building Construction and Materials.
  - 2. ASTM E814, Standard Method of Fire Tests of Through-Penetration Fire Stops.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

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

#### 1.6 COORDINATION

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

#### 1.7 SCHEDULING

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

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### **Section 23 07 19- Duct Insulation for Mechanical Systems**

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#### **PART 2 - PRODUCTS**

##### **2.1 MANUFACTURERS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Mineral-Fiber Insulation:
    - a. CertainTeed Manson.
    - b. Knauf FiberGlass GmbH.
    - c. Owens-Corning Fiberglas Corp.
    - d. Johns Manville.
  - 2. Fire Barrier Duct Wrap:
    - a. 3M Fire Barrier.
    - b. Pyroscat Duct Wrap.
    - c. Unifrax FyreWrap.

##### **2.2 INSULATION MATERIALS**

- A. Mineral-Fiber Board Thermal Insulation: Glass fibers bonded with a thermosetting resin. Comply with ASTM C 612, Type IB, without facing and with all-service jacket manufactured from kraft paper, reinforcing scrim, aluminum foil, and vinyl film.
- B. Mineral-Fiber Blanket Thermal Insulation: Glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II, without facing and with all-service jacket manufactured from kraft paper, reinforcing scrim, aluminum foil, and vinyl film.

##### **2.3 FIELD-APPLIED JACKETS**

- A. Aluminum Jacket: Sheets manufactured from aluminum alloy complying with ASTM B 209, and having an integrally bonded moisture barrier over entire surface in contact with insulation. Metal thickness is scheduled at the end of this Section.
  - 1. Finish: Embossed finish.
  - 2. Thickness: 0.04-inch thick.

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### **Section 23 07 19- Duct Insulation for Mechanical Systems**

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#### **2.4 ACCESSORIES AND ATTACHMENTS**

- A. Bands: 3/4-inch wide, aluminum band, minimum 0.007-inch thick.
- B. Adhesive-Attached Anchor Pins and Speed Washers: Galvanized steel plate, pin, and washer manufactured for attachment to duct and plenum with adhesive. Pin length sufficient for insulation thickness indicated.
  - 1. Adhesive: Recommended by the anchor pin manufacturer as appropriate for surface temperatures of ducts, plenums, and breechings; and to achieve a holding capacity of 100 lb for direct pull perpendicular to the adhered surface.

#### **2.5 VAPOR RETARDERS**

- A. Mastics: Materials recommended by insulation material manufacturer that are compatible with insulation materials, jackets, and substrates. Perm rating not greater than 0.5 and all joints sealed.

#### **2.6 FIRE BARRIER DUCT WRAP**

- A. UL Classified Fire resistant flexible wrap consisting of high temperature, non-asbestos inorganic blanket encapsulated with a scrim-reinforced foil rated for use with commercial grease stainless steel exhaust ducts. Installed system shall allow for zero clearance to combustibles and provide a 2-hour fire resistive enclosure system.
- B. Insulation Pins: 12 Gauge stainless steel pins with round or square clips.
- C. Banding Straps: Minimum 1/2-inch wide Type 302 Stainless Steel bands
- D. Firestopping Material: UL classified, noncombustible

#### **2.7 FIRE BARRIER WRAP ACCESS DOORS**

- A. Fire barrier grease duct access door shall be rated for use with fire barrier wrap complete with extension kit. Coordinate opening sizes and locations with Division 15 Section "Metal Ducts" and "Duct Accessories." Installed access assembly shall be rated no less than the fire resistive protection rating to that of grease duct fire barrier wrap. Provide extension kit to allow duct wrap layers to mechanically fastened to cover plate for ease of removal and re-installation without the use of a tool. Label "ACCESS PANEL. DO NOT BLOCK" on exterior of access door assembly.

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### **Section 23 07 19- Duct Insulation for Mechanical Systems**

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#### **PART 3 - EXECUTION**

##### **3.1 EXAMINATION**

- A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

##### **3.2 PREPARATION**

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

##### **3.3 GENERAL APPLICATION REQUIREMENTS**

- A. Apply insulation materials, accessories, and finishes according to the manufacturer's written instructions; with smooth, straight, and even surfaces; and free of voids throughout the length of ducts and fittings.
- B. Refer to schedules at the end of this Section for materials, jackets, and thicknesses required for each duct system.
- C. Use accessories compatible with insulation materials and suitable for the service. Use accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Apply multiple layers of insulation with longitudinal and end seams staggered.
- E. Joints and Seams: Cover with tape and vapor retarder as recommended by insulation material manufacturer to maintain vapor seal.
- F. Keep insulation materials dry during application and finishing.
- G. Apply insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by the insulation material manufacturer.
- H. Apply insulation with the least number of joints practical.
- I. Apply insulation over fittings and specialties, with continuous thermal and vapor-retarder integrity, unless otherwise indicated.



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### **Section 23 07 19- Duct Insulation for Mechanical Systems**

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- J. Hangers and Anchors: Where vapor retarder is indicated, seal penetrations in insulation at hangers, supports, anchors, and other projections with vapor-retarder mastic. Apply insulation continuously through hangers and around anchor attachments.
- K. Insulation Terminations: For insulation application where vapor retarders are indicated, seal ends with a compound recommended by the insulation material manufacturer to maintain vapor retarder.
- L. Cut insulation according to manufacturer's written instructions to prevent compressing insulation to less than 75 percent of its nominal thickness.
- M. Install vapor-retarder mastic on supply and outside air ducts and plenums.
  - 1. Ducts with Vapor Retarders: Overlap insulation facing at seams and seal with vapor-retarder mastic and pressure-sensitive tape having same facing as insulation. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-retarder seal.
  - 2. Ducts without Vapor Retarders: Overlap insulation facing at seams and secure with outward clinching staples and pressure-sensitive tape having same facing as insulation.
  - 3. Vapor-Retarder Mastics: Where vapor retarders are indicated, apply mastic on seams and joints and at ends adjacent to duct flanges and fittings.
- N. Roof Penetrations: Apply insulation for interior applications to a point even with top of roof flashing.
  - 1. Seal penetrations with vapor-retarder mastic.
  - 2. Apply insulation for exterior applications tightly joined to interior insulation ends.
  - 3. Seal insulation to roof flashing with vapor-retarder mastic.
- O. Interior Wall and Partition Penetrations: Apply insulation continuously through walls and partitions, except fire-rated walls and partitions.
- P. Fire-Rated Wall and Partition Penetrations: Terminate insulation at fire/smoke damper sleeves for fire-rated wall and partition penetrations.
- Q. Floor Penetrations: Terminate insulation at underside of floor assembly and at floor support at top of floor.
  - 1. For insulation indicated to have vapor retarders, taper termination and seal insulation ends with vapor-retarder mastic.

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### Section 23 07 19- Duct Insulation for Mechanical Systems

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#### 3.4 MINERAL-FIBER INSULATION APPLICATION

- A. Blanket Applications for Ducts and Plenums: Secure blanket insulation with anchor pins and speed washers.
1. Install anchor pins and speed washers on sides and bottom of horizontal ducts and sides of vertical ducts as follows:
    - a. On duct sides with dimensions 18 inches and smaller, along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
    - b. On duct sides with dimensions larger than 18 inches. Space 16 inches o.c. each way, and 3 inches maximum from insulation joints. Apply additional pins and clips to hold insulation tightly against surface at cross bracing.
    - c. Anchor pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
    - d. Do not overcompress insulation during installation.
  2. Impale insulation over anchors and attach speed washers.
  3. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
  4. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation segment with 1/2-inch staples, 1-inch o.c., and cover with pressure-sensitive tape having same facing as insulation.
  5. Overlap unfaced blankets a minimum of 2 inches on longitudinal seams and end joints. Secure with steel band at end joints and spaced a maximum of 18 inches o.c.
  6. Apply insulation on rectangular duct elbows and transitions with a full insulation segment for each surface. Apply insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
  7. Insulate duct stiffeners, hangers, and flanges that protrude beyond the insulation surface with 6-inch-wide strips of the same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with anchor pins spaced 6 inches o.c.
  8. Apply vapor-retarder mastic to open joints, breaks, and punctures for insulation indicated to receive vapor retarder.
- B. Board Applications for Ducts and Plenums: Secure board insulation with anchor pins and speed washers.
1. Space anchor pins as follows:
    - a. On duct sides with dimensions 18 inches and smaller, along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.

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- b. On duct sides with dimensions larger than 18 inches. Space 16 inches o.c. each way, and 3 inches maximum from insulation joints. Apply additional pins and clips to hold insulation tightly against surface at cross bracing.
  - c. Anchor pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
  - d. Do not overcompress insulation during installation.
2. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
  3. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation segment with 1/2-inch staples, 1-inch o.c., and cover with pressure-sensitive tape having same facing as insulation.
  4. Apply insulation on rectangular duct elbows and transitions with a full insulation segment for each surface. Groove and score insulation to fit as closely as possible to outside and inside radius of elbows. Apply insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
  5. Insulate duct stiffeners, hangers, and flanges that protrude beyond the insulation surface with 6-inch-wide strips of the same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with anchor pins spaced 6 inches o.c.
  6. Apply vapor-retarder mastic to open joints, breaks, and punctures for insulation indicated to receive vapor retarder.

#### **3.5 FIRE BARRIER DUCT WRAP APPLICATION**

- A. Install fire barrier duct wrap and components in accordance with manufacturer's instructions.
- B. Coordinate installation and spatial requirements with Division 15 Sections "Metal Ducts" and "Duct Accessories."
- C. Install hangers and supports insulation to maintain fire resistive rating.
- D. Install firestopping system at rated penetrations (wall, floors, ceilings, roof).
- E. Verify duct access openings are not obstructed.

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#### **3.6 FIELD-APPLIED JACKET APPLICATION**

- A. Apply jacket, where indicated, directly over bare insulation or insulation with factory-applied jackets.
  - 1. Apply jacket smooth and tight to surface with 2-inch overlap at seams and joints.
  - 2. Completely encapsulate insulation with jacket, leaving no exposed raw insulation.
  - 3. Seal outdoor jacket watertight.
  - 4. Round Ducts: Overlap seams 45 degrees from bottom.

#### **3.7 DUCT SYSTEM APPLICATIONS**

- A. Insulation materials and thicknesses are specified in schedules at the end of this Section.
- B. Materials and thicknesses for systems listed below are specified in schedules at the end of this Section.
- C. Insulate the following plenums and duct systems:
  - 1. Supply-, return-, and outside-air ductwork.
  - 2. Outside-air ductwork and exhaust-air ductwork shall be insulated from isolation damper to the exterior of the building.
  - 3. Grease hood exhaust duct.
- D. Items Not Insulated: Unless otherwise indicated, do not apply insulation to the following systems, materials, and equipment:
  - 1. Metal ducts with duct liner, unless required to meet the Energy Code requirements.
  - 2. Factory-insulated flexible ducts.
  - 3. Factory-insulated plenums, casings, terminal boxes, and filter boxes and sections.
  - 4. Flexible connectors.
  - 5. Vibration-control devices.
  - 6. Testing agency labels and stamps.
  - 7. Nameplates and data plates.
  - 8. Access panels and doors in air-distribution systems.
  - 9. Toilet exhaust ducts in conditioned spaces.
  - 10. General exhaust ducts in conditioned spaces.
  - 11. Exposed ducts within a space that serves that space only.

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#### **3.8 INDOOR DUCT AND PLENUM APPLICATION SCHEDULE**

- A. Service: Supply and return-air ducts, concealed unconditioned space.
  - 1. Material: Mineral-fiber blanket.
  - 2. Thickness: 2-inch.
  - 3. Minimum Installed Insulation R-Value: 6.
- B. Service: Round, supply and return-air ducts, conditioned space.
  - 1. Material: Mineral-fiber blanket.
  - 2. Thickness: 1-1/2-inch.
  - 3. Minimum Installed Insulation R-Value: 3.3.
- C. Service: Rectangular, supply and return-air ducts, conditioned space.
  - 1. Material: Mineral-fiber board.
  - 2. Thickness: 1 inch.
  - 3. Minimum Installed Insulation R-Value: 3.3.
- D. Service: Round, outside-air ducts, downstream of damper.
  - 1. Material: Mineral-fiber blanket.
  - 2. Thickness: 3-inches.
  - 3. Minimum Installed Insulation R-Value: 7.
- E. Service: Round, outside-air ducts, upstream of damper; Round, exhaust-air ducts, downstream of damper.
  - 1. Material: Mineral-fiber blanket.
  - 2. Thickness: Layers as required to maintain minimum envelope R-Value.
  - 3. Minimum Installed Insulation R-Value: [11][19].
- F. Service: Rectangular, outside-air ducts and plenums upstream of damper; Rectangular, exhaust-air duct, downstream of damper.
  - 1. Material: Mineral-fiber board.
  - 2. Thickness: Layers as required to maintain minimum envelope R-Value.
  - 3. Minimum Installed Insulation R-Value: [11][19].

#### **3.9 OUTDOOR DUCT AND PLENUM APPLICATION SCHEDULE**

- A. Service: Round, supply and return-air ducts.
  - 1. Material: Mineral-fiber blanket.
  - 2. Thickness: 3-inches.

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3. Field-Applied Jacket: Aluminum.
  4. Minimum Installed Insulation R-Value: 8.
- B. Service: Rectangular, supply and return-air ducts.
1. Material: Mineral-fiber board.
  2. Thickness: 2 inches.
  3. Field-Applied Jacket: Aluminum.
  4. Minimum Installed Insulation R-Value: 8.
- C. Service: Grease Hood Exhaust Duct.
1. Material: Fire barrier duct wrap system.

END OF SECTION

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Related Sections include the following:
  - 1. Division 07 for fire-resistant sealants for use around duct penetrations and fire-damper installations in fire-rated floors, partitions, and walls.
  - 2. Division 08 for wall- and ceiling-mounted access doors for access to concealed ducts.
  - 3. Division 08 for intake and relief louvers and vents connected to ducts and installed in exterior walls.
  - 4. Division 23 Section "Duct Insulation for Mechanical Systems" for duct insulation.
  - 5. Division 23 Section "Vibration and Seismic Controls for Mechanical Piping and Equipment" for vibration isolation and seismic restraints of metal ducts.
  - 6. Division 23 Section "HVAC Casings" for factory- and field-fabricated casings for mechanical equipment.
  - 7. Division 23 Section "Air Duct Accessories" for volume dampers, fire dampers, combination fire/smoke dampers, duct silencers, duct-mounted access doors and panels, turning vanes, screened openings, flexible connectors, and flexible ducts.
  - 8. Division 23 Section "Air Terminal Units" for air terminals and additional installation requirements.
  - 9. Division 23 Section "Diffusers, Registers, and Grilles."
  - 10. Division 23 Section "Instrumentation and Control for HVAC" for automatic control dampers and operators.
  - 11. Division 23 Section "Testing, Adjusting, and Balancing for HVAC" for air balancing and final adjusting of manual-volume dampers.

1.2 SUMMARY

- A. This Section includes fabrication and installation of rectangular, round, and flat-oval metal ducts and plenums for heating, ventilating, and air-conditioning systems in pressure classes from minus 2- to plus 10-inch wg.

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1.3 SYSTEM DESCRIPTION

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

1.4 PERFORMANCE REQUIREMENTS

A. DUCT PRESSURE CLASSIFICATIONS

- 1. Rectangular Duct Static-Pressure Classifications: Construct ducts to the following:
  - a. Supply Ducts, unless indicated otherwise: 2-inch wg.
  - b. Return Ducts: 2-inch wg, negative pressure.
  - c. Exhaust Ducts: 2-inch wg, negative pressure.
  - d. Outside Air Intake Ducts: 2-inch wg, negative pressure.
- 2. Round Duct Static Pressure Classifications: Construct ducts to the following:
  - a. Supply Ducts, unless indicated otherwise: 2-inch wg.
  - b. Return Ducts: 2-inch wg, negative pressure.
  - c. Exhaust Ducts: 2-inch wg, negative pressure.
  - d. Outside Air Intake Ducts: 2-inch wg, negative pressure.

B. Pressure Classification:

- 1. 3-inch wg and Greater: Seal Class A; all transverse joints, longitudinal seams and duct wall penetrations.
- 2. Below 3-inch wg: Seal Class B; all transverse joints and longitudinal seams.

1.5 SUBMITTALS

- A. General: See Section 23 05 00 for general requirements of Product Data, Shop Drawings, Reports and Certificates, and Operation and Maintenance data submittals.
- B. Product Data: Provide submittals of the following:
  - 1. Duct Liner and adhesives.
  - 2. Joint Sealants.



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3. Gaskets joint systems.
- C. Shop Drawings: In addition to requirements set forth in Section 23 05 00, shop drawings for the listed systems shall also include duct sizes, top and/or bottom elevations, pressure classifications, combination fire/smoke dampers, fire dampers and smoke dampers, building structural components, connections to equipment, seam and joint construction, location of duct accessories, including dampers, turning vanes and access doors, and required service clearances. Provide submittals of the following metal duct systems:
1. Supply Air
  2. Return Air
  3. Exhaust Air
  4. Duct Fittings
- D. Coordination Drawings:
1. Comply with requirements in Section 01 33 00 and Section 23 05 00 for providing coordination drawings for areas as indicated on the drawings. Approved ductwork shop drawings shall be used to generate coordination drawings.
- E. Reports and Certificates: Provide submittals of the following:
1. Duct Leakage Test Report.
  2. Duct Cleanliness Tests.
  3. Welding certificates.
- 1.6 QUALITY ASSURANCE
- A. Fabricate ducts and fittings according to SMACNA "HVAC Duct Construction Standards--Metal and Flexible" unless otherwise indicated.
  - B. Welding Standards: Qualify welding procedures and welding personnel to perform welding processes for this Project according to AWS D1.1, "Structural Welding Code--Steel," for hangers and supports; AWS D1.2, "Structural Welding Code--Aluminum," for aluminum supporting members; and AWS D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.
  - C. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems" unless otherwise indicated.
  - D. Comply with NFPA 96, "Ventilation Control and Fire Protection of Commercial Cooking Operations," Chapter 7, "Exhaust Duct System," for range hood ducts, unless otherwise indicated.

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**1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Keep metal ducts and duct liner dry and dust free during fabrication and storage at factory.
- B. Before shipment shrink-wrap all openings of ducts fabricated with duct liner. During shipment, protect all metal ducts from weather.
- C. Store all metal ducts in dry location on-site on elevated dunnage. Protect metal ducts from moisture, dirt, and dust.
- D. Retain shrink-wrap protection of openings (where required to be protected) until immediately prior to connection of that opening to erected duct system.
- E. On the event that any duct liner does get wet, dry duct liner within 48-hours using forced air heater. Ducts detected with moist fiberglass liner will be required to be replaced at no additional cost to the Owner.
- F. Remove dust from the inside of metal duct sections as they are erected. Cover all openings with 6-mil poly and duct tape at the end of each workday to prevent dust migration into ducts.
- G. Deliver and store stainless-steel sheets with mill-applied adhesive protective paper maintained through fabrication and installation.

**PART 2 - PRODUCTS**

**2.1 SHEET METAL MATERIALS**

- A. Galvanized, Sheet Steel: Lock-forming quality; ASTM A 653/A 653M, G90 coating designation; mill-phosphatized finish for surfaces of ducts exposed to view.
- B. Carbon-Steel Sheets: ASTM A 1008/A 1008M, cold-rolled sheets; commercial quality; with oiled, exposed matte finish.
- C. Stainless Steel: ASTM A 480/A 480M, Type 304 or 316L, sheet form with polished finish for surfaces of ducts exposed to view; Type 304, sheet form with No. 1 finish for concealed ducts.
- D. Aluminum Sheets: ASTM B 209, Alloy 3003, Temper H14, sheet form with standard, one-side bright finish for ducts exposed to view and with mill finish for concealed ducts.

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- E. Reinforcement Shapes and Plates: Galvanized steel reinforcement where installed on galvanized, sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.
- F. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for 36-inch length or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

**2.2 DUCT LINER**

- A. Fibrous Glass Duct Liner: Comply with NFPA 90A and NAIMA AH124 "Fibrous Glass Duct Liner Standard." Can operated in temperatures up to 250-Degrees F and air velocities up to 5,000 fpm. ASTM C 1071 with coated surface exposed to airstream to prevent erosion of glass fibers. Coating contains EPA registered anti-microbial agent so it will not support the growth of fungus or bacteria, and is water repellent. Antimicrobial compound shall be tested for efficacy by the EPA for use in HVAC systems.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. CertainTeed Corporation; Insulation Group.
    - b. Johns Manville.
    - c. Knauf Insulation.
    - d. Owens Corning.
  - 2. Thickness: See Duct Schedule.
  - 3. Density: Minimum 2 lb per cubic foot.
  - 4. Maximum Thermal Conductivity (k-Value): 0.26 at 75 deg F mean temperature.
  - 5. Fire-Hazard Classification: Maximum flame-spread rating of 25 and smoke-developed rating of 50, when tested according to ASTM E 84 and UL 723.
  - 6. Minimum Noise Reduction Criteria (NRC): 0.55 for 1/2-inch, 0.70 for 1-inch, 0.90 for 1-1/2-inch and 1.0 for 2-inch tested per ASTM C 423 using Type A mounting.
  - 7. Mechanical Fasteners: Galvanized steel, suitable for adhesive attachment, mechanical attachment, or welding attachment to duct without damaging liner when applied as recommended by manufacturer and without causing leakage in duct.
    - a. Tensile Strength: Indefinitely sustain a 50-lb-tensile, dead-load test perpendicular to duct wall.
    - b. Fastener Pin Length: As required for thickness of insulation and without projecting more than 1/8 inch into airstream.

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- c. Adhesive for Attaching Mechanical Fasteners: Comply with fire-hazard classification of duct liner system.
  - 8. Johns Manville Spiracoustic Plus Round Duct Lining System. See Duct Schedule for thickness; preformed liner for ducts 8-inch through 18-inch diameter, round duct liner board for ducts greater than 18-inch diameter.
- B. Natural-Fiber Duct Liner: 85 percent cotton, 10 percent borate, and 5 percent polybinding fibers, treated with a microbial growth inhibitor and complying with NFPA 90A or NFPA 90B.
- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Bonded Logic, Inc.
    - b. Reflectix Inc.
  - 2. Maximum Thermal Conductivity: 0.24 Btu x in./h x sq. ft. x deg F (0.034 W/m x K) at 75 deg F (24 deg C) mean temperature when tested according to ASTM C 518.
  - 3. Surface-Burning Characteristics: Maximum flame-spread index of 25 and maximum smoke-developed index of 50 when tested according to ASTM E 84; certified by an NRTL.
  - 4. Liner Adhesive: As recommended by insulation manufacturer and complying with NFPA 90A or NFPA 90B.

### 2.3 SEALANT AND ADHESIVE MATERIALS

- A. Joint and Seam Sealants:
  - 1. Joint and Seam Sealant: Water-based vinyl or acrylic copolymer mastic formulated to withstand temperatures from minus 20 to plus 180 Degrees F, minimum of 65 percent solids, water resistant, VOC: maximum 75g/L (less water).
  - 2. Flanged Joint Gasket Material: Elastomer butyl.
- B. Duct Liner Adhesive: Water-based vinyl copolymer adhesive formulated to withstand temperatures from minus 20 to plus 160 Degrees F. Comply with NFPA 90A and ASTM C 916

### 2.4 HANGERS, SUPPORTS AND RESTRAINTS

- A. Comply with Division 23, Section "Vibration and Seismic Controls for Mechanical Piping and Equipment."

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- B. Building Attachments: Concrete inserts, stud-wedge or female wedge, mechanical-anchor bolts, or structural-steel fasteners appropriate for building materials. Powder actuated concrete fasteners are not allowed.
  - 1. If concrete inserts cannot be used, install mechanical-anchor (stud-wedge or female wedge type) bolts in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions. Concrete inserts and mechanical-anchor fasteners shall be made of steel. Stainless steel for outdoor applications.
- C. Hanger Materials: Galvanized, sheet steel or round, threaded steel rod.
  - 1. Hangers Installed in Corrosive Atmospheres: Electrogalvanized, all-thread rod or galvanized rods with threads painted after installation.
  - 2. Straps and Rod Sizes: Comply with SMACNA "HVAC Duct Construction Standards--Metal and Flexible" for sheet steel width and thickness and for steel rod diameters.
- D. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.
- E. Trapeze and Riser Supports: Steel shapes complying with ASTM A 36/A 36M.
  - 1. Supports for Galvanized-Steel Ducts: Galvanized steel shapes and plates.
  - 2. Supports for Stainless-Steel Ducts: Stainless-steel support materials.
  - 3. Supports for Aluminum Ducts: Aluminum support materials, unless materials are electrolytically separated from ductwork.

**2.5 RECTANGULAR DUCT AND FITTING FABRICATION**

- A. General: Fabricate ducts, elbows, transitions, offsets, branch connections, and other construction with galvanized, sheet steel, according to SMACNA "HVAC Duct Construction Standards--Metal and Flexible," based on indicated static pressure class, unless indicated otherwise. Comply with requirements for metal thickness, reinforcing types and intervals, tie-rod applications, and joint types and intervals.
  - 1. Lengths: Fabricate rectangular ducts in lengths appropriate to reinforcement and rigidity class required for pressure classification.
  - 2. Materials: Free from visual imperfections such as pitting, seam marks, roller marks, stains, and discolorations.
  - 3. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-4, "Transverse (Girth) Joints," for static-pressure class, applicable sealing

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requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

- a. Prefabricated transverse joints shall comply SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," for static-pressure class, leakage rating.
    - 1) Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      - a) Duct Mate Industries, Inc.
      - b) Ward Flange.
  4. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-5, "Longitudinal Seams - Rectangular Ducts," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
  5. Material Thickness: For SMACNA "HVAC Duct Construction Standard – Metal and Flexible," but not less than 26 gauge.
- B. Cross Breaking or Cross Beading: Cross break or cross bead duct sides 19 inches and larger and 0.0359 inch thick or less, with more than 10 sq. ft. of unbraced panel area, unless ducts are lined.
- C. Elbow Configuration:
1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Elbows."
    - a. Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
    - b. Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
    - c. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows."
- D. Branch Configuration:
1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-6, "Branch Connections."
    - a. Rectangular Main to Rectangular Branch: 45-degree entry.

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- b. Rectangular Main to Round Branch: Conical or Bellmouth.

**2.6 SHOP APPLICATION OF LINER IN RECTANGULAR DUCTS**

- A. Adhere a single layer of indicated thickness of duct liner with 90 percent coverage of adhesive at liner contact surface area. Multiple layers of insulation to achieve indicated thickness is not allowed.
- B. Apply adhesive to liner facing in direction of airflow not receiving metal nosing.
- C. Butt transverse joints without gaps and coat joint with adhesive.
- D. Fold and compress liner in corners of rectangular ducts or cut and fit to ensure butted-edge overlapping.
- E. Do not apply liners in rectangular ducts with longitudinal joints, except at corners of ducts, unless duct size and standard liner product dimensions make longitudinal joints necessary.
- F. Secure liner with mechanical fasteners 4 inches from corners and at intervals not exceeding 12-inches transversely around perimeter; at 3 inches from transverse joints and at intervals not exceeding 18 inches longitudinally.
- G. Secure transversely oriented liner edges facing the airstream with metal nosings that have either channel or "Z" profile or are integrally formed from duct wall. Fabricate edge facings at the following locations:
  - 1. Fan discharge.
  - 2. Intervals of lined duct preceding unlined duct.
- H. Additional liner requirements for duct velocities over 2500 fpm (12.7 m/s)
  - 1. Apply adhesive coating on longitudinal seams in ducts with air velocity of 2500 fpm (12.7 m/s).
  - 2. Upstream edges of transverse joints in ducts with metal nosings that have either channel or "Z" profile or are integrally formed from duct wall.
  - 3. Secure insulation liner with perforated sheet metal liner of same metal thickness as specified for duct, secured to ducts with mechanical fasteners that maintain metal liner distance from duct without compressing insulation.
  - 4. Sheet Metal Liner Perforations: 3/32-inch diameter, with an overall open area of 23 percent.
- I. Terminate liner with duct buildouts installed in ducts to attach dampers, turning vane assemblies, and other devices. Fabricated buildouts (metal hat sections) or other buildout means are optional; when used, secure buildouts to duct wall

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with bolts, screws, rivets, or welds. Terminate liner at fire dampers at connection to fire-damper sleeve.

**2.7 ROUND DUCT FABRICATION**

- A. General: Diameter as applied to flat-oval ducts in this Article is the diameter of the size of round duct that has a circumference equal to perimeter of a given size of flat-oval duct. Minimum 26-gauge duct wall thickness.
- B. Round Ducts: Fabricate supply ducts of galvanized steel according to SMACNA "HVAC Duct Construction Standards--Metal and Flexible," unless indicated otherwise.
- C. Double-Wall (Insulated) Ducts: Fabricate double-wall (insulated) ducts with an outer shell and an inner liner. Dimensions indicated on internally insulated ducts are inside dimensions.
  - 1. Thermal Conductivity (k-Value): 0.26 at 75 deg F mean temperature.
  - 2. Outer Shell: Base outer-shell metal thickness on actual outer-shell dimensions. Fabricate outer-shell lengths 2 inches longer than inner shell and insulation, and in metal thickness specified for single-wall duct.
  - 3. Insulation: 1-inch-thick fibrous-glass insulation, unless otherwise indicated. Terminate insulation where internally insulated duct connects to single-wall duct or uninsulated components. Terminate insulation and reduce outer duct diameter to inner liner diameter.
  - 4. Solid Inner Liner: Fabricate round and flat-oval inner liners with solid sheet metal of thickness listed below:
  - 5. Maintain concentricity of liner to outer shell by mechanical means. Retain insulation from dislocation by mechanical means.
- D. Elbow Configuration:
  - 1. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-3, "Round Duct Elbows."
    - a. Round Elbows, 8 Inches and Smaller: Fabricate stamped elbows for 45- and 90-degree elbows and pleated elbows for 30-, and 60-degree elbows. Stamped elbows shall be 20 gauge thick minimum with two-piece welded construction. Fabricate nonstandard bend-angle configuration or nonstandard diameter elbows with mitered construction.
    - b. Round Elbows, 9 through 12 Inches: Fabricate segmented (mitered) or pleated elbows for 30, 45, 60, and 90 degrees. Fabricate non-



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standard bend-angle configuration or nonstandard diameter elbows with mitered construction.

- c. Round Elbows, Larger than 12-Inches: Segmented (mitered) elbows for all bend angle configurations.
- d. Round Elbows, Segmented (mitered) Two-Piece 90-Degree: Use only where specifically indicated. Fabricate with single turning vane.
- e. Flat Oval Elbows: Segmented (mitered) type.

E. Branch Configuration:

- 1. Round and Flat Oval: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "90 Degree Tees and Laterals," and Figure 3-5, "Conical Tees." Saddle taps are not permitted.

- a. 90-degree Tee Fittings:

- 1) Main to Branch (branch greater than  $\frac{2}{3}$  the diameter of main or 12-inch diameter branch): Use 90 degree conical tee fitting. 90-degree conical taps or 90-degree lateral fittings can be used for all others.
- 2) 45 degree lateral tee and 45-degree elbow in lieu of 90-degree tee fitting or tap on supply ductwork where space allows.

- b. 45-degree Tee Fittings:

- 1) Main to Branch (branch greater than  $\frac{2}{3}$  the diameter of main or 12-inch diameter branch): Use 45-degree lateral fitting. 45-degree lateral taps or 45-degree lateral can be used for all others.

2.8 ROUND SUPPLY AND EXHAUST FITTING FABRICATION

A. 90-Degree Tee Fittings and Taps: Fabricate to comply with SMACNA "HVAC Duct Construction Standards--Metal and Flexible," with metal thicknesses specified for longitudinal seam straight duct.

B. Diverging-Flow Fittings: Fabricate with a reduced entrance to branch taps with no excess material projecting from body onto branch tap entrance.

C. Round Elbow Construction: Fabricate in die-stamped, pleated, or mitered construction as indicated above. Fabricate bend radius of elbows to one and one-half times elbow diameter. Unless elbow construction type is indicated otherwise, fabricate elbows as follows:

- 1. Mitered Elbow Pieces: Welded construction with 5-pieces for 90-degree elbow, 4-pieces for 60-degree elbow and 3-pieces for 45-degree elbow.

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2. Metal Thickness, Pressure Classes from Minus 2- to Plus 2-inch wg:
  - a. Ducts 3 to 26 Inches in Diameter: 24-gauge.
  - b. Ducts 27 to 36 Inches in Diameter: 22-gauge.
  - c. Ducts 37 to 50 Inches in Diameter: 20-gauge.
  - d. Ducts 52 to 60 Inches in Diameter: 18-gauge.
  - e. Ducts 62 to 84 Inches in Diameter: 16-gauge.
  
3. Metal Thickness, Pressure Classes from Minus 2- to 10-inch wg:
  - a. Ducts 3 to 14 Inches in Diameter: 24-gauge.
  - b. Ducts 15 to 26 Inches in Diameter: 22-gauge.
  - c. Ducts 27 to 50 Inches in Diameter: 20-gauge.
  - d. Ducts 52 to 60 Inches in Diameter: 18-gauge.
  - e. Ducts 62 to 84 Inches in Diameter: 16-gauge.
  
- D. Double-Wall (Insulated) Fittings: Fabricate double-wall (insulated) fittings with an outer shell and an inner liner. Dimensions indicated on internally insulated ducts are inside dimensions.
  1. Thermal Conductivity (k-Value): 0.26 at 75 deg F mean temperature.
  2. Outer Shell: Base outer-shell metal thickness on actual outer-shell dimensions. Fabricate outer-shell lengths 2 inches longer than inner shell and insulation. Use the same metal thicknesses for outer duct as for un-insulated fittings.
  3. Insulation: 1-inch-thick fibrous-glass insulation, unless otherwise indicated. Terminate insulation where internally insulated duct connects to single-wall duct or uninsulated components. Terminate insulation and reduce outer duct diameter to nominal single-wall size.
  4. Solid Inner Liner: Fabricate round and flat-oval inner liners with solid sheet metal of thickness listed below:
  5. Perforated Inner Liner: Fabricate round and flat-oval inner liners with sheet metal having 3/32-inch-diameter perforations, with an overall open area of 23 percent. Use the following sheet metal thicknesses:
    - a. Ducts 3 to 34 Inches in Diameter: 24-gauge.
    - b. Ducts 35 to 58 Inches in Diameter: 22-gauge.
    - c. Ducts 60 to 88 Inches in Diameter: 20-gauge.
  6. Maintain concentricity of liner to outer shell by mechanical means. Retain insulation from dislocation by mechanical means.
  
- E. Elbow Configuration:
  1. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-3, "Round Duct Elbows."

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- a. Round Elbows, 8 Inches and Smaller: Fabricate stamped ~~die-formed~~ elbows for 45- and 90-degree elbows and pleated elbows for 30-, and 60-degree elbows. Stamped ~~Die formed elbows~~ shall be 20 gauge thick minimum with two-piece welded construction. Fabricate nonstandard bend-angle configuration or nonstandard diameter elbows with mitered construction.
- b. Round Elbows, 9 through 12 Inches: Fabricate segmented (mitered) or pleated elbows for 30, 45, 60, and 90 degrees. Fabricate nonstandard bend-angle configuration or nonstandard diameter elbows with mitered construction.
- c. Round Elbows, Larger than 12-Inches: Segmented (mitered) elbows for all bend angle configurations.
- d. Round Elbows, Segmented (mitered) Two-Piece 90-Degree: Use only where specifically indicated. Fabricate with single turning vane.
- e. Flat Oval Elbows: Segmented (mitered) type.

F. Branch Configuration:

1. Round and Flat Oval: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "90 Degree Tees and Laterals," and Figure 3-5, "Conical Tees." Saddle taps are not permitted.
  - a. 90-degree Tee Fittings:
    - 1) Main to Branch (branch greater than  $\frac{2}{3}$  the diameter of main or 12-inch diameter branch): Use 90 degree conical tee fitting. 90-degree conical taps or 90-degree lateral fittings can be used for all others.
    - 2) 45 degree lateral tee and 45-degree elbow in lieu of 90-degree tee fitting or tap on supply ductwork where space allows.
  - b. 45-degree Tee Fittings:
    - 1) Main to Branch (branch greater than  $\frac{2}{3}$  the diameter of main or 12-inch diameter branch): Use 45-degree lateral fitting. 45-degree lateral taps or 45-degree lateral can be used for all others.

PART 3 - EXECUTION

3.1 DUCT INSTALLATION, GENERAL

- A. Duct installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of ducts, fittings, and accessories.

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- B. Provide access panels every 50 feet on all medium pressure ductwork for inspection and duct clearing.
- C. Construct and install each duct system for the specific duct pressure classification indicated.
- D. Install round and flat-oval ducts in lengths not less than 12 feet, unless interrupted by fittings.
- E. Install ducts with fewest possible joints.
- F. Install fabricated fittings for changes in directions, changes in size and shape, and connections.
- G. Install couplings tight to duct wall surface with a minimum of projections into duct.
- H. Install ducts, unless otherwise indicated, vertically and horizontally, parallel and perpendicular to building lines; avoid diagonal runs.
- I. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.
- J. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.
- K. Conceal ducts from view in finished spaces. Do not encase horizontal runs in solid partitions, unless specifically indicated.
- L. Coordinate layout with suspended ceiling, fire- and smoke-control dampers, lighting layouts, and similar finished work. Allow for post-construction access to air terminals, volume dampers, and other components requiring maintenance and/or readjustment.
- M. Electrical Equipment Spaces: Route ductwork to avoid passing through transformer vaults and electrical equipment spaces and enclosures, unless ductwork is intended to serve these spaces.
- N. Non-Fire-Rated Partition Penetrations: Where ducts pass through interior partitions and exterior walls, and are exposed to view, conceal space between construction opening and duct or duct insulation with sheet metal flanges of same metal thickness as duct. Overlap opening on four sides by at least 1-1/2 inches.
- O. Fire-Rated Partition Penetrations: Where ducts pass through interior partitions and exterior walls, install appropriately rated combination fire/smoke damper or fire damper sleeve, and firestopping sealant. Fire, smoke and combination fire/smoke dampers are specified in Division 23 Section "Duct Accessories."

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Firestopping materials and installation methods are specified in Division 07 Section "Firestopping."

**3.2 SEALING**

- A. General: Seal duct seams and joints according to the duct seal class described in SMACNA "HVAC Duct Construction Standards--Metal and Flexible" corresponding to the pressure class given below.
- B. Pressure Classification:
  - 1. 3-inch wg and Greater: Seal Class A; all transverse joints, longitudinal seams and duct wall penetrations.
  - 2. Below 3-inch wg: Seal Class B; all transverse joints and longitudinal seams.
- C. Seal externally insulated ducts before insulation installation.

**3.3 HANGING, RESTRAINING, AND SUPPORTING**

- A. Install rigid round, rectangular, and flat-oval metal duct with support systems indicated in SMACNA "HVAC Duct Construction Standards--Metal and Flexible."
- B. Install duct seismic restraints as indicated in Division 23, Section "Vibration and Seismic Controls for Mechanical Piping and Equipment."
- C. Support horizontal ducts within 24 inches of each elbow and within 48 inches of each branch intersection.
- D. Support vertical ducts at a maximum interval of 16 feet and at each floor.
- E. Install upper attachments to structures with an allowable load not exceeding one-fourth of failure (proof-test) load.
- F. Install concrete inserts before placing concrete.
- G. Install mechanical-anchor fasteners after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

**3.4 CONNECTIONS**

- A. Unless indicated otherwise, connect metal ducts to rotating equipment with flexible connectors according to Division 23 Section "Duct Accessories."

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- B. For branch, outlet and inlet, and terminal unit connections, comply with SMACNA "HVAC Duct Construction Standards--Metal and Flexible," unless indicated otherwise.

**3.5 FIELD QUALITY CONTROL**

**A. Leakage Test:**

1. Disassemble, reassemble, and seal segments of systems as required to accommodate leakage testing and as required for compliance with test requirements.
2. Conduct tests, in presence of Architect, at static pressures equal to maximum design pressure of system or section being tested. If pressure classifications are not indicated, test entire system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure. Give seven days' advance notice for testing. Test ducts in shafts prior to shaft enclosure.
3. Determine leakage from entire system or section of system by relating leakage to surface area of test section.
4. Maximum Allowable Leakage: Comply with requirements for Leakage Classification 3 for round and flat-oval ducts, Leakage Classification 12 for rectangular ducts in pressure classifications less than and equal to 2-inch wg (both positive and negative pressures), and Leakage Classification 6 for pressure classifications from 2- to 10-inch wg.
5. Remake leaking joints and retest until leakage is less than maximum allowable.
6. Leakage Test: Perform tests according to SMACNA "HVAC Air Duct Leakage Test Manual." Submit test report.

**B. Duct System Cleanliness Tests:**

1. Visually inspect duct system to ensure that no visible contaminants are present.
2. Test sections of metal duct system, chosen randomly by Owner, for cleanliness according to "Vacuum Test" in NADCA ACR, "Assessment, Cleaning and Restoration of HVAC Systems."
  - a. Acceptable Cleanliness Level: Net weight of debris collected on the filter media shall not exceed 0.75 mg/100 sq. cm.

- C. Duct system will be considered defective if it does not pass tests and inspections.

- D. Prepare test and inspection reports.

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E. Leakage Test: Perform tests according to SMACNA "HVAC Air Duct Leakage Test Manual." Submit test report for the following:

1. Ductwork constructed with a duct static pressure classification greater than 3-inch w.g.

**3.6 ADJUSTING**

A. Refer to Division 23 Section "Testing, Adjusting, and Balancing for HVAC" for detailed procedures.

**3.7 DUCT CLEANING**

A. Clean new duct system(s) before testing, adjusting, and balancing.

B. Use service openings for entry and inspection.

1. Create new openings and install access panels appropriate for duct static-pressure class if required for cleaning access. Provide insulated panels for insulated or lined duct. Patch insulation and liner as recommended by duct liner manufacturer. Comply with Division 23 Section "Air Duct Accessories" for access panels and doors.
2. Disconnect and reconnect flexible ducts as needed for cleaning and inspection.
3. Remove and reinstall ceiling to gain access during the cleaning process.

C. Particulate Collection and Odor Control:

1. When venting vacuuming system inside the building, use HEPA filtration with 99.97 percent collection efficiency for 0.3-micron-size (or larger) particles.
2. When venting vacuuming system to outdoors, use filter to collect debris removed from HVAC system, and locate exhaust downwind and away from air intakes and other points of entry into building.

D. Clean the following components by removing surface contaminants and deposits:

1. Air outlets and inlets (registers, grilles, and diffusers).
2. Supply, return, and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.
3. Air-handling unit internal surfaces and components including mixing box, coil section, air wash systems, spray eliminators, condensate drain pans,

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humidifiers and dehumidifiers, filters and filter sections, and condensate collectors and drains.

4. Coils and related components.
5. Return-air ducts, dampers, actuators, and turning vanes except in ceiling plenums and mechanical equipment rooms.
6. Supply-air ducts, dampers, actuators, and turning vanes.
7. Dedicated exhaust and ventilation components and makeup air systems.

E. Mechanical Cleaning Methodology:

1. Clean metal duct systems using mechanical cleaning methods that extract contaminants from within duct systems and remove contaminants from building.
2. Use vacuum-collection devices that are operated continuously during cleaning. Connect vacuum device to downstream end of duct sections so areas being cleaned are under negative pressure.
3. Use mechanical agitation to dislodge debris adhered to interior duct surfaces without damaging integrity of metal ducts, duct liner, or duct accessories.
4. Clean fibrous-glass duct liner with HEPA vacuuming equipment; do not permit duct liner to get wet. Replace fibrous-glass duct liner that is damaged, deteriorated, or delaminated or that has friable material, mold, or fungus growth.
5. Clean coils and coil drain pans according to NADCA 1992. Keep drain pan operational. Rinse coils with clean water to remove latent residues and cleaning materials; comb and straighten fins.
6. Provide drainage and cleanup for wash-down procedures.
7. Antimicrobial Agents and Coatings: Apply EPA-registered antimicrobial agents if fungus is present. Apply antimicrobial agents according to manufacturer's written instructions after removal of surface deposits and debris.

3.8 DUCT SCHEDULE

A. Fabricate ducts with galvanized sheet steel.

B. Intermediate Reinforcement:

1. Galvanized-Steel Ducts: Galvanized steel.
2. Stainless-Steel Ducts: Galvanized steel.
3. Aluminum Ducts: Aluminum or galvanized sheet steel coated with zinc chromate.

C. Liner:



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1. Supply-Air Ducts: Fibrous glass, 1 inch thick. Use perforated metal liner for all supply ducts above 2500 fpm.
2. Return-Air Ducts: Fibrous glass, 1 inch thick, unless noted otherwise.
3. Exhaust Air: Fibrous glass, 1 inch thick, unless noted otherwise.
4. Outdoor Return-Air and Fan Plenum: Fibrous glass, 2 inches thick, unless noted otherwise.
5. Transfer Ducts: Fibrous glass, 1 inch thick, unless noted otherwise.

END OF SECTION

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Related Sections include the following:
  - 1. Division 08 Section "Access Doors and Frames" for wall- and ceiling-mounted access doors and panels.
  - 2. Division 08 Section "Louvers and Vents" for intake and relief louvers and vents connected to ducts and installed in exterior walls.
  - 3. Division 23 Section "Metal Ducts" for ductwork, duct liner and duct sealants.
  - 4. Division 23 Section "Air Terminal Units" for air terminals.
  - 5. Division 23 Section "Diffusers, Registers, and Grilles."
  - 6. Division 15 Section "Testing, Adjusting, and Balancing for HVAC" for final positioning of manual-volume dampers.
  - 7. Division 28 Section "Fire Detection and Alarm" for duct-mounted fire and smoke detectors.

1.2 SUMMARY

- A. This Section includes the following:
  - 1. Backdraft dampers.
  - 2. Manual-volume dampers.
  - 3. Fire dampers.
  - 4. Ceiling fire dampers.
  - 5. Smoke dampers.
  - 6. Combination fire/smoke dampers.
  - 7. Duct silencers.
  - 8. Roof ventilation hoods.
  - 9. Turning vanes.
  - 10. Duct-mounted access doors.
  - 11. Flexible ducts.
  - 12. Flexible connectors.
  - 13. Screened openings.
  - 14. Duct accessory hardware.

1.3 SUBMITTALS

- A. Product Data: For the following:

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1. Backdraft dampers.
2. Manual-volume dampers.
3. Fire, smoke and combination fire/smoke dampers.
4. Ceiling fire dampers.
5. Duct silencers.
6. Duct-mounted access doors and panels.
7. Flexible connectors.
8. Flexible ducts.
9. Roof ventilation hoods.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loadings, required clearances, method of field assembly, components, location, and size of each field connection. Detail the following:

1. Special fittings and manual-volume-damper installations.
2. Fire- and smoke-damper installations, including sleeves and duct-mounted access doors and panels.

C. Product Certificates: Submit certified test data on dynamic insertion loss; self-noise power levels; and airflow performance data, static-pressure loss, dimensions, and weights.

#### 1.4 QUALITY ASSURANCE

A. NFPA Compliance: Comply with the following NFPA standards:

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

#### 1.5 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.

1. Fusible Links: Furnish quantity equal to 10 percent of amount installed.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

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

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1. Backdraft Dampers:
  - a. Ruskin.
  - b. American Warming & Ventilating.
  - c. Greenheck.
  
2. Fire Dampers:
  - a. Ruskin.
  - b. Air Balancing, Inc.
  - c. Greenheck.
  - d. National Controlled Air.
  
3. Smoke Dampers:
  - a. Ruskin.
  - b. Air Balancing, Inc.
  - c. Greenheck.
  - d. National Controlled Air.
  
4. Ceiling Fire Dampers:
  - a. Ruskin.
  - b. Air Balancing, Inc.
  - c. Greenheck.
  - d. National Controlled Air.
  
5. Combination Fire/Smoke Dampers:
  - a. Ruskin.
  - b. Air Balance, Inc.
  - c. Greenheck.
  - d. National Controlled Air.
  
6. Duct Silencers:
  - a. Industrial Acoustics Company.
  - b. Rink.
  - c. Vibro-Acoustics.
  - d. Dynasonics.
  - e. Semco.
  
7. Roof Ventilation Hoods:
  - a. Penn Ventilator.
  - b. Cook.
  - c. Greenheck.
  - d. Ruskin.

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**2.2 SHEET METAL MATERIALS**

- A. Galvanized, Sheet Steel: Lock-forming quality; ASTM A 653/A 653M, G90 coating designation; mill-phosphatized finish for surfaces of ducts exposed to view.
- B. Carbon-Steel Sheets: ASTM A 366/A 366M, cold-rolled sheets, commercial quality, with oiled, exposed matte finish.
- C. Aluminum Sheets: ASTM B 209, Alloy 3003, Temper H14, sheet form; with standard, one-side bright finish for ducts exposed to view and mill finish for concealed ducts.
- D. Extruded Aluminum: ASTM B 221, Alloy 6063, Temper T6.
- E. Reinforcement Shapes and Plates: Galvanized steel reinforcement where installed on galvanized, sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.
- F. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for 36-inch length or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

**2.3 BACKDRAFT DAMPERS**

- A. Description: Suitable for horizontal or vertical installations as indicated.
- B. Counterbalance Type: Extruded aluminum with counterbalanced blades; blades begin to open at minimum 0.01 inches w.g. and be fully open at minimum 0.05 inches w.g. Designed for maximum 3500 feet per minute spot velocity and up to 4-inches w.g. back pressure.
  - 1. Frame: Minimum 0.125 inches thick extruded aluminum, braced at corners.
  - 2. Blades: Minimum 0.070 inches thick extruded aluminum. Blade seals extruded vinyl, mechanically attached.
  - 3. Bearings: Corrosion resistant, long life synthetic.
  - 4. Linkage: 1/2-inch diameter tie bar with stainless steel pivot pins; mounted on blades. Adjustable counterbalance.
- C. Top-of-Blade Hinged Type: Extruded aluminum heavy duty backdraft dampers; blades begin to open at minimum 0.12 inches w.g. and be fully open at minimum of 0.20 inches w.g. Designed for maximum 3500 feet per minute spot velocity.
  - 1. Frame: Minimum 0.125 inches thick extruded aluminum, braced at corners.

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2. Blades: Minimum 0.70 inches thick extruded aluminum. Blade seals extruded vinyl, mechanical attached.
3. Bearings: Corrosion resistant, long life, synthetic.
4. Linkage: 1/2-inch diameter tie bar with stainless steel pivot pins; mounted on blades.

**2.4 MANUAL-VOLUME DAMPERS**

- A. General: Factory fabricated with required hardware and accessories. Stiffen damper blades for stability. Include locking device to hold single-blade dampers in a fixed position without vibration. Close duct penetrations for damper components to seal duct consistent with pressure class.
  1. Pressure Classifications of 3-Inch wg or Higher: End bearings or other seals for ducts with axles full length of damper blades and bearings at both ends of operating shaft.
- B. Steel Standard Volume Dampers: Multiple- or single-blade, opposed-blade design unless indicated otherwise, standard leakage rating, with linkage outside airstream, and suitable for horizontal or vertical applications.
  1. Steel Frames: Hat-shaped, galvanized, sheet steel channels, minimum of 16 gauge thick, with mitered and welded corners; frames with flanges where indicated for attaching to walls; and flangeless frames where indicated for installing in ducts.
  2. Roll-Formed Steel Blades: 16 gauge thick, galvanized, sheet steel.
  3. Blade Axles: Galvanized steel.
  4. Tie Bars and Brackets: Galvanized steel.
- C. Aluminum Standard Volume Dampers: Multiple- or single-blade, opposed-blade design unless indicated otherwise, standard leakage rating, with linkage outside airstream, and suitable for horizontal or vertical applications.
  1. Aluminum Frames: Hat-shaped, 0.10-inch thick, aluminum sheet channels; frames with flanges where indicated for attaching to walls; and flangeless frames where indicated for installing in ducts.
  2. Aluminum Blades: [Roll-formed 0.10-inch thick aluminum sheet][Extruded 0.050-inch thick extruded aluminum].
  3. Blade Axles: Nonferrous.
  4. Tie Bars and Brackets: Aluminum.
- D. Steel Low-Leakage Volume Dampers: Multiple- or single-blade, opposed-blade design unless indicated otherwise, low-leakage rating, with linkage outside airstream, and suitable for horizontal or vertical applications.

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1. Steel Frames: Hat-shaped, galvanized, sheet steel channels, minimum of 16 gauge thick, with mitered and welded corners; frames with flanges where indicated for attaching to walls; and flangeless frames where indicated for installing in ducts.
  2. Roll-Formed Steel Blades: 16 gauge thick, galvanized, sheet steel.
  3. Blade Seals: [Felt][Vinyl][Neoprene].
  4. Blade Axles: Galvanized steel.
  5. Tie Bars and Brackets: Galvanized steel.
- E. Aluminum Low-Leakage Volume Dampers: Multiple- or single-blade, opposed-blade design unless indicated otherwise, low-leakage rating, with linkage outside airstream, and suitable for horizontal or vertical applications.
1. Aluminum Frames: Hat-shaped, 0.063-inch thick, extruded-aluminum channels; frames with flanges where indicated for attaching to walls; and flangeless frames where indicated for installing ducts.
  2. Aluminum Blades: [Roll-formed 0.10-inch thick aluminum sheet][Extruded 0.050-inch thick extruded aluminum].
  3. Blade Seals: [Felt][Vinyl][Neoprene].
  4. Blade Axles: Nonferrous.
  5. Tie Bars and Brackets: Aluminum.
- F. Steel High-Performance Volume Dampers: Multiple- or single-blade, opposed-blade design unless indicated otherwise, low-leakage rating, with linkage outside airstream, and suitable for horizontal or vertical applications.
1. Steel Frames: Hat-shaped, galvanized steel channels, minimum of 0.064 inch thick, with mitered and welded corners; frames with flanges where indicated for attaching to walls; and flangeless frames where indicated for installing in ducts.
  2. Steel Blades: 18 gauge thick, galvanized, sheet steel; airfoil shaped.
  3. Blade Seals: Dual-durometer vinyl on blade edges; metallic compression on jambs.
  4. Blade Axles: Galvanized steel.
  5. Tie Bars and Brackets: Galvanized steel.
- G. High-Performance Volume Dampers: Multiple- or single-blade, opposed-blade design unless indicated otherwise, low-leakage rating, with linkage outside airstream, and suitable for horizontal or vertical applications.
1. Aluminum Frames: Hat-shaped, 0.125-inch thick, extruded-aluminum channels; frames with flanges where indicated for attaching to walls; and flangeless frames where indicated for installing in ducts.
  2. Extruded-Aluminum Blades: Minimum of 0.081-inch thick, 6063T extruded aluminum.
  3. Blade Seals: Dual-durometer vinyl on blade edges; metallic compression on jambs.

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4. Blade Axles: Nonferrous.
  5. Tie Bars and Brackets: Aluminum.
- H. Jackshaft: 1-inch diameter, galvanized steel pipe rotating within a pipe-bearing assembly mounted on supports at each mullion and at each end of multiple-damper assemblies.
1. Length and Number of Mountings: Appropriate to connect linkage of each damper of a multiple-damper assembly.
- I. Damper Regulators: Zinc-plated, die-cast core with dial and handle made of 3/32-inch-thick zinc-plated steel, and a 3/4-inch hexagon locking nut. Include center hole to suit damper operating-rod size. Include elevated platform for insulated duct mounting.

**2.5 FIRE DAMPERS**

- A. General: Labeled to UL 555. "Standard for Fire Dampers" for use in dynamic systems. Damper shall close with air velocity of 2375 fpm and 4-inch w.g. static pressure with airflow horizontal, airflow up or airflow down.
- B. Fire Rating: [1-1/2 hours][1-1/2 and 3 hours].
- C. Frame: SMACNA Type B with blades out of airstream; fabricated with roll-formed, minimum 20-gauge thick galvanized steel; with mitered and interlocking corners.
- D. Mounting Sleeve: Factory- or field-installed galvanized, sheet steel.
1. Minimum Thickness: 20-gauge or 0.138 inch thick as indicated, and length to suit application. Provide retaining angles.
  2. Exceptions: Omit sleeve where damper frame width permits direct attachment of perimeter mounting angles on each side of wall or floor, and thickness of damper frame complies with sleeve requirements.
- E. Mounting Orientation: Vertical or horizontal as indicated.
- F. Blades: Roll-formed, interlocking, minimum 24-gauge thick, galvanized, sheet steel. In place of interlocking blades, use full-length, minimum 24-gauge thick, galvanized steel blade connectors.
- G. Closure Spring: Include stainless-steel constant force closure spring.
- H. Fusible Link: Replaceable, 165 deg F rated unless specifically indicated, 212 deg F or 285 deg F.



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**2.6 CEILING FIRE DAMPERS**

- A. General: Labeled to UL 555C "Ceiling Dampers"; comply with construction details for tested floor- and roof-ceiling assemblies as indicated in UL's "Fire Resistance Directory."
- B. Frame: Minimum 20-gauge thick, galvanized, sheet steel; round or rectangular; style to suit ceiling construction.
- C. Blades: Minimum 22-gauge thick, galvanized, sheet steel with U.L. Classified nonasbestos refractory insulation.
- D. Volume Adjustment: UL-labeled, fusible volume-control adjustment.
- E. Fusible Link: Replaceable, 165 deg F rated unless specifically indicated, 212 deg F or 285 deg F.

**2.7 SMOKE DAMPERS**

- A. General: Labeled to UL 555S. Dampers shall have the ability to operate against pressures up to 4-inches w.g. and velocities up to 2,000 fpm. Class I leakage rating. Controlled gradual closure between 10 and 15 seconds. Automatic remote reset after test, smoke detection, or power failure.
- B. Temperature Rating: 350 degrees F.
- C. Frame: Minimum 16-gauge thick, galvanized, sheet steel.
- D. Blades: Minimum 14-gauge thick, galvanized sheet steel. Airfoil type blades. Flexible stainless steel compression type joint seals. Silicone blade edge seals capable of withstanding 450 degrees F. Opposed blade action.
- E. Mounting Sleeve: Factory-installed, minimum 18-gauge thick, galvanized, sheet steel; length to suit wall or floor application.
- F. Blade Position Indicator Switch: Provide blade position two-position indicator switch for remote monitoring of blade position.
- G. Damper Motors: Provide for two-position action.
  - 1. Permanent-Split-Capacitor or Shaded-Pole Motors: With oil-immersed and sealed gear trains.
  - 2. Spring-Return Motors: Equip with an integral spiral-spring mechanism where indicated. Enclose entire spring mechanism in a removable housing designed for service or adjustments. Size for running torque rating of 150 in. x lbf and breakaway torque rating of 150 in. x lbf.

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3. Outdoor Motors and Motors in Outside-Air Intakes: Equip with O-ring gaskets designed to make motors weatherproof. Equip motors with internal heaters to permit normal operation at minus 40 deg F.
4. Two-Position Motor: 115 V, single phase, 60 Hz.

**2.8 COMBINATION FIRE/SMOKE DAMPERS**

- A. General: Labeled to UL 555 "Standard for Fire Damper" for 1-1/2 or 3 hour fire damper. Labeled to UL 555S "Standard for Leakage Rated Dampers for use in Smoke Control Systems". Open and close under operating conditions up to 4-inches w.g. in closed position and 4000 fpm in open position. Class I leakage rating. Controlled gradual closure between 10 and 15 seconds. Automatic remote reset after test, smoke detection or power failure.
- B. Fire Rating: [1-1/2 hours][1-1/2 and 3 hours].
- C. Fusible Link: Replaceable, 165 deg F rated unless specifically indicated 212 deg F or 285 deg F.
- D. Frame: Minimum 16-gauge thick, galvanized, sheet steel.
- E. Blades: Minimum 14-gauge single piece airfoil construction. Opposed blade action, unless indicated specifically parallel. Stainless steel bearings. Flexible stainless steel compression type joints seals. Silicone blade edge seals, capable of withstanding 450 deg F.
- F. Mounting Sleeve: Factory-installed, minimum 20-gauge thick, galvanized, sheet steel; length to suit wall or floor application.
- G. Blade Position Indicator Switch: Provide blade position two-position indicator switch for remote monitoring of blade position.
- H. Damper Motors: Provide for two-position action.
  1. Permanent-Split-Capacitor or Shaded-Pole Motors: With oil-immersed and sealed gear trains.
  2. Spring-Return Motors: Equip with an integral spiral-spring mechanism where indicated. Enclose entire spring mechanism in a removable housing designed for service or adjustments. Size for running torque rating of 150 in. x lbf and breakaway torque rating of 150 in. x lbf.
  3. Outdoor Motors and Motors in Outside-Air Intakes: Equip with O-ring gaskets designed to make motors weatherproof. Equip motors with internal heaters to permit normal operation at minus 40 deg F.
  4. Two-Position Motor: 115 V, single phase, 60 Hz.

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2.9 DUCT SILENCERS

- A. General: Factory-fabricated and -tested, round or rectangular silencer with performance characteristics and physical requirements as indicated.
- B. Fire Performance: Adhesives, sealers, packing materials, and accessory materials shall have fire ratings not exceeding 25 for flame spread and 50 for smoke developed when tested according to ASTM E 84.
- C. Rectangular Units: Fabricate casings with a minimum of 22-gauge thick, solid sheet metal for outer casing and 26-gauge thick, perforated sheet metal for inner casing.
- D. Round Units: Casings with minimum sheet metal thicknesses for diameters listed below:
  - 1. Up to 24 Inches: 22-gauge.
  - 2. 26 through 40 Inches: 20-gauge.
  - 3. 42 through 52 Inches: 18-gauge.
  - 4. 54 through 60 Inches: 16-gauge.
  - 5. Casings fabricated of spiral lock-seam duct may be one size thinner than that indicated.
  - 6. Interior Partitions and Baffles: At least 22-gauge and designed for minimum aerodynamic losses.
- E. Sheet Metal Perforations: 1/8-inch diameter for inner casing and baffle sheet metal.
- F. Fibrous Acoustic-Fill Material: Inert and vermin-proof fibrous material, packed under not less than 15 percent compression. Bacteria and fungus resistant.
- G. Nonfibrous Acoustic-Fill Material: Moisture-proof nonfibrous material.
- H. Fibrous Acoustic-Fill Material with Film Lining: Inert and vermin proof fibrous material, packed under not less than 15 percent compression. Bacteria and fungus resistant. Fill material completely wrapped with Tedlar or Mylar film. The wrapped acoustic media separated from the perforated metal by an acoustically transparent spacer.
- I. Fabricate silencers to form rigid units that will not pulsate, vibrate, rattle, or otherwise react to system pressure variations. Silencer to withstand 8-inches w.g. differential pressure.
  - 1. Do not use nuts, bolts, and sheet metal screws for unit assemblies.
  - 2. Lock form and seal or continuously weld joints.
  - 3. Suspended Units: Factory-installed suspension hooks or lugs attached to frame in quantities and spaced to prevent deflection or distortion.

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4. Reinforcement: Cross or trapeze angles for rigid suspension.
- J. Source Quality Control: The following factory tests shall have been conducted on silencers identical to units required:
1. Acoustic Performance: Test according to ASTM E 477, with airflow in both directions through silencer.
  2. Record acoustic ratings, including dynamic insertion loss and self-noise power levels, for both forward flow (air and noise in same direction) and reverse flow (air and noise in opposite directions) with an airflow of at least 2000-fpm face velocity.
  3. Leak Test: Test units for airtightness at 200 percent of associated fan static pressure or 6-inch wg static pressure, whichever is greater.
  4. Aerodynamic Performance: Pressure drops not to exceed those indicated. Pressure drop measurements in accordance with ASTM E 477 for units identical for which acoustical data is presented.

**2.10 ROOF VENTILATION HOODS**

- A. General Description: Louvered penthouse, low silhouette hood, or low silhouette aluminum spun housing, curb base, and accessories. Rated for 20 psf wind/snow load.
- B. Housing: Heavy-gauge, removable, louvered or spun-aluminum, dome top and outlet baffle; square, one-piece, hinged, aluminum base.
- C. Accessories:
1. Bird Screens: Removable 1/2-inch mesh, 16-gauge, aluminum or brass wire.
  2. Insect Screens: Removable 1/8-inch mesh, aluminum or brass wire.
  3. Backdraft Dampers: Counterbalanced, parallel-blade, backdraft dampers mounted in curb base, factory set to close when fan stops. Provide where indicated.
  4. Roof Curbs: Prefabricated, heavy-gauge, galvanized steel; mitered and welded corners; 2-inch thick, rigid, fiberglass insulation adhered to inside walls; built-in cant and mounting flange for flat roof decks; and 2-inch wood nailer. Size as required to suit roof opening and fan base.

**2.11 TURNING VANES**

- A. Fabricate to comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible."

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- B. **Manufactured Turning Vanes:** Fabricate of 1-1/2-inch-wide, curved blades set 3/4 inch o.c.; support with bars perpendicular to blades set 2 inches o.c.; and set into side strips suitable for mounting in ducts.
- C. **Acoustic Turning Vanes:** Fabricate of airfoil-shaped aluminum extrusions with perforated faces and fibrous-glass fill.

#### **2.12 DUCT-MOUNTED ACCESS DOORS**

- A. **General:** Fabricate doors and panels airtight and suitable for duct pressure class. 14-inch by 14-inch, unless indicated otherwise.
- B. **Frame:** Unless indicated differently, minimum 24-gauge thick galvanized, sheet steel, with bend-over tabs and foam gaskets.
- C. **Door:** Double-wall, galvanized, sheet metal construction with insulation fill and thickness, and number of hinges and locks as indicated for duct pressure class. Include vision panel where indicated. Include piano hinge and cam latches. Multiple cam latches used on doors greater than 12-inches in height.
- D. **Seal around frame attachment to duct and door to frame with neoprene or foam rubber.**
- E. **Insulation:** 1-inch-thick, fibrous-glass.

#### **2.13 FLEXIBLE CONNECTORS**

- A. **General:** Flame-retarded or noncombustible fabrics, coatings, and adhesives complying with UL 181, Class 1. Fabricate designed to meet UL 214, NFPA 90A, airtight and waterproof.
- B. **Standard Metal-Edged Connectors:** Factory fabricated with a strip of fabric 3-inches wide attached to two strips of 3-inch-wide, minimum 24-gauge thick, galvanized, sheet steel or 0.032-inch aluminum sheets. Select metal compatible with connected ducts.
- C. **Extra-Wide Metal-Edged Connectors:** Factory fabricated with a strip of fabric 5-3/4 inches wide attached to two strips of 3-inch-wide, minimum 24-gauge thick, galvanized, sheet steel or 0.032-inch aluminum sheets. Select metal compatible with connected ducts.
- D. **Transverse Flanged Metal-Edged Connectors:** Factory fabricated with a strip of fabric 3-1/2 inches wide attached to two strips of 4-3/8-inch-wide, 24-gauge thick, galvanized, sheet steel or 0.032-inch aluminum sheets formed for flanged type connection. Select metal compatible with connected ducts.

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- E. Conventional, Indoor System Flexible Connector Fabric: Woven nylon/polyester blend with vinyl coating.
  - 1. Minimum Weight: 22 oz./sq. yd..
  - 2. Tensile Strength: 240 lbf/inch in the warp, and 220 lbf/inch in the filling.
  
- F. Conventional, Outdoor System Flexible Connector Fabric: Glass fabric double coated with a synthetic-rubber, weatherproof coating resistant to the sun's ultra-violet rays and ozone environment.
  - 1. Minimum Weight: 24 oz./sq. yd..
  - 2. Tensile Strength: 500 lbf/inch in the warp, and 500 lbf/inch in the filling.

**2.14 FLEXIBLE DUCTS**

- A. General: Comply with UL 181, Class 1, UMC Standard 6-1, and NFPA Standards 90A and 90B.
  
- B. Flexible Ducts, Insulated: Factory-fabricated, insulated, round duct, with an outer jacket enclosing 1-inch-thick, glass-fiber insulation around a continuous inner liner. Rated for maximum pressures of 6-inches w.g. positive and 1-inch w.g. negative.
  - 1. Reinforcement: Steel-wire helix encapsulated in inner liner.
  - 2. Outer Jacket: Glass-reinforced, silver Mylar with a continuous hanging tab, integral fibrous-glass tape, and nylon hanging cord.
  - 3. Inner Liner: Polyethylene film.
  
- C. Flexible Ducts, Uninsulated: Spiral-wound steel spring with reinforced flame-proof vinyl sheathing. Rated for maximum pressures of 10-inches w.g. positive and 2-inches w.g. negative and maximum velocity of 4000 fpm.

**2.15 SCREENED OPENINGS**

- A. Screened Openings: 16-gauge steel angle frame enclosing 1/2-inch mesh, 14-gauge galvanized steel wire screen.

**2.16 ACCESSORY HARDWARE**

- A. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pitot tube and other testing instruments, and length to suit duct insulation thickness.

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- B. Splitter Damper Accessories: Zinc-plated damper blade bracket; 1/4-inch, zinc-plated operating rod; and a duct-mounted, ball-joint bracket with flat rubber gasket and square-head set screw.
- C. Flexible Duct Clamps: Stainless-steel band with cadmium-plated hex screw to tighten band with a worm-gear action, in sizes 3 to 18 inches to suit duct size.
- D. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.
- E. Concealed Damper Regulators: Gear operated linkage, minimum 3/8-inch diameter, steel rod, chrome plated ceiling cover, flush mount.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Install duct accessories according to applicable details shown in SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for metal ducts.
- B. Volume Dampers:
  - 1. Install volume dampers at all diffuser and grille duct connections. Place as far upstream as layout and accessibility allow.
  - 2. Install manual volume dampers in lined duct; avoid damage to and erosion of duct liner.
- C. Concealed Damper Regulators: Install concealed damper regulators in locations where manual volume dampers are inaccessible above ceilings or behind walls.
- D. Damper Actuators: Actuators shall not be mounted in the air stream.
- E. Maximum length of flexible duct is six feet.
- F. Provide instrument test holes where indicated.
- G. Install combination fire/smoke, fire and smoke dampers according to manufacturer's UL-approved written instructions.
  - 1. Install fusible links in fire dampers.
- H. Install duct access panels for access to both sides of duct coils and every 50-feet of duct run for general inspection. Install duct access panels downstream from branch volume dampers, fire dampers, smoke dampers, combination fire/smoke dampers, turning vanes, and equipment.

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1. Install duct access panels to allow access to interior of ducts for cleaning, inspecting, adjusting, and maintaining accessories and terminal units.
  2. Install access panels on side of duct where adequate clearance is available.
- I. Label access doors according to Division 23 Section "Identification for HVAC Piping and Equipment."

**3.2 ADJUSTING**

- A. Adjust duct accessories for proper settings.
- B. Adjust fire and smoke dampers for proper action.
- C. Final positioning of manual-volume dampers is specified in Division 23 Section "Testing, Adjusting, and Balancing for HVAC."

END OF SECTION



**DIVISION 23 - MECHANICAL**  
**Section 23 34 19 – Packaged Air Handling Units**

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**PART 1 - GENERAL**

**1.1 GENERAL DESCRIPTION**

- A. This section includes the design, controls and installation requirements for the owner supplied, mechanical contractor installed packaged outdoor air handling units.

**1.2 QUALITY ASSURANCE**

- A. Unit shall be certified in accordance with UL Standard 1995/CSA C22.2 No. 236, Safety Standard for Heating and Cooling Equipment.
- B. Unit shall be safety certified by ETL and ETL US listed. Unit nameplate shall include the ETL/ETL Canada label.

**1.3 SUBMITTALS**

- A. Product Data: Literature shall be provided that indicates dimensions, operating and shipping weights, capacities, ratings, fan performance, filter information, factory supplied accessories, electrical characteristics and connection requirements. Installation, Operation, and Maintenance manual with startup requirements shall be provided.
- B. Shop Drawings: Unit drawings shall be provided that indicate assembly, unit dimensions, construction details, clearances and connection details. Computer generated fan curves for each fan shall be submitted with specific design operation point noted. Wiring diagram shall be provided with details for both power and control systems and differentiate between factory installed and field installed wiring.

**1.4 DELIVERY, STORAGE AND HANDLING**

- A. Unit shall be shipped with doors screwed shut and outside air hood closed to prevent damage during transport and thereafter while in storage awaiting installation.
- B. Follow Installation, Operation, and Maintenance manual instructions for rigging, moving, and unloading the unit at its final location.
- C. Unit shall be stored in a clean, dry place protected from construction traffic in accordance with the Installation, Operation, and Maintenance manual.

**1.5 WARRANTY**

- A. Manufacturer shall provide a limited “parts only” warranty for a period of 12 months from the date of equipment startup or 18 months from the date of original equipment shipment from the factory, whichever is less. Warranty shall cover material and workmanship that prove defective, within the specified warranty period, provided manufacturer’s written instructions for Installation, Operation, and maintenance have been followed. Warranty

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excludes parts associated with routine maintenance, such as belts and filters.

**PART 2 – PRODUCTS**

**2.1 MANUFACTURER**

- A. Products shall be provided by the following manufacturers:
  - 1. Trane as scheduled in drawings.
  - 2. Package heat pumps are owner supplied and mechanical contractor installed.

**2.2 PACKAGE HEAT PUMP WITH ELECTRIC SUPPLEMENTAL HEAT**

- A. General: Provide outdoor package Hp unit with electric supplement complete with compressor cooling, electric heating, economizer controls, modulating power exhaust, and all accessories and controls as required for a complete and operational system. All units shall be factory assembled, internally wired, fully charged with R410A refrigerant, and fully tested before leaving the factory.
- B. Casing: Constructed of phosphated, zinc coated, heavy gauge, galvanized steel for 500 salt spray hours. Exterior surfaces shall be cleaned and finished with a weather-resistant baked enamel finish. Cabinet construction shall allow for maintenance on one side of the unit. Filter/evaporator, supply fan, and compressor access shall be thru hinged access panels that are air and water tight.. All exposed vertical panels and top covers in the indoor air section shall be insulated with cleanable foil faced insulation.
- C. Compressors: Direct drive, fully hermetic, scroll-type compressors with centrifugal oil pumps, factory installed vibration isolation.
- D. Controls: Factory wired with necessary controlled and contactor pressure lugs or terminal block for power wiring. Unit shall provide an external location for mounting a fused disconnect device. A centralized microprocessor shall provide anti-short cycle timing and time delay between compressor to provide a high level of machine protection. 24-volt electromechanical control circuit shall include control transformer and contactor pressure lugs for power wiring. Units shall have single point power entry as standard.

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### **Section 23 34 19 – Packaged Air Handling Units**

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- E. Evaporator and Condenser Coils: Internally finned 5/16” copper tubes mechanically bonded to a configured aluminum plate fin. Coils shall be leak tested and the factory. The evaporator and condenser coil shall be leak tested to 575 psig and pressure tested to 450 psig. A removable, reversible, double sloped condensate drain pan shall be standard.
- F. Indoor Fan: ECM motor, FC blades with corrosion resistant finish, dynamically balanced. All motors shall be thermally protected
- G. Outdoor Fans: Direct-drive, statically and dynamically balanced with vertical discharge, corrosion resistant. Fan motor shall be permanently lubricated and shall have built-in thermal protection.
- H. Filters: 2” thick MERV 7 pleated filter.
- I. Economizer: Factory installed economizer controls with modulating power exhaust relief. Fully modulating 0-100 percent motor and dampers, minimum position setting, preset linkage, wiring harness with plug, spring return actuator, and fixed dry bulb control. The power exhaust relief shall provide a pressure operated damper that shall be fully modulating to maintain positive pressure within building.
- J. Thermostat: 7-day programmable setback. Honeywell VisionPro or equivalent.

## **PART 3 – EXECUTION**

### **3.1 INSTALLATION, OPERATION AND MAINTENANCE**

- A. Installation, Operation, and Maintenance manual shall be supplied with the unit.
- B. Installing contractor shall install unit, including field installed components, in accordance with Installation, Operation, and Maintenance manual instructions.
- C. Start up and maintenance requirements shall be complied with to ensure safe and correct operation of the unit.

**END OF SECTION**

## **DIVISION 23 - MECHANICAL**

### **Section 23 37 13- Diffusers, Registers, and Grilles**

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#### **PART 1 - GENERAL**

##### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Related Sections include the following:
  - 1. Division 08 for fixed and adjustable louvers and wall vents, whether or not they are connected to ducts.
  - 2. Division 23 Section "Duct Accessories" for fire and smoke dampers and volume-control dampers not integral to diffusers and grilles.
  - 3. Division 23 Section "Testing, Adjusting, and Balancing for HVAC" for balancing diffusers and grilles.

##### **1.2 SUMMARY**

- A. This Section includes ceiling-, floor-, sill- and wall-mounted diffusers and grilles.

##### **1.3 DEFINITIONS**

- A. Diffuser: Circular, square, or rectangular air distribution outlet, generally located in the ceiling and comprised of deflecting members discharging supply air in various directions and planes and arranged to promote mixing of primary air with secondary room air.
- B. Grille: A louvered or perforated covering for an opening in an air passage, which can be located in a sidewall, ceiling, sill, or floor.

##### **1.4 SUBMITTALS**

- A. Product Data: For each model indicated, include the following:
  - 1. Data Sheet: For each type of air outlet and inlet, and accessory furnished; indicate construction, finish, and mounting details.
  - 2. Performance Data: Include throw and drop, static-pressure drop, and noise ratings for each type of air outlet and inlet.
  - 3. Schedule of diffusers and grilles indicating drawing designation, room location, quantity, model number, size, and accessories furnished.
  - 4. Assembly Drawing: For each type of air outlet and inlet; indicate materials and methods of assembly of components.

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#### 1.5 QUALITY ASSURANCE

- A. NFPA Compliance: Install diffusers and grilles according to NFPA 90A, "Standard for the Installation of Air-Conditioning and Ventilating Systems."

#### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Air Systems Components; Krueger.
  - 2. Titus.
  - 3. Price Companies.
  - 4. Seiho.
  - 5. Air Concepts.

#### 2.2 MANUFACTURED UNITS

- A. Diffusers and grilles are scheduled on Drawings.

#### 2.3 SOURCE QUALITY CONTROL

- A. Testing: Test performance according to ASHRAE 70, "Method of Testing for Rating the Performance of Air Outlets and Inlets."

#### 2.4 CEILING DIFFUSERS

- A. Performance: Provide ceiling air diffusers that have, as minimum, temperature and velocity traverses, throw and drop, and noise criteria ratings for each size device as listed in manufacturer's current data.
- B. Ceiling Compatibility: Provide diffusers with border styles that are compatible with ceiling systems, and that are specifically manufactured to fit into ceiling module with accurate fit and adequate support. Refer to general construction drawings and specifications for types of ceiling systems, which will contain each type of ceiling air diffuser.
- C. Types: Provide ceiling diffusers of type, construction, capacity, and with accessories and finishes as indicated.

## **DIVISION 23 - MECHANICAL**

### **Section 23 37 13- Diffusers, Registers, and Grilles**

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1. Ceiling Diffuser – Modular Core (MC)
  - a. Material: 22-gauge steel modular core, back pan shall be one piece stamped 22-gauge steel.
  - b. Diffuser Construction: Fixed louver directional modules, which can be easily repositioned without tools in the field for one, two, three or four way discharge. Each module shall be removable.
  - c. Finish: White, anodic acrylic paint.
  - d. Accessories: Opposed blade damper, operable from the face of the diffuser (OBD).
  
2. Ceiling Diffuser – Perforated Modular Core (PMC)
  - a. Material: 22-gauge steel modular core, back pan shall be one piece stamped 22-gauge steel. 22-gauge steel perforated face with 3/16-inch diameter holes on 1/4-inch staggered centers.
  - b. Diffuser Construction: Fixed louver directional modules, which can be easily repositioned without tools in the field for one, two, three or four way discharge. Each module shall be removable. Removable perforated flush type face.
  - c. Finish: White, anodic acrylic paint.
  - d. Accessories: Opposed blade damper, accessible through opening perforated face removal of one of the cones (OBD).
  
3. Ceiling Diffuser – Square Adjustable Louver (SAL)
  - a. Material: Steel, 24 gauge or Aluminum, 0.040 in.
  - b. Diffuser Construction: Round neck; three concentric square cones, two inner cones removable. Cones each one piece die stamped construction. The two inner cones constructed as single piece and assembly include adjustable vanes to change airflow discharge from fully horizontal to fully vertical
  - c. Finish: White, anodic acrylic paint or aluminum colored paint.
  - d. Accessories:
    - 1) Opposed blade damper, operable from the face of the diffuser without removing inner cone assembly (OBD).
    - 2) Equalizing Grid (EG).
    - 3) Earthquake tabs (ET).
    - 4) Blank-off baffles (BOB).
  
4. Ceiling Diffuser – Square Louver (SL)
  - a. Material: Steel, 24 gauge or Aluminum, 0.040 in.

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### Section 23 37 13- Diffusers, Registers, and Grilles

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- b. Diffuser Construction: Round neck; three concentric square cones, two inner cones constructed as an assembly and removable. Cones each one piece die stamped construction.
  - c. Finish: White, anodic acrylic paint or aluminum colored paint.
  - d. Accessories:
    - 1) Opposed blade damper, operable from the face of the diffuser without removing inner cone assembly (OBD).
    - 2) Equalizing Grid (EG).
    - 3) Earthquake tabs (ET).
    - 4) Blank-off baffles (BOB).
5. Ceiling Diffuser – Round Adjustable Louver (RAL)
- a. Material: Steel, 18 gauge or Aluminum, 0.051 in.
  - b. Diffuser Construction: Round neck; four concentric round cones, three inner cones removable. Cones each one piece die stamped construction. The inner cone assembly is adjusted by rotating the center cone to change airflow discharge from horizontal to vertical
  - c. Finish: White, anodic acrylic paint or aluminum colored paint.
  - d. Accessories:
    - 1) Opposed blade damper, operable from the face of the diffuser (OBD).
    - 2) Equalizing Grid (EG).
    - 3) Earthquake tabs (ET).
    - 4) Blank-off baffles (BOB).

#### 2.5 LINEAR DIFFUSERS

- A. Performance: Provide linear air diffusers that have, as minimum, temperature and velocity traverses, throw and drop, and noise criteria ratings for each size device as listed in manufacturer's current data.
- B. Ceiling Compatibility: Provide diffusers with border styles that are compatible with ceiling systems, and that are specifically manufactured to fit into ceiling module with accurate fit and adequate support. Refer to general construction drawings and specifications for types of ceiling systems, which will contain each type of air diffuser.
- C. Wall Compatibility: Provide diffusers with border styles that are compatible with wall systems, and that are specifically manufactured to fit into wall construction with accurate fit and adequate support. Refer to general construction drawings and specifications for types of wall construction, which will contain each type of wall diffuser.

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### Section 23 37 13- Diffusers, Registers, and Grilles

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- D. Floor Compatibility: Provide diffusers with border styles that are compatible with floor systems, and that are specifically manufactured to fit into floor construction with accurate fit and adequate support. Refer to general construction drawings and specifications for types of floor construction, which will contain each type of floor diffuser.
- E. Sill Compatibility: Provide diffusers with border styles that are compatible with sill systems, and that are specifically manufactured to fit into sill construction with accurate fit and adequate support. Refer to general construction drawings and specifications for types of sill construction, which will contain each type of sill diffuser.
- F. Types: Provide linear diffusers of type, construction, capacity, and with accessories and finishes as indicated.
1. Linear Diffuser – Slot
    - a. Materials: 0.063-inch extruded aluminum frame; aluminum end borders, end caps and support bars. Steel pattern controller.
    - b. Diffuser Construction: One piece lengths up to 6 feet long. Multiple units, placed end to end, shall be joined with alignment pins to for a continuous slot appearance. Pattern controller shall be aerodynamically curved shaped deflector capable of 180 degree pattern adjustment from the face of the diffuser and shall allow dampening if required. Maximum length of each pattern controller is 3 feet. Exposed frame shall be constructed with mitered corners.
    - c. Finish: Border, white anodic acrylic paint or aluminum; pattern controller, black.
    - d. Accessories: Diffuser plenum; galvanized sheet metal construction, lengths and widths to match individual diffusers, [1/2-inch][1-inch][no] internal duct liner.
  2. Linear Diffuser – Bar
    - a. Materials: Extruded aluminum bar core locked into 0.081-inch aluminum frame.
    - b. Diffuser Construction: Bars shall be fixed, [1/8][1/4]-thick, [0][15]degrees deflection, spaced on [1/4][1/2]-inch centers, parallel to the long dimension of the diffuser. The core shall have support bars perpendicular to the bars at no more than 9 inch centers. One piece lengths up to 6 feet long. Multiple units, placed end to end, shall be joined with alignment pins to for a continuous appearance. Exposed frame shall be constructed with mitered corners.
    - c. Finish: White anodic acrylic paint or anodized aluminum.
    - d. Accessories: Opposed blade damper, operable from the face of the diffuser (OBD).



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### Section 23 37 13- Diffusers, Registers, and Grilles

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#### 3. Linear Diffuser – Architectural Type

##### a. General

- 1) The systems shall be complete in every respect and shall include all required appurtenances. Furnish and install all plenums, hoods, blank-offs, and associated sheet metal components including all duct connections there to.
- 2) The diffusers shall integrate into the ceiling system. Where curved linear slot diffusers are indicated, they shall be stretched curved to the exact radii required. Rolled or segmented linear slot diffusers will not be accepted.
- 3) The linear diffusers shall have a single slot unless shown otherwise and shall be capable of being used for supply air, return air, exhaust air, or any combination thereof.
- 4) The linear diffusers shall be capable of supporting the ceiling system. Linear diffusers supported by screws in the flanges or from air plenums are unacceptable. For lay-in ceiling, provide hanger wire support clips that are integral with the linear diffusers allowing the diffusers to be supported from the building structure with ceiling wire. For hard ceilings, provide clips that are integral with the diffusers allowing the diffusers to be secured directly to the ceiling framing without the requirement for hanger supports. Provide spline clips to secure joints and ceiling tees to the diffusers.
- 5) Provide ends and corners as required. Ends shall be butt type, field installed, or mitered picture frame type factory installed, as indicated herein or shown on the drawings. Corners shall be mitered one piece unit.

- b. Materials: Extruded aluminum frame and pattern controllers, minimum wall thickness 0.062 inches. Spring steel retainer clips.
- c. Diffuser Construction: Modular linear slot diffuser with adjustable pattern controllers to direct air horizontally in either direction or vertical. Pattern controllers shall be maximum 24-inches long and held by spring loaded spacers. Air throw pattern shall be [vertical throw][adjustable horizontal flow][or][as-indicated].
- d. Finish: Flanges exposed to view shall be painted factory standard white. All other surfaces and blank-off panels shall be painted flat black.
- e. Accessories: Diffuser plenums, 24 gauge galvanized steel with 1/2-inch duct lining. Provide blank-offs for any openings in the plenum or diffuser body that is not meant to deliver supply air directly to the space it serves.

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### Section 23 37 13- Diffusers, Registers, and Grilles

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- f. Return Air Slots: Same unit as adjacent supply air diffusers. Provide return hood/light shield constructed of 51% free area perforated metal painted flat black.

#### 2.6 SUPPLY GRILLES

- A. Performance: Provide supply grilles that have, as minimum, temperature and velocity traverses, throw and drop, and noise criteria ratings for each size device and listed in manufacturer's current data.
- B. Wall Compatibility: Provide grilles with border styles that are compatible with wall systems, and that are specifically manufactured to fit into wall construction with accurate fit and adequate support. Refer to general construction drawings and specifications for types of wall construction, which will contain each type of wall grille.
- C. Types: Provide supply grilles of type, construction, capacity, and with accessories and finishes as indicated.
  - 1. Supply Grille – Louvered
    - a. Materials: 20 gauge steel or 0.050 aluminum frame with heavy duty aluminum blades
    - b. Grille Construction: 1-1/4-inch wide border, corners assembled with full penetration resistance welds. Screw holes countersunk. Double deflection solid airfoil blades, front blades parallel to the [short][long] dimension, spaced on 3/4-inch centers. Blades shall extend through the side frame on each side. Blades shall be individually adjustable, held in place with tension wire, adjustable without loosening or rattling.
    - c. Finish: White, anodic acrylic paint.
    - d. Accessories: Opposed blade damper, operable from the face of the grille (OBD).
  - 2. Supply Grille – Drum Louver
    - a. Materials: Heavy gauge extruded aluminum frame with heavy duty aluminum drum and blades.
    - b. Grille Construction: 1-1/4-inch wide border, corners assembled with full penetration resistance welds. Screw holes countersunk. Drum shall rotate 25 degrees up and down from horizontal. Blades shall be in vertical configuration and individually adjustable.
    - c. Finish: White, anodic acrylic paint.
    - d. Accessories: Opposed blade damper, operable from the face of the grille (OBD).

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### Section 23 37 13- Diffusers, Registers, and Grilles

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#### 2.7 EXHAUST/RETURN GRILLES

- A. Performance: Provide exhaust and return grilles that have, as minimum, temperature and velocity traverses, throw and drop, and noise criteria ratings for each size device and listed in manufacturer's current data.
- B. Ceiling Compatibility: Provide grilles with border styles that are compatible with ceiling systems, and that are specifically manufactured to fit into ceiling module with accurate fit and adequate support. Refer to general construction drawings and specifications for types of ceiling systems, which will contain each type of grille.
- C. Wall Compatibility: Provide grilles with border styles that are compatible with wall systems, and that are specifically manufactured to fit into wall construction with accurate fit and adequate support. Refer to general construction drawings and specifications for types of wall construction, which will contain each type of wall grille.
- D. Types: Provide exhaust and return grilles of type, construction, capacity, and with accessories and finishes as indicated.

##### 1. Exhaust/Return Grille – Louvered

- a. Materials: 22-gauge roll formed steel frame and blades or 0.040 minimum extruded aluminum frame and blades.
- b. Grille Construction: 1-1/4-inch wide border, corners assembled with full penetration resistance welds. Screw holes countersunk. Blades at 35 degree deflection at [1/2][3/4]-inch spacing. Blades fixed in place, parallel to the [short][long] dimension of the grille.
- c. Finish: White, anodic acrylic paint or aluminum colored paint.
- d. Accessories: Opposed blade damper, operable from the face of the grille (OBD).

##### 2. Exhaust/Return Grille – Airfoil Louvered

- a. Materials: 20-gauge roll formed steel frame and blades or 0.040 minimum extruded aluminum frame and blades.
- b. Grille Construction: 1-1/4-inch wide border, corners assembled with full penetration resistance welds. Screw holes countersunk. Airfoil shape blades at 45-degree deflection at [1/2][3/4]-inch spacing. Blades fixed in place, parallel to the [short][long] dimension of the grille.
- c. Finish: White, anodic acrylic paint or aluminum colored paint.
- d. Accessories: Opposed blade damper, operable from the face of the grille (OBD).

##### 3. Exhaust/Return Grille – Eggcrate

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### **Section 23 37 13- Diffusers, Registers, and Grilles**

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- a. Materials: 22-gauge roll formed steel frame with aluminum grid.
- b. Grille Construction: 1-3/4-inch wide border, corners assembled with full penetration resistance welds. Screw holes countersunk. Eggcrate core shall provide a minimum of 90% free area with 1/2 x 1/2 x 1-inch aluminum grid.
- c. Finish: White, anodic acrylic paint.

#### **2.8 SPECIALTY DIFFUSERS**

- A. Performance: Provide diffusers that have, as minimum, temperature and velocity traverses, throw and drop, and noise criteria ratings for each size device and listed in manufacturer's current data.
- B. Wall Compatibility: Provide diffusers with border styles that are compatible with wall systems, and that are specifically manufactured to fit into wall construction with accurate fit and adequate support. Refer to general construction drawings and specifications for types of wall construction, which will contain each type of wall diffuser.
- C. Ceiling Compatibility: Provide diffusers with border styles that are compatible with ceiling systems, and that are specifically manufactured to fit into ceiling module with accurate fit and adequate support. Refer to general construction drawings and specifications for types of ceiling systems, which will contain each type of ceiling diffuser.
- D. Types: Provide diffusers of type, construction, capacity, and with accessories and finishes as indicated.

##### **1. Spot Diffusers**

- a. Materials: Manufacturer's standard heavy gauge extruded aluminum frame and adjustable blades. Not welded, fastened or riveted.
- b. Diffuser Construction: Multi-directional capable of directing airstream up to a minimum of 39° from diffuser centerline to any direction. Flange-to-body gasket shall be two tandem felt strips and flange mounting gasket shall be close-cell neoprene or felt. Provide internal damper under stainless steel leaf spring.
- c. Finishes: Coordinate exact color with Architect.

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PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas where diffusers and grilles are to be installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install diffusers and grilles level and plumb, according to manufacturer's written instructions, project Coordination Drawings, original design, and referenced standards.
- B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practicable. For units installed in lay-in ceiling panels, locate units in the center of the panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.
- C. Duct-Mounted Supply and Exhaust/Return Grilles: Mount to duct branch with 16-gauge steel angle collar. Mounting screws to match grille frame. Screws shall not protrude more than 1/4-inch past angle collar.
- D. Install diffusers and grilles with airtight connection to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.
- E. Install in-line multiple linear diffusers with alignment pins for a straight continuous appearance.

3.3 ADJUSTING

- A. After installation, adjust diffusers and grilles to air patterns indicated, or as directed, before starting air balancing.

3.4 CLEANING

- A. After installation of diffusers and grilles, inspect exposed finish. Clean exposed surfaces to remove burrs, dirt, and smudges. Replace diffusers and grilles that have damaged finishes.

**DIVISION 23 - MECHANICAL**  
**Section 23 37 13- Diffusers, Registers, and Grilles**

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END OF SECTION

**DIVISION 26 - ELECTRICAL**  
**Section 26 00 10 – Basic Electrical Requirements**

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PART 1 - GENERAL

1.01. APPLICABLE PROVISIONS

- A. The General, Supplementary and other Conditions of the Contract, modifications to the General Conditions, the Drawings, and the applicable provisions of the other Divisions are hereby made a part of this Division and all its sections.

1.02. SUMMARY

- A. The requirements of this Section and the other Division 26, 27 & 28 sections apply to all the electrical work.
- B. Coordinate electrical work with related work shown and specified elsewhere.
- C. Work Included: The Contractor shall perform all the Work required (including the furnishing of all supervision, labor, services, tools, materials and equipment and the performance of all operations and incidentals necessary) for a complete, safe and reliable electrical installation, adjusted, tested and ready for operation. The electrical work is generally described as follows:
  - 1. Coordination and scheduling.
  - 2. Demolition.
  - 3. Grounding.
  - 4. Wiring devices and special purpose receptacles.
  - 5. Ancillary systems raceways, boxes, etc.
  - 6. Lighting fixtures.
  - 7. Lighting controls.
  - 8. Branch circuit wiring system for lighting, outlets, equipment, etc.
  - 9. Disconnecting means, switches, receptacles, motor starters, control devices, etc. (installation only if furnished with the equipment), and final power and line voltage (120 volt or greater) control connections to equipment and devices provided by the Owner, General Contractor or other Sub-Contractors, including the following:
    - a. HVAC equipment and associated variable frequency drives, line voltage control devices, etc.;

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- b. Plumbing systems equipment and associated variable frequency drives, line voltage control devices, etc.;
  - c. Motorized doors, etc.
10. Line voltage (120 volt or higher) control stations, devices, conduit, boxes, wiring, etc. (installation only if furnished with mechanical equipment).
  11. Motorized doors low voltage control conduit, boxes, wiring, etc. (except, control stations and devices will be furnished with the doors for installation by Contractor).
  12. Modification and expansion of the existing access control system and the existing intrusion detection system.
  13. Supports.
  14. Equipment backboards.
  15. Pull strings and ropes.
  16. Trenching and backfilling for underground electrical work, including that required by the utilities.
  17. Cutting and patching, core drilling, etc.
  18. Moisture, fire and dust stopping and sealing.
  19. Temporary construction power & lighting.
  20. Testing and completing.
  21. Final cleaning.
  22. Obtaining and paying for all required licenses, permits, inspections and fees.
- D. Work not included: The following electrical system related work will be provided by the Owner, General Contractor, other Subcontractors, or Systems Contractors working directly with the Owner:
1. Mechanical Contractor: Mechanical equipment and systems low voltage control wiring, conduits, devices, etc. See mechanical specification sections and schedule on drawings.



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2. Mechanical Contractor: Mechanical equipment and systems line voltage control devices, etc (except, installation by Contractor). See mechanical specification sections and schedule on drawings.
3. Doors Supplier: Motorized (overhead type, roll-up type, power assisted ADA type, etc.) door control stations, devices, etc. (except, installation by Contractor).
4. Owner: Payment of utility service charges.

#### **1.03. EXISTING CONDITIONS**

- A. Before submitting bid, examine existing site (and building or equipment) conditions to determine effect on execution of the electrical work and include costs in bid.
- B. Underground utilities (electrical, water, sewer, cable television, etc.) are known to exist in the area of construction. The location of existing utilities shown on the drawings is approximate only and is not guaranteed to be an indication of all utilities in the area. The contractor is responsible for contacting the Owner and all utility companies and for field location of all utilities prior to construction. The one-call number for underground utility location services is 1-800-424-5555. The Contractor shall promptly notify the Engineer of any conflicts between the contract documents and field location of existing utilities. The Contractor is responsible for maintaining the integrity of all existing utilities during construction.
- C. Damaged electrical and telecommunications (telephone, computer/data, television, fiber, copper, etc.) cables shall be replaced in their entirety. Splicing will not be allowed.
- D. Restore site soils and plantings in trenching and backfilling areas and extend site restoration into adjoining areas to remain in a manner that eliminates evidence of trenching and backfilling.

#### **1.04. PLAN REVIEW AND PERMITS**

- A. The Contractor shall arrange for inspections and pay for all required licenses, permits, inspections and fees.

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#### 1.05. DEFINITIONS

- A. The term "Contractor" used throughout Division 26 and all its sections of these specifications and on the electrical drawings shall be understood to mean the Electrical Contractor. All other work shall be called out by name.
- B. "Approved" means approved by the Architect. "For approval" means for the Architect's approval.
- C. "Furnish" means to supply and deliver to the Project, ready for installation and in operable condition.
- D. "Install" means to incorporate in the work in final position, complete, anchored, connected, and in operable condition.
- E. "Provide" means furnish and install.
- F. "Remove" means to remove the existing item indicated and all associated conduit, boxes, cables, etc. to their point of origin and/or destination; except, concealed conduits and flush boxes may be abandoned in place and/or re-used in the new installation. Cables shall be removed and/or replaced.
- G. "Replace" means to remove the existing and add in lieu the new as indicated.
- H. "As directed" means as directed by the Architect.
- I. "Concealed" means hidden from sight in trenches, walls, chases, ceilings, etc.
- J. "Exposed" means within sight; that is, not concealed as defined above, and installed on the surface of walls, ceilings, etc.
- K. "C.O." means conduit only; that is, without cable (except, provide pull string or rope).
- L. "F.O.I.C." means Furnished by Others (e.g. general contractor, other subcontractors, equipment suppliers, Owner, systems contractors working directly with the Owner, etc.), Installed by Contractor.
- M. "N.I.C." means Not in Contract.
- N. Definitions of all other terms, etc. are in accordance with AIA, ANSI, IEEE, IES, NEMA, etc. standard definitions.

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#### 1.06. DRAWINGS & SPECIFICATIONS

- A. The electrical plan drawings are general in form and do not attempt to show complete details or list every item of the electrical systems, the building construction or the various equipment (new or existing); however, the routing of raceways and circuits, and the locations of equipment, devices, fixtures, etc. represent the desired finished arrangement; except, as governed by structural or mechanical conditions or obstructions.
- B. Specifications are, in some cases, written in an abbreviated form. Words such as shall, shall be, the Contractor shall, and similar mandatory phrases are supplied by inference.
- C. Investigate the structural and finish conditions affecting the work. Refer to the architectural, structural and mechanical drawings, supplier shop drawings and submittals, etc. for additional details, equipment ratings, dimensions, location and swing of doors, location and size of partitions, cabinets, etc. and similar features. Verify all dimensions, equipment ratings, etc. with the actual before installation. Arrange the work accordingly.
- D. The intent of the drawings and specifications is to include all items necessary for the proper execution and completion of the Work; however, any item or detail not specifically mentioned in the specifications or shown on the drawings, but which is necessary to produce the intended results shall be included.
- E. The Contractor shall bring to the Engineer's attention any discrepancies, inconsistencies, conflicts, errors, or omissions within the Contract Documents, between the Contract Documents and field conditions, and any design and layout changes required due to specific equipment selection, etc. prior to equipment and material purchasing and installation. If Contractor purchases any equipment or materials and performs any construction activity, and it knows or reasonably should have known that the documents contain a discrepancy, inconsistency, conflict, error or omissions, corrective work shall be at the Contractor's expense.
- F. In the event that there are discrepancies between requirements shown on different sheets of the drawings or between the drawings and the specifications, the more restrictive of the requirements shall apply.
- G. Verify all equipment and device locations with the Owner and Architect prior to rough-in.
- H. Verify exposed raceway routing with the Owner, Architect and Engineer prior to rough-in.

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#### 1.07. SUBMITTALS

- A. Refer to Division 01, Section 01 33 00 Submittals.
- B. Submittals from the electrical contractor and each sub-contractor shall include a cover sheet indicating the company name, project manager name, and contact information for the contractor.
- C. Forward all submittals to the Architect, together in a complete package, at one time, in electronic format as single .pdf files for each specification section. Submittals for individual products or incomplete submittals are not acceptable and will be returned without review.
- D. Submittals shall be grouped by specification section and shall be arranged in the same order in which they are found in the specifications to facilitate the review process.
- E. Re-submittals, when requested, shall be provided as complete and comprehensive for each specification section. Re-submittals for individual products or incomplete re-submittals are not acceptable and will be returned without review.
- F. Provide submittals for the equipment, boxes, devices, fixtures, special raceways, systems and their components, etc. as directed in the various sections of the specifications.
- G. Prepare detail layout drawings to a larger scale than the contract drawings in areas where the work is of sufficient complexity to warrant additional detailing.
- H. Submittal drawings shall be on standard size sheets no larger than the contract drawings.
- I. Submit M.S.D.S. (Manufacturer's Safety Data Sheets) for all chemicals or hazardous materials. All chemicals and hazardous materials to meet NIOSH Permissible Exposure Levels (P.E.L.) and OSHA Time Weighted Average (T.W.A.) requirements before commencing work.
- J. If requested by the Owner, provide samples of materials for evaluation.
- K. Submittals shall provide sufficient detail so compliance with the drawings and specifications can be ascertained. Clearly identify each item by manufacturer, brand, trade name, number, size, rating, or whatever other data is necessary to properly identify and review materials and equipment. Catalog pages containing more than one product shall be marked with arrows to indicate the proposed product.

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- L. Obtain approval before purchasing any products. Items not in accordance with the drawings and specifications will be rejected.
- M. The Contractor shall establish quantities, check drawings and data, verify space requirements, dimensions, and possible interferences prior to submittal. Submittals which indicate quantities will not be reviewed by the Engineer for accuracy of quantity.
- N. The Architect and Engineer will review each submittal, mark to indicate action taken, and return. Compliance with specified characteristics is the Contractor's responsibility.
- O. Approval of submittals does not release the Contractor from a proper installation, compliance with the drawings, specifications, codes, standards, etc. or coordination of the work.
- P. Allow two weeks turnaround time for each submittal from the time of receipt at the engineer's office, except the engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until the related submittals are received.

#### **1.08. SUBSTITUTE PRODUCTS APPROVAL**

- A. Refer to Division 01, Section 01 25 00 Product Selection, Substitutions & Handling.
- B. During Bidding:
  - 1. Substitutions for equipment and materials other than that specified will be considered if equal (or better and/or higher) in quality, ratings and function; and similar in type, style, size and appearance.
  - 2. Submit written requests to Owner, Architect and Engineer.
    - a. If received no later than 7 work days prior to Bid opening, requests will be considered, but not thereafter.
    - b. Bidders will be informed by Addendum of any approved items.
    - c. No responses will be provided for rejected items.

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3. Requests shall be accompanied by complete specifications, samples, record or performance, certified tests by impartial, recognized laboratories, and other such information as required to clearly represent the proposed substitution.
4. Lighting fixture substitution requests shall include photometric data.
5. Final decisions as to quality and suitability of proposed substitutions rest solely with the Owner, Architect and Engineer, and will be based on proof submitted.
6. The cost of changes required in order to incorporate the proposed substitution, such as revisions to controls, raceways, wiring, openings, appurtenances, etc., shall be included in the bid. Any cost reduction resulting from substitutions shall benefit the Owner through a reduced bid.
7. When Owner, Architect and Engineer approve a proposed substitution, it is with the understanding that Bidder certifies that substitute articles or materials are equal to or better than those specified and that no exception is taken with any of the performance objectives, service or warranty requirements or features herein specified.

#### C. After Bidding:

1. Substitute products requests will not be considered.

#### 1.09. RECORD DOCUMENTS

- A. Submit record documents at completion of the project in accordance with the specific submittal requirements listed elsewhere in these documents.
- B. Provide “as-built” drawings in both full size reproducible form and in software form as AutoCAD .dwg type files.
- C. All record documents in software form shall be provided on a single CD-ROM. Include the necessary program(s) to read test results. Separate submittals for the various disciplines will not be accepted.

#### 1.10. "AS BUILT" DRAWINGS

- A. The Contractor shall continuously maintain a marked job set of as-built drawings as the work progresses, to indicate deviations from the original design, including

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change orders. Maintain records of all concealed wiring and of actual equipment, device, etc. locations. Provide dimensions from accepted reference lines as needed. The as-built drawings shall be kept on-site and available for inspection by the Owner.

- B. Include any detailed equipment, raceway, wiring, etc. diagrams and layouts prepared by Contractor or his subcontractors, suppliers, etc.
- C. At substantial completion, Contractor shall modify one complete set of reproducible copies, with all "as built" information and submit these drawings to the Owner for approval. Each sheet shall be marked "CORRECTED TO AS BUILT"; or, if there are no changes, drawings shall be marked "NO CHANGES, INSTALLATION PER PLAN".
- D. After approval, Contractor shall transfer all "as built" information from the marked job set and other information as appropriate to AutoCAD .dwg type files. (Consultant/Engineer will provide construction drawings AutoCAD files to contractor.) Utilize the layering scheme, font types, line types, title block, etc. provided in the AutoCAD drawing files. All drawings shall be noted as "As-Built" with a stamp and date. After adding the "as-built" information, return the AutoCAD files to the Consultant/Engineer for inclusion into the final project record set.
- E. "As-built" drawings for all portions of the work shall be combined into a single set matching the contract documents. Separate submittals for the various disciplines will not be accepted.

#### **1.11. OPERATION AND MAINTENANCE MANUALS**

- A. Following installation of the electrical systems, but prior to acceptance of the work, Contractor shall submit to Architect one loose-leaf volume with information systematically segregated and indexed for easy reference to be reviewed by the Owner, Architect and Engineer. This submittal copy will be returned to the Contractor, and the material can be used in preparation of final volumes. After approval of preliminary copy, but prior to project completion, submit 3 finished copies.
- B. Format shall be 8<sup>1</sup>/<sub>2</sub>" x 11" size with neat, clean copies, drawings (accordion folded), etc. Manuals shall have a typewritten index, and divider sheets with identification tabs between categories. Manuals shall be in hard cover 3 ring binders with titles permanently embossed on the cover face and the spine. The front of each volume shall be imprinted with the project name, title (e.g. "Electrical Equipment and Devices Operating Instructions and Maintenance Manual"), Owner, Architect, Electrical Engineer and Contractor.

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C. Manuals shall include:

1. Record documents (see above); except, full size reproducible bond paper copy of drawings to be provided separately.
2. Submittals, updated to "as built" conditions.
3. Description of systems configuration and operation including component identification and interrelations, including diagrams and supplementary drawings where necessary.
4. Installation, operation, maintenance and programming manuals covering the installed systems, equipment and materials.
5. Maintenance instructions (frequency of service, type of service, etc.).
6. Parts lists for all equipment; including recording information, recommended spares and anticipated useful life.
7. Supplier's names, addresses, telephone and reference order numbers for all equipment and materials.
8. Warranties and Bonds.
9. Copies of final inspection certificates from the authorities having jurisdiction.

D. Omit non-applicable data.

1.12. WARRANTY

- A. The complete installation shall be guaranteed for a period of one (1) year after date of project completion. For warranty purposes, the date of project completion shall be considered the date of final acceptance of the installation by the Owner certified in writing, and after Owner has received all project close-out requirements. All corrective work, if needed and requested by the Owner, shall be provided without cost to the Owner during the guarantee period.
- B. All corrective work performed by the Contractor in remedying defective work during the guarantee period following the Owner's acceptance of the project shall be subject to the same guarantee requirements of the original work for a period as specified from the date of completion of the corrective work.



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- C. Corrective work shall include on-site service by the Contractor, subcontractor or supplier (e.g. fire alarm and telecommunications systems), and/or nearest technical service representative of the equipment manufacturer. Service shall be provided within 24 hours from the time of request for warranty service by the Owner.

#### **1.13. TRAINING/INSTRUCTION AND ASSISTANCE**

- A. After the installation is complete and operating, and prior to acceptance of the work, conduct a minimum of a one (1) hour training/instruction period at the site for each type of system to point out locations of service and maintenance and instruct the Owner's in the operation of all systems and equipment.
- B. The person(s) who conduct these instructions and demonstrations shall be a qualified representative(s) of the manufacturer with substantial training and operating experience on this equipment and project, and shall be versed in the operating theory as well as practical operation and maintenance work. Instructor(s) shall have the necessary educational and interpersonal skills, as well as proven ability to effectively perform the training. Their qualifications shall be submitted to the Owner before conducting the instruction period.
- C. Each period shall include preliminary discussion and presentation of information using the actual maintenance manuals required for this project. Contractor shall notify Owner and Engineer at least 48 hours in advance of readiness to conduct the instruction period. The actual time and date of instruction period shall be acceptable to the Owner and Engineer.
- D. All training material shall be furnished and supplied by the Contractor.

#### **1.14. QUALITY ASSURANCE**

- A. The Contractor and Contractor's personnel shall be experienced, thoroughly trained and completely familiar with the systems, equipment, devices, fixtures, materials, etc. and the required methods of installation.
- B. The Contractor shall provide, upon request, after bid opening and prior to notice to proceed, a company resume including a list of project personnel with years of experience and qualifications/certifications, a list of similar projects completed within the past 5 years with contact information for the Owners and Engineers for each project and any other information which may be pertinent to the project. If requested, the Contractor shall provide a similar resume for sub-contractors.

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- C. The Contractor shall provide proof, upon request, that all personnel are licensed according to Washington State RCW19.28.161.
  
- D. All materials, equipment and workmanship shall be properly inspected by the Contractor and shall at all times be subject to inspection by the Owner, Architect and Engineer. Contractor shall provide all samples, data and documents necessary for such inspection. Owner, Architect and Engineer shall be afforded full and free access at the jobsite and the shops and places of business of the Contractor for such inspection and to determine the status of the work. If Contractor covers all or any part of the work prior to any inspection or test specifically requested by Owner, Architect and/or Engineer, the cost of any necessary uncovering and replacing shall be borne by the Contractor.
  
- E. Neither the failure to make inspections or tests, nor to discover defective workmanship, materials or equipment, shall prejudice the rights of the Owner, Architect or Engineer thereafter to reject the work and/or require its correction.
  
- F. The completed installation shall comply with the more stringent of the requirements of the drawings and specifications, the authorities having jurisdiction, and all laws, ordinances, rules, regulations and requirements in effect at the site, including current editions of the following:
  - 1. NEC - National Electrical Code.
  - 2. National Electrical Safety Code.
  - 3. OSHA - Occupational Safety and Health Act (and its Washington State equivalent).
  - 4. ADA - Americans with Disabilities Act (and its Washington State equivalent).
  - 5. International Fire Code (and its Washington State equivalent).
  - 6. International Building Code (and its Washington State equivalent).
  - 7. Washington State Rules and Regulations for Installing Electrical Wires and Equipment (WAC 296-46).
  - 8. Washington State Safety Standards for Electrical Workers (WAC 296-45).
  - 9. Washington State Non-Residential Energy Code (NREC).
  - 10. Washington State "Excavation, Trenching and Shoring" law.
  
- G. The following standards establish the minimum requirements for the equipment and installation, unless exceeded by the requirements of the drawings or specifications:
  - 1. ANSI - American National Standards Institute.
  - 2. BICSI – Building Industry Consulting Service International
  - 3. ICEA - Insulated Cable Engineers Association.
  - 4. IEEE - Institute of Electrical and Electronics Engineers.
  - 5. NEMA - National Electrical Manufacturers Association.

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6. NEIS – National Electrical Installation Standards
  7. NFPA - National Fire Protection Association.
  8. NECA – National Electrical Contractors Association
  9. EIA - Electronic Industries Association.
  10. TIA - Telecommunications Industry Association.
- H. Nothing in the drawings or specifications shall be construed to direct or permit work not conforming to applicable laws, ordinances, rules, regulations, requirements or standards. Discrepancies or conflicts shall be brought to the attention of the Owner and Engineer promptly for resolution.
- I. The Owner and Engineer shall be advised prior to any inspection being requested. The Owner and Engineer shall be provided the opportunity to inspect the installation prior to wallboard, ceiling or finish installation. Any materials, equipment or workmanship that is not (in the opinion of the Owner, Engineer or Inspector) as it should be, shall be taken out and replaced without cost to the Owner.

## **PART 2 - PRODUCTS**

### **2.01. GENERAL**

- A. Coordinate the features of materials and equipment so they form an integrated system.
- B. Contractor shall make certain that all materials selected by him, his subcontractors or by his suppliers, conform exactly to requirements of the drawings and specifications. Transmittal of such specifications and drawing information to subcontractors, person manufacturing and/or supplying materials to the project, and rigid adherence thereto, is the Contractor's responsibility.
- C. All equipment, devices, luminaires, materials, etc. shall be UL (Underwriter's Laboratories, Inc.) listed, labeled and approved for the service intended where UL standards have been established. If no UL label is available, the label of a testing agency or conformance to national standards recognized and approved by the electrical inspector having jurisdiction is required.
- D. All equipment, devices, fixtures, materials, etc. shall be new and installed only if in first class condition.
  1. Unless specifically designated as existing.

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- 2. Existing raceways, boxes, etc. may be re-used if in "like new condition" and appropriate for the new installation.
- E. All equipment, devices, etc. and their components shall be designed for continuous duty without degradation of function or performance.
- F. In the event that any item is not available exactly as specified, the Contractor shall so notify the Owner and Engineer in writing prior to bidding as early as possible to allow ample time for an alternate item to be selected without delay to the project.

#### **2.02. EQUIPMENT MANUFACTURERS**

- A. Unless specifically noted otherwise, all references to manufacturer's or supplier's model numbers and other pertinent information herein is intended to establish minimum standards of performance, function and quality.
- B. All equipment, devices, materials, etc. shall be of a type manufactured by reputable recognized vendors. Each type or groups of items, system components, etc. having the same or similar function shall be the same manufacturer, make and quality throughout the facility.
- C. Approval of a manufacturer's name and/or type does not release the Contractor of the responsibility for providing materials which comply in all details with requirements in the contract documents.

#### **2.03. SPARE CAPACITY**

- A. Unless sizes and/or quantities are specifically indicated, provide at least 20% spare wiring capacity in all cabinets, panels, cable trays and raceways.

#### **2.04. ENCLOSURES**

- A. Equipment, devices, luminaires, boxes, etc. located indoors shall have general purpose (NEMA 1) enclosures.
- B. Equipment, devices, luminaires, boxes, etc. located outdoors shall be provided with weatherproof (NEMA 3R) enclosures. Surface finish shall be a rust inhibiting primer followed by an epoxy or polyurethane polyester top coat.
- C. Provide gaskets, seals, etc. as required to prevent the entrance of moisture, debris, insects, etc.

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- D. Enclosures and boxes shall be fabricated from code gauge, or heavier, galvanized steel. Surface preparation and finish shall be manufacturer's standard unless noted otherwise.
- E. Include all necessary mounting, etc. accessories.

#### **2.05. LOCKS**

- A. All equipment, panels, etc. shall be provided with suitable locks, keyed alike.
- B. Provide a minimum of 2 keys for each lock.

#### **2.06. SUPPORTS AND CHANNEL**

- A. Channel, framing members, etc. shall be 12 gauge steel, galvanized,  $1\frac{5}{8}$  inch channel width with all necessary accessories.
- B. Beam clamps shall be steel, minimum 500 lb load rated.
- C. Threaded rod shall be steel, minimum  $\frac{3}{8}$  inch diameter.

#### **2.07. ANCHORS AND FASTENERS**

- A. Anchors and fasteners used shall be of a type designed for use in the base material to which the item is to be attached. Attach to wood with wood or lag screws, to metal with machine screws or bolts and to concrete with carbon steel wedge or sleeve type expansion anchors or self-drilling metal anchors and machine screws or bolts.
- B. Pad and floor mounted equipment shall be secured with suitable hot dipped galvanized steel anchor bolts, washers, hex nuts, etc.
- C. Powder actuated fasteners, plastic expansion type anchors, nails and toggle bolts are not permitted.
- D. Anchors shall be non-corrosive or have suitable corrosion resistant coatings or treatment.
- E. Bolts, nuts, screws and other threaded devices shall have standard threads and heads, unless required for tamper-proof installation.

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2.08. IDENTIFICATION

- A. Provide nameplates for all equipment (e.g. switchboards, panels, disconnecting means, control panels, control stations, etc.) and other devices used for the control of circuits, equipment, etc. Nameplates shall adequately describe the function or operation of the identified equipment, devices, etc. and include the panel and circuit number(s) from which it is fed. Nameplate designations shall be consistent with the project documents. Submit proposed inscriptions for approval.
- B. Provide nameplates for switchboards and panelboards to identify the system color coding scheme for phase and neutral conductors as required.
- C. Definite purpose devices shall be labeled with a description of the device's function, rating and include the panel and circuit number(s) from which it is fed.
- D. All equipment and outlets shall be labeled with the panel and circuit number(s) from which it is fed.
- E. Spare, C.O., etc. conduits shall be labeled with their destination.
- F. Nameplates shall be laminated plastic, with lettering etched through the outer covering. Character size as appropriate for the application, approved by Engineer; ¼ inch except minimum 1/8 inch. Nameplates shall be securely fastened with suitable adhesive or self tapping screws. Character and background colors shall conform to the following system color code:

<u>Background.</u>	<u>Char.</u>	<u>System</u>
Black	White	Power & Lighting
Orange	White	Emergency Systems

- G. Identification tags shall be plastic, flexible type with a label. Identification tags shall be securely fastened with cable ties. Tags shall be mounted so as to be clearly visible.
- H. Labels shall be heavy duty adhesive type, clear background with black letters on light colored devices and clear background with white letters on dark colored devices; except, labels on devices connected to the emergency power system shall have red letters. Lettering shall be appropriately sized for the application, ¼ inch except minimum 1/8 inch. Labels on ceiling mounted devices shall be large enough to read from the floor. Labels shall be as manufactured by Kroy, Brothers, or approved equal. Self-adhesive circuit numbers, masking tape, plastic punch type "Dymo" labels, etc. are not acceptable.

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PART 3 - EXECUTION

3.01. CONSTRUCTION/WIRING METHODS

- A. Wiring methods shall be as follows:
  - 1. Feeders - PVC conduit below grade and EMT above grade.
  - 2. Branch circuits - PVC conduit below grade and EMT above grade.
  - 3. Access control, intrusion detection, etc. - PVC conduit below grade and EMT above grade; except, suitable cables run "open" in accessible locations above accessible ceilings.
- B. All wire and cable shall be enclosed within the raceway system.
- C. Conduit and cable shall be run concealed in the walls (including within CMU and similar construction), above the ceiling, or below the floor with all devices, etc. flush mounted; except, in the Mechanical and Electrical Rooms, conduit drops to panels, equipment, etc. may be run exposed.
- D. Exposed raceways shall be run as neatly and unobtrusively as possible, to the approval of the Owner, Architect and Engineer.
- E. Equipment shall be surface mounted unless noted otherwise.
- F. Devices, etc. shall be flush mounted unless noted otherwise.

3.02. CONTRACTOR CONTROL AND SUPERVISION

- A. Contractor shall supervise and direct the Work, using its best skill and attention, and shall perform the work in a skillful manner. 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, unless the Contract Documents give other specific instructions concerning these matters. Contractor shall disclose its means and methods of construction when requested by Owner.
- B. Performance of the work shall be directly supervised by a competent superintendent (and/or foreman) who is satisfactory to Owner and has authority to act for Contractor. The superintendent (and/or foreman) shall constantly

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supervise the work and check all materials prior to installation for conformance with the Contract Documents. The superintendent (and/or foreman) shall not be changed without the prior written consent of Owner.

- C. Contractor shall enforce strict discipline and good order among Contractor's employees and other persons performing the Work. Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them. Contractor's employees shall at all times conduct business in a manner which assures fair, equal, and nondiscriminatory treatment of all persons.
- D. Inappropriate activity or comments by Contractor, Contractor's employees and other persons performing the work will result in immediate removal from the site.

#### **3.03. GENERAL**

- A. The installation shall be done in a neat and workmanlike manner and shall be suitable for the location. Conduit stub-ups, sleeves and ends left open for future connection, unused hubs in fittings and unused holes in boxes shall be plugged or capped to prevent the entrance of moisture and debris.
- B. For the actual fabrication, installation and testing use only persons thoroughly trained, experienced and completely familiar with the items required and with the manufacturers' recommended methods of installation. In acceptance or rejection of the work, no allowance will be made for lack of skill or experience.
- C. Circuits shall be run from equipment to equipment, outlet to outlet, luminaire to luminaire, device to device, etc. and all homeruns shall be run as shown on the drawings unless permission is obtained from the Engineer to alter the arrangement.
- D. Changes in location (e.g. equipment and devices up to 10 feet, trench and raceway routing, cable tray locations, etc.) made before installation and deviations to avoid interferences shall be made without increase in Contract Sum.
- E. The Contractor shall conduct operations in a manner to avoid the risk of bodily harm to persons or damage to any property. Construction equipment and tools shall be in good operating condition and be designed to perform the work required. The Contractor shall continuously inspect all work to discover any unsafe conditions and be solely responsible for their correction.
- F. Use all means necessary to protect the equipment and materials and the work, materials, etc. of the other trades before, during and after installation. Do all cutting carefully to prevent damage to the work. Correct lifting, jacking and/or



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moving methods shall be used. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Owner and Engineer without increase in Contract Sum.

- G. The Contractor shall provide all cutting, patching, core drilling, etc. as required for the work. Use only journeymen skilled in the necessary cutting or patching operation. Patching shall match adjacent work. Structural members shall not be cut without approval of the Architect. Where penetrations in structural members for conduits, cables, etc. are allowed, the holes shall be no larger than absolutely necessary.
- H. Contractor shall x-ray or otherwise determine the exact location of existing structural components, conduits, piping, wiring, ducts and the like prior to making any new penetrations or openings (or expanding existing openings) in any floor, wall or ceiling.
- I. The premises shall be kept free from the accumulation of rubbish and debris caused by the work. Dust, fibers, debris, etc. caused by the work shall be cleaned up immediately (prior to the worker leaving the area, room or space) and not tracked to other areas, rooms, spaces, etc. Cleanup shall be with a vacuum cleaner or similar provided with a proper HEPA filter.
- J. The Contractor shall provide all backboards, hangers, supports, chases, anchor bolts, inserts, sleeves and other openings in the construction required for the electrical work.
- K. The Contractor shall move existing equipment, furniture, bookcases, boxes, miscellaneous (office, storage, maintenance, etc.) objects and materials, and other building furnishings, attached or unattached, as required to perform the work, including returning the items to their original location in their original condition.
- L. Wall, ceiling and floor penetrations by raceways (both inside and outside the raceway), cables, etc. shall be sealed to maintain the original moisture, dust and fire resistance to the approval of the Architect.

#### **3.04. PROTECTION OF PERSONS, FACILITIES & UTILITIES**

- A. Provide all traffic control, flagging, barricades, barriers, guards, warnings, notifications, etc. at equipment, materials, open excavations, open trenches, etc. and post with warning lights. Barricades on or adjacent to public use and/or vehicular traffic areas such as buildings, roads, parking areas, pathways, etc. shall be chain link construction fence (minimum 6 feet high), locked when Contractor's personnel are not in the immediate vicinity.

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- B. Provide heavy-duty steel plate (suitable for vehicle traffic) and/or encircle with chain link construction fence (minimum 6 feet high and locked) over all open excavations, open trenches, etc. when Contractor's personnel are not present in the immediate vicinity.
- C. Provide devices and methods and proceed with sufficient caution to preclude damaging any facilities, utilities (e.g. power, water, sewer, natural gas, telecommunications, etc.) or similar, above ground or underground, concealed or exposed, known or unknown, located or not located. In the event unidentified utilities are encountered, notify the utility, Owner and Engineer.
- D. Unless otherwise provided by the drawings or specifications, do not cut or alter any existing utility or similar without authorization of the Owner and Engineer. The Contractor shall pay all costs, as determined by the Engineer, of remedial work necessitated by unauthorized or accidental cutting, patching, trenching, excavating, backfilling, etc. which damages and/or impairs the performance of existing utilities or similar (e.g. power, water, sewer, natural gas, telecommunications, etc.), above ground or underground, concealed or exposed, known or unknown, located or not located.
- E. All such work shall be verified with Owner and Engineer before execution of replacement, re-routing, relocation, repair or termination commences.
- F. Notify Regulating Agencies, Locator Service, Utility Companies, Engineer and Owner's Project Manager a minimum of a minimum of fourteen (14) days in advance and re-confirmed a minimum of 48 hours in advance, or as mutually agreed upon with Owner, prior to commencement of any such work. Submit procedures to assure safe and continuous operation of the utilities for approval.
- G. Proceed with sufficient caution to preclude damaging any utilities or similar (e.g. power, water, sewer, natural gas, telecommunications, etc.), above ground or underground, concealed or exposed, known or unknown, located or not located. In the event unidentified utilities are encountered, notify the utility, Owner and Engineer.
- H. Provide a spotter at all times when excavation occurs by use of a backhoe or other mechanical equipment.
- I. Provide adequate means of support and protection during earthwork operations.
- J. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of Owner and utility, without increase in Contract Sum.

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- K. Damaged electrical and telecommunications (telephone, computer/data, television, fiber, copper, etc.) cables shall be replaced in their entirety. Splicing will not be allowed.

#### **3.05. COORDINATION AND SCHEDULING**

- A. The Contractor shall coordinate the work and cooperate with the Owner, other trades and System Contractors to have the work completed to the best advantage, insure there are no interferences, provide reasonable opportunity for the other trades and Contractors to complete their work and to not delay the work.
- B. Contractor shall schedule all equipment, utility, electrical, telecommunications, fire alarm, fire protection, etc. interruptions. Interruptions and closures shall not be extended overnight.
- C. Contractor shall schedule road closures, complete or partial.
- D. Any and all costs incurred for non-standard hours, double-shifts, overtime, etc. or any other costs associated with completing the project within the completion times required shall be included without increase in contract sum.

#### **3.06. DELIVERY, STORAGE AND HANDLING**

- A. All equipment and materials shall be stored neatly and out of the way. Conduit, fittings, cable, etc. shall be stored off the ground, protected from the weather in racks or bins or on shelves. Equipment, panelboards, fixtures, devices, etc. shall be stored indoors in a dry, warm area, free of dust and one in which condensation will not occur.
- B. Ship equipment in its original package to prevent damage or entrance of foreign matter. Perform all handling and shipping in accordance with manufacturer's recommendations and packing label instructions. Provide protective coverings during construction.
- C. Following installation, protect materials and equipment from corrosion, condensation, physical damage, and the effects of moisture. Keep openings in boxes or equipment closed when work is not being done in them during construction.
- D. Identify materials and equipment delivered to the site and storage organized to permit checking against approved material lists and submittals.

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#### 3.07. TEMPORARY POWER

- A. The Contractor shall provide all temporary power services, facilities, equipment, devices, material, etc. required for the construction; including adequate lighting, outlets, balancing, testing, etc. as may be necessary for the proper performance and inspection of the work.
- B. The temporary power system shall be provided in a neat and safe manner, in compliance with governing codes and good working practice.
- C. The temporary power system shall be removed when no longer required.

#### 3.08. DEMOLITION

- A. Existing cables shall be removed or replaced. Provide pull strings in existing conduits being abandoned in place. Existing below grade conduits shall be cut off and capped flush with grade.
- B. Label the ends of conduits abandoned in place with origin and destination description, and note locations on the as-built drawings.
- C. Where existing equipment, fixtures, devices, etc. are indicated to be replaced, remove and dispose of the existing and provide new in its place.
- D. For all items indicated as to be removed or re-wired, Contractor shall remove all associated conduit, boxes, cables, etc. back to their point of origin &/or destination; except, concealed conduits & boxes may be abandoned in place &/or existing conduits & boxes may be re-used if in good condition & appropriate for the new installation. Existing cables shall be removed or replaced.
- E. Existing equipment, fixtures, devices, etc. to remain shall be protected as required during demolition and construction. In the event of damage, immediately make all repairs and/or replacements necessary to the approval of the Owner and Engineer without increase in Contract Sum.
- F. Existing equipment, fixtures, devices, etc. to be re-used in the new work shall be removed carefully, and protected as required during demolition and construction. In the event of damage, immediately make all repairs and/or replacements necessary to the approval of the Architect and Engineer without increase in Contract Sum.
- G. Items not indicated shall remain "as is"; except, shall be re-connected as required if its circuit is interrupted during the demolition.

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- H. All surplus materials removed during the demolition shall be inspected by the Owner and those items selected shall remain the property of the Owner. All remaining surplus materials shall be removed from the site and disposed of by the Contractor without increase in Contract Sum.

#### **3.09. INTERRUPTIONS**

- A. Power, fire alarm, telecommunications and other systems interruptions, whether to individual equipment or to the entire system, shall not be done without prior approval and scheduling with the Owner. Power, fire alarm and/or telecommunications interruptions required to facilitate construction work and that affect operation of the existing facility shall not be done during normal working hours. Some working of non-standard or longer than standard hours will be required, without increase in Contract Sum.
- B. In order to minimize the interruptions to the individual systems and equipment, and to keep maximum service available; the new utility and utility distribution system shall be completed and energized before the existing utility is de-energized and removed.
- C. Change-over of individual items shall be done 1 at a time.
- D. As much as possible, items shall be pre-assembled and systems prefabricated to minimize the change-over time.
- E. Shutdowns will not be allowed to extend beyond the time Contractors personnel are present.

#### **3.10. LOCATIONS**

- A. Locations and mounting heights of equipment, devices, etc. shall be consistent, and in accordance with the requirements of NFPA, ADA and the authority having jurisdiction.
- B. Devices and associated wallplates shall be located so as to not span different types of building finishes.
- C. In general, surface raceways, cable trays, cable racks, etc. shall be mounted as unobtrusively as possible, tight against whiteboard trim, chair rails, in room corners, against ceilings, against chases, etc. and other breaks in the construction.

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- D. Prior to rough-in, the Contractor shall mark or otherwise show the location of all equipment and devices, and the proposed routing of raceways. Obtain specific approval for the location of each from the Owner, Architect and Engineer before rough-in.
- E. Changes in location (e.g. equipment and devices up to 10 feet, trench and conduit routing, etc.) made before installation and deviations to avoid interferences shall be made without increase in Contract Sum.

#### **3.11. EQUIPMENT, LUMINAIRES AND DEVICES**

- A. Equipment, luminaires, devices, etc. shall be installed plumb and true, and shall be square with the adjacent walls, ceilings, structural members and other equipment; in a horizontal or vertical position as intended. The location of similar items shall be consistent.
- B. Light standards (poles), luminaires, etc. shall be set to stand plumb and true and shall be square with the adjacent buildings, property lines, sidewalks, roadway, etc.
- C. Equipment, cabinets, boxes, fixtures, devices, etc. shall be accurately mounted and leveled and be firmly supported either directly or indirectly by a sound and safe structural member of the building in accordance with manufacturer's instructions, or as directed. Supports shall be neatly placed and properly fastened. In addition to the weight of the equipment or material, allowance shall be made for vibration (e.g. motors and fans) and variable and/or shock loading from internal or external forces (e.g. operation of disconnect switches or circuit breakers).
- D. The correct lifting, jacking and/or moving gear which will prevent damage shall be used.
- E. All bolts, nuts, screws and other fastenings shall be tightened in accordance with manufacturers or listing instructions and all covers replaced on equipment and boxes. All electrical connections, particularly those on bus work in panelboards, etc. shall be checked to ensure tightness and electrical conductivity.
- F. Follow manufacturer's installation details wherever available. Provide supports, boxes, mountings, wiring, fittings, etc. as required, standard or special. Wherever any conflict arises between manufacturer's instructions, codes and regulations, and these Contract Documents, follow Owner's decision.
- G. Following installation, protect materials and equipment from corrosion, condensation, physical damage, and the effects of moisture. Keep openings in

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boxes or equipment closed when work is not being done in them during construction.

- H. Provide gaskets, seals, etc. as required to prevent the entrance of moisture, debris, insects, etc. Check for proper fit.

#### **3.12. SUPPORTS**

- A. Provide all necessary supports, anchors, fasteners, and backing for all raceways, boxes, enclosures, fixtures and equipment.
- B. Hangers and supports shall be made from standard structural shapes and hardware or systems of shapes, fittings and hardware designed for the purpose.
- C. Support cable trays with trapeze style hangers/systems, minimum 8 foot on center.
- D. Hangers and supports shall be adequately and safely attached to the building structure. Equipment or materials to be supported shall be securely fastened to the supporting means. Use size and number of attachments as required for a safety factor of at least four. In addition to the weight of the material, consideration shall be given to the weight of the support itself, the weight of materials within, vibration, external operational forces, shock load, etc.
- E. Brace all equipment, cable tray, cable racks, etc. as required to meet the requirements of the International Building Code (IBC).
- F. Attach to wood with wood or lag screws, to metal with machine screws or bolts and to concrete with carbon steel wedge or sleeve type expansion anchors or self-drilling metal anchors and machine screws or bolts.
- G. Pad and floor mounted equipment shall be secured with suitable hot dipped galvanized steel anchor bolts, washers, hex nuts, etc.

#### **3.13. CORROSION PROTECTION**

- A. All material and equipment shall have corrosion protection suitable for the atmosphere in which they are installed.
- B. Maintain the integrity of factory provided corrosion protection. Repair damaged corrosion protection and touch-up paint all scratched, marred or damaged factory finish on equipment, devices, luminaires, enclosures, etc.; per manufacturer's instructions where available.

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- C. Paint field cuts with a suitable cold galvanizing compound.

3.14. APPROVALS

- A. Prior to rough-in, the Contractor shall mark or otherwise show the location of all equipment and devices, and the proposed routing of raceways, cables, etc. Obtain specific approval for the location of each from the Owner, Architect and Engineer before rough-in.
- B. Prior to beginning installation of cables, obtain approval of concealed raceway installation from the Owner, Architect and Engineer.
- C. Prior to beginning installation of cables, obtain approval of the raceway installation from the Owner, Architect and Engineer.

3.15. CLEANING

- A. Remove trash, combustible material, and other debris from electrical rooms and areas around equipment.
- B. Remove shipping materials, supports, spacers, etc. from equipment, devices, etc.
- C. Remove all debris from equipment, devices, etc. including all scraps of wire, metal shavings, plaster, dust, and other foreign material.
- D. The top sides and interiors of all equipment and enclosures shall be vacuumed clean.
- E. The exterior of all equipment and enclosures shall be wiped down with a clean, dry, lint-free cloth or soft bristled brush.
- F. Clean screens, louvers, baffles, etc. covering ventilation openings to ensure they are clear.
- G. Remove paint splatters and other spots, dirt, and debris.
- H. Touch up scratches to match original finish.
- I. Remove all traces of soil, dirt, dust, smudges, fingerprints and other foreign matter from visible surfaces of equipment, devices, luminaires, etc. Pay close



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attention to highly finished surfaces such as glass and polished metals. Wipe lamps clean.

- J. Maintain adequate ventilation during cleaning.
- K. Follow manufacturer's instructions. Failure to follow manufacturer's recommendations when cleaning equipment can result in damage from the use of improper cleaning methods or agents.

#### **3.16. VISUAL AND MECHANICAL INSPECTION**

- A. Verify that all equipment and their components are sized properly for the load and the types, sizes, etc. are in accordance with the contract documents, approved submittals, etc.
- B. Visually inspect equipment for physical damage. Repair physical damage, if practical and approved by the manufacturer. Consult Owner, Engineer and manufacturer for recommendations for suitable protective barriers to prevent future damage.
- C. Inspect molded and formed equipment and components (e.g. circuit breaker cases, fuses, starters, relays, insulators, supports, etc.) for cracks or other defects.
- D. Check all bolts, connections, cable terminations, etc. for tightness using a calibrated torque wrench or screwdriver. Refer to manufacturer's instructions and markings for proper torque values.
- E. Visually check the equipment, its components and associated raceways, conductors, etc. for proper grounding and bonding. Ensure that grounding and bonding terminal bars, bus bars, straps, and conductors are properly connected.
- F. Verify that cables do not contact live parts and that cables are properly secured to withstand the effects of fault currents.
- G. Check equipment anchorage, mounting, clearances, alignment and fit of components.
- H. Check that phase barriers are in place, if applicable.
- I. Visually check disconnect switch blade alignment, blade penetration, travel stops, and mechanical operation.

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- J. Inspect each fuse holder to determine whether it seems to be adequately supporting the fuse and that the fuse holders are securely attached to the mounting base. Verify fuses are set tightly in the clips provided.
- K. Operate equipment and components (e.g. disconnect switches, circuit breakers, etc.) to insure smooth operation.
- L. Compare all circuits (internal and external) with wiring and/or control diagrams to verify they are installed correctly.
- M. Confirm correct operation and sequencing of electrical and mechanical interlock systems, if so equipped. Attempt closure on locked-open devices. Attempt to open locked-closed devices.
- N. Confirm that equipment nameplates and safety labels are provided.

#### **3.17. TESTING**

- A. The Contractor shall perform all tests required in the various sections of the specifications and in accordance with manufacturer's recommendations. Record test results and include in operation and maintenance manuals.
- B. The Owner and Engineer shall be notified one week prior to any testing so that the testing may be witnessed.
- C. All testing shall be performed by personnel that are trained in the specific task to be performed
- D. Do not proceed with tests until previously identified deficiencies are corrected.
- E. Test equipment in accordance with manufacturer's recommendations. Maintain test results for future comparisons. Include in operation and maintenance manuals.
- F. Upon completion, all equipment and systems shall be tested for functional operation, including all intended modes and sequences of operation.
- G. Readings of the voltage and amperage shall be taken on each phase at each panelboard and at the end of the longest branch circuit.
- H. All systems shall test free from shorts and grounds and shall be without mechanical and electrical defects. If any test indicates a failure, in the opinion of the Engineer; the item shall be replaced or suitably repaired to the approval of

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the Owner, Architect and Engineer, and the test repeated without additional cost to the Owner.

**3.18. ENERGIZING**

- A. Energize equipment in accordance with manufacturer's recommendations.
- B. The Owner, Engineer and other affected personal shall be notified one week prior to energizing so that the energizing may be witnessed.
- C. All commissioning and testing shall be performed by personnel that are trained and fully qualified in the specific task to be performed. Qualifications shall include expert knowledge relative to the specific work involved, documentation and tools to service and test the equipment, and willingness to work with the Commissioning Agent(s) and/or Contractor(s) to get the work completed in a timely manner. The Commissioning Agent(s) and/or Contractor(s), Owner, Architect or Engineer reserve the right to judge the capabilities and qualifications of the proposed commissioning and testing personnel relative to each item of equipment and/or system.
- D. Qualified representatives of the manufacturers shall assist in tests if deemed necessary by the Commissioning Agent(s) and/or Contractor(s), Owner, Architect or Engineer.

**3.19. CONTRACT CLOSE-OUT**

- A. As a requirement for substantial completion of the Work, the Contractor shall thoroughly check the installation. Checking shall consist of visual inspection and manual adjustment to confirm correct installation and arrangement and to assure the intended function, response and operability. Checking shall include, as a minimum, the following:
  - 1. Check that equipment, devices, etc. are of the correct type and rating.
  - 2. Check that all raceways, fittings, devices, boxes, enclosures, etc. are secure and that all conduit connections are tight.
  - 3. Check that all electrical connections are correctly tightened.
  - 4. Check that equipment, devices, panelboard circuit directories, etc. are correctly labeled.

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5. Check that equipment, fixtures, devices, etc. are clean with all unnecessary labels removed.
- B. As a requirement for substantial completion of the Work, the Contractor shall:
1. Obtain final inspections from the authorities having jurisdiction.
  2. Perform final cleaning.
  3. Submit approved "As Built" Drawings, Record Documents, Test Records, Manuals, etc.
  4. Submit written warranty statements for equipment, materials and installation.
  5. Conduct system tests.
- C. After the requirements for substantial completion have been met, the contractor shall notify the Engineer in writing that the Work is substantially complete. The Engineer will then perform a final inspection of the installation and issue a "punchlist" for final completion.
- D. The Contractor shall complete the work on the punchlist, initial each item as complete or provide written explanation for not completing the work. The punchlist shall be signed by the contractor and returned to the Engineer when complete.
- E. The Engineer will re-inspect the work to verify that all the items have been completed.
- F. The above process shall be completed a single time for the project. If additional punchlist and inspection cycles are required to be completed due to the contractors failure to complete items on the punchlist, the contractor will be backcharged for the Engineer's additional services on time and material basis through the construction contract.
- G. Subsequent to final completion and testing operations, instruct Owner's authorized representatives as required in operation, adjustment and maintenance of equipment and systems.

END OF SECTION

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### **Section 26 05 00 – Common Work Results for Electrical**

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#### **PART 1 - GENERAL**

##### **1.01. APPLICABLE PROVISIONS**

- A. The General, Supplementary and other Conditions of the Contract, modifications to the General Conditions, the Drawings, and the applicable provisions of the other Divisions are hereby made a part of this Division and all its sections.

##### **1.02. SUMMARY**

- A. The requirements of this Section and the other Division 26, 27 and 28 Sections apply to all the electrical work.
- B. Coordinate electrical work with related work shown and specified elsewhere.
- C. Provide all materials necessary for the proper execution and completion of the work as herein specified or called for on the drawings. Required items not specifically mentioned in the specifications or indicated on the drawings shall be provided as necessary to produce the intended results.
- D. In the event that any item is not available exactly as specified, the Contractor shall so notify the Engineer in writing as early as possible to allow ample time for an alternate item to be selected without delay to the project.

##### **1.03. SUBMITTALS**

- A. Provide submittals for the following:
  - 1. Exterior outlet boxes.

#### **PART 2 - PRODUCTS**

##### **2.01. RACEWAYS**

- A. Raceways, where required, shall be of the types listed below, unless noted otherwise:
  - 1. Electrical Metallic Tubing (EMT) – Concealed above grade and exposed in Utility Rooms and other Non-Public Areas not readily visible to building occupants, except as noted below.
  - 2. Polyvinyl Chloride Conduit (PVC) – below grade, except as noted below.

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3. Flexible Metal Conduit (FLEX) - final connections to vibrating equipment and for fixture whips. Also, FLEX may be substituted for EMT for branch circuits between wiring devices and boxes concealed inside frame walls and ceilings. FLEX shall not be used for any homeruns, conduit stub-ups into accessible ceiling spaces, nor for any exposed or surface conduit runs except as final connections to vibrating equipment.
  4. Type MC Cable may not be used.
- B. Raceways shall be sized so that the cable fill does not exceed 40%; except, minimum conduit sizes shall be as follows:
1.  $\frac{1}{2}$  inch - runs with 2 or fewer #12, or smaller.
  2.  $\frac{3}{4}$  inch – above grade branch circuits, ancillary systems circuits or similar, except as noted below.
  3. 1 inch – below grade.
  4.  $\frac{3}{8}$  inch - fixture whips furnished by the manufacturer with the fixtures.
- C. PVC conduit shall be heavy-wall (Schedule 40), flame-retardant, suitable for use with 90°C cable, shall not distort from heat it will normally encounter and shall be resistant to low temperature and sunlight effects, impact and crushing.
- D. PVC conduit installed in shallow trenches (less than 24" deep) shall be same as above, except, heavy wall Schedule 80 grade.
- E. Electrical metallic tubing shall be electro-galvanized steel.
- F. Flexible metal conduit shall be helically wound galvanized steel, type FMC; except outdoors, liquidtight flexible metal conduit shall have a liquidtight, non-metallic, sunlight-resistant jacket over a flexible galvanized steel metal core, type LFMC. Flexible conduit connections shall be a minimum of 18 inches long.
- G. Conduit elbow radius and bends in conduits 2 inch diameter and smaller shall be not less than 6 times the conduit diameter and radius bends in larger conduits shall be not less than 10 times the conduit diameter.

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#### **2.02. RACEWAY FITTINGS**

- A. Fittings for steel conduit shall be steel, galvanized or cadmium plated, threaded type. Couplings shall be galvanized steel. Locknuts and bushings shall be galvanized steel.
- B. Connectors, couplings, etc. for EMT shall be steel set-screw type; except, steel raintight compression type in potentially wet or damp locations (e.g. outdoors).
- C. Fittings for flexible metal conduit shall be of a type specifically designed for the purpose.
- D. Fittings for nonmetallic conduits shall be of same manufacturer and material as the conduit.
- E. End bells and/or insulated bushings shall be used on all underground conduit system terminations at vaults, junction boxes, padmounted equipment, etc.
- F. Conduit terminations at equipment, etc. shall be suitably sealed and/or plugged at both ends to prevent the entrance of moisture. Spare, c.o., etc. conduits shall be provided with removable gasketed covers at the high end to prevent the flow of moisture from one box to another.
- G. “Open” end of ancillary, telecommunications, spare, c.o., etc. conduits shall be provided with insulated bushings.
- H. “Open” ends of telecommunications conduits entering the telecommunications room shall be provided with bonding bushings & bonded to the ground bar.
- I. Connectors at sheet metal enclosures shall have insulated throats.
- J. Provide approved properly bonded expansion fittings (capable of expansion and contraction as required), deflection couplings, etc. wherever conduits pass over or through joints or other locations where raceways may be affected by dissimilar movements of the supporting structure.

#### **2.03. BOXES**

- A. The use of exposed boxes in areas readily visible to building occupants shall be kept to a minimum.
- B. Boxes shall accommodate any devices to be installed and shall be sized as required by the applicable codes for number and size of conduits and cables entering and leaving; except minimum as noted below.

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- C. Indoor boxes above grade in dry locations shall be standard stamped galvanized steel type, suitable for embedment in concrete and/or masonry where required.
- D. Surface mounted boxes installed in wet or damp locations and outdoors shall be threaded rigid body type, cast aluminum or galvanized iron.
- E. Unless noted otherwise, larger size pull and junction boxes shall be fabricated from code gauge galvanized steel.
- F. Unless noted otherwise, larger size pull, splice and terminal boxes shall be fabricated from code gauge galvanized steel, with full access screw type cover unless noted otherwise. Sizes shall be as required, except minimum as indicated.
- G. Switch, power outlet, device, etc. boxes shall be single or ganged to accommodate the required number of devices; except, flush mounted boxes shall be minimum 4 inches square for conduits 1 inch or less and  $4\frac{11}{16}$  inches square for larger conduits. Boxes containing a single device shall be minimum  $1\frac{1}{2}$  inches deep. Boxes containing multiple devices shall be minimum  $2\frac{1}{8}$  inches deep. Flush mounted boxes shall be equipped with plaster rings and suitable wallplates. Surface mounted boxes shall have raised surface type covers.
- H. Junction and pull boxes shall be sized as required by the NEC except the minimum size shall be 4 inch, square or octagonal as required, by  $1\frac{1}{2}$  inches deep. Junction and pull boxes shall have full-access screw covers.
- I. Ancillary systems (e.g. fire alarm, security, etc.) outlet, device, junction, etc. boxes shall be in accordance with the requirements of the respective supplier; except, minimum as specified above.
- J. Boxes shall be equipped with mud rings where required and proper wallplates and/or covers.
- K. Unused flush mounted boxes, including existing abandoned in place, shall have blank wallplates or ceiling box type covers. Color shall match existing surface paint color as close as possible with manufacturer's standard colors.
- L. Openings in boxes, etc. through which cables are intended to pass shall be provided with suitable nonmetallic grommets.
- M. Device, junction, etc. boxes (other than the surface raceway type) for fire alarm systems shall be substantially red in color, both inside and outside.



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#### 2.04. WIRE AND CABLE

- A. Wire and cable sizes indicated and/or specified are minimums only and shall be increased as required due to NEC, system, load, voltage drop, etc. requirements.
- B. All wire and cable (power, control, ancillary systems, etc.) installed in below grade conduit shall be suitable for wet locations.
- C. All wire and cable (power, control, ancillary systems, etc.) shall be suitable for wet or dry locations, in conduit, above ground and underground.
- D. Ground electrode conductors shall be copper, bare below grade.
- E. Service and below grade feeder cable shall be single conductor stranded copper with 600 volt type USE/RHH/RHW or XHHW insulation.
- F. Branch circuit cable, above grade feeder cable and equipment ground cable, where run in raceways, shall be single conductor copper with 600 volt type XHHW or THWN/THHN insulation. The minimum conductor size shall be #12 AWG; except, fixture whips provided as an assembly by the fixture manufacturer with the fixtures may be #14 AWG. Conductors shall be stranded, except #12 AWG lighting and general purpose receptacle branch circuit conductors may be solid.
- G. Line voltage (Class 1) control cable shall be single conductor stranded copper with 600 volt type XHHW or THWN/THHN insulation. The minimum conductor size shall be #14 AWG.
- H. Low voltage (Class 2) control cable shall be single conductor copper with 600 volt type XHHW or THWN/THHN insulation if installed in conduit. Low voltage (Class 2) control cable run "open" shall be multi-conductor copper with 300 volt insulation and an overall jacket, type CL2, listed as being resistant to the spread of fire; except in air handling plenums, cable shall be plenum rated, be listed as being resistant to the spread of fire and bear flammability testing ratings as cable type CL2P. The minimum conductor size shall be #16 AWG.
- I. Cords shall be multi-conductor stranded copper with a green insulated grounding conductor, 600 volt type SO insulation and an overall neoprene jacket. The minimum conductor size shall be #12 AWG.
- J. Fixture cable, where supplied by the Contractor, shall be stranded copper with 600 volt type PF insulation.
- K. Color coding for power cable shall be as follows:

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1. 480Y/277 volt, 3 phase, 4 wire:  
Phase A = brown, B = orange, C = yellow, N = gray;
  2. 208Y/120 volt, 3 phase, 4 wire:  
Phase A = black, B = red, C = blue, N = white;
  3. Equipment ground cables shall be green.
  4. Switch legs shall be the same color as the phase conductors. Switch travelers shall be purple.
- L. Cable pulling lubricants shall be gel type, of the best quality and shall not have any damaging effect on the insulation. (Ideal Yellow 77 is not approved.)

#### **2.05. CABLE SUPPORTS**

- A. Supports for cables run “open” above ceilings and the like shall be wide base type J-hook assemblies capable of supporting up to 50 category 5 UTP cables, Erico CablCat series or equal. Support spacing shall not exceed 5 feet.
- B. Cable ties shall be utilized in panelboards, etc. to group and support conductors. Multi-wire branch circuits shall be grouped together as required. All cable shall be fanned-out to terminals and identified by labels; or, if terminated on circuit breakers or control devices, by typewritten indexes or nameplates.
- C. Cord drops from ceilings or similar shall have suitable stainless steel basket weave support/strain relief grips, Kellems or approved equal. Cord connectors shall liquidtight type.

#### **2.06. CONNECTIONS AND TERMINATIONS**

- A. Taps and splices shall be kept to a minimum.
- B. Taps and splices in #8 AWG, and smaller, branch and fire alarm circuit cable shall be made with twist-on spring type wire nuts. Taps and splices in telecommunications cables, ancillary systems cables, larger branch circuit cables, feeder cables, control cables, etc. or below grade will not be allowed without specific approval from the Engineer.
- C. Splices in #8 AWG and larger cable, where allowed, shall be made with proper size compression-type sleeve splice connectors. Connectors shall match wire size and type, seamless copper tubing (for copper wire), electro-tin plated,

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center wire stop, chamfered barrel, color coded for correct wire size and UL486A/B listed, 600V, IlSCO, Burndy, or approved equal. (Mechanical set-screw type connectors will not be allowed.) Use proper crimp tool specifically for use with connectors. Wrap completely with suitable electrical insulating tape or shrink-wrap in accordance with manufacturer's instructions.

#### **2.07. PULL STRING AND ROPE**

- A. Pull string shall be resistant to rot and mildew and shall not deteriorate when exposed to oil, grease, etc.
- B. Pull rope shall be twisted polypropylene treated with ultraviolet stabilizers, minimum  $\frac{1}{4}$  inch diameter. Rope shall be resistant to rot and mildew and shall not deteriorate when exposed to oil, grease, etc.
- C. Pull rope shall be flat, woven polyester tape, minimum 1800 tensile strength. Rope shall be pre-lubricated to reduce pulling tension and shall be durably printed with sequential footage markings. Rope shall be resistant to rot and mildew and shall not deteriorate when exposed to oil, grease, lubricants, etc. Where installed in underground conduits, the pull rope shall have a # 22AWG detectable tracer wire woven into the tape. Pull rope shall be Neptco Muletape, or equivalent.

#### **PART 3 - EXECUTION**

##### **3.01. RACEWAYS**

- A. Raceways shall be run concealed in the walls (including within CMU and similar construction), soffits (new and existing), above the ceiling or below the floor unless indicated otherwise; except, exposed within utility rooms and other similar type spaces. Raceways may be run exposed within public spaces, classrooms, offices, and the like only where indicated and with prior approval of the Owner and Architect. Exposed raceways shall be run as neatly and unobtrusively as possible, to the approval of the Owner, Architect and Engineer.
- B. Raceways shall be installed straight, plumb and true and shall be without kinks or sags.
- C. Exposed raceway runs shall be either parallel or at right angles to walls and structural members, as neatly and unobtrusively as possible (e.g. adjacent to window and door trims and base, at wall/wall or wall/ceiling intersections, etc.). Exposed parallel or banked raceways shall be run together.

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- D. Below grade conduits shall be direct buried between 24 and 30 inches below grade (except, conduits below the building concrete floor slab may be run immediately below the floor) and/or as required to bury conduits below footings, grade beams, etc., and spaced a minimum of 2 inches between conduits.
- E. Underground conduits extending into the building and at transformers, panels, etc. shall be suitably sealed or plugged at both ends. Sealant shall be removable. Ductseal is not acceptable.
- F. PVC conduit shall be solvent welded to prevent the entrance of moisture.
- G. Verify location, mounting heights, etc. of cable trays, surface metal raceways from the Owner and Engineer prior to installation. In general, surface raceways shall be mounted as unobtrusively as possible, tight against whiteboard trim, chair rails, in room corners, against chases, etc. & other breaks in the in the wall or ceiling.
- H. Raceways shall be located to not interfere with the removal of pipes or equipment for maintenance or repair. All raceways shall be kept a minimum of 6 inches away from items producing heat.
- I. Above grade raceways, fittings, etc. shall be securely supported from permanent structural members of building, either directly or indirectly. Raceways shall be fastened at intervals of 8 feet, nominally, and within 36 inches of each outlet, fitting, panel, etc. Caddy clips or wire ties using not less than No. 14 wire and "ladder-ties" which will prevent displacement, may be used only for concealed runs of EMT or GRS to 1 $\frac{1}{2}$  inch. Single runs of exposed conduit shall be supported with steel pipe straps.
- J. Raceways, cable trays, etc. shall not be supported from ducts, plumbing or other piping or from other raceways. Support raceways, cable trays, etc. only from building structural elements.
- K. Bends in raceways shall be made without flattening, kinking or reducing the cross-sectional area of the raceway. Bends in parallel or banked runs shall be made from the same center line so that the bends are parallel.
- L. All raceway cuts shall be made square with a proper cutting tool. The inside and outside of all raceway ends shall be reamed after cutting and/or threading to eliminate burrs and rough edges, then wiped clean. Joints shall be cut square and shall butt solidly into couplings. Running threads will not be permitted.

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- M. Raceways shall be closely and tightly fitted in couplings, connectors, boxes, etc. to provide an electrically continuous low resistance ground fault return path. Threaded joints shall be made up with at least 5 threads fully engaged.
- N. The raceway systems shall be complete (including the installation of bushings, grommets, etc.), snaked and cleaned, and approval of the installation is obtained from the Owner and Engineer, before or pulling any cable.
- O. Exposed exterior raceways shall be painted.

#### **3.02. EXCAVATION AND BACKFILLING**

- A. Excavate to depths noted, and as required for proper completion of all below grade work and cut to sufficient size to provide ample room for construction of forms, shoring and bulkheads as required.
- B. Cut existing asphalt, concrete, etc. as required. Push under existing curbs, sidewalks, etc. where possible.
- C. Underground utilities (electrical, water, sewer, cable television, etc.) are known to exist in the area of construction. The location of existing utilities shown on the drawings is approximate only and is not guaranteed to be an indication of all utilities in the area. The contractor is responsible for contacting the Owner and all utility companies and for field location of all utilities prior to construction. The one-call number for underground utility location services is 811 (1-800-424-5555). The Contractor shall promptly notify the Engineer of any conflicts between the contract documents and field location of existing utilities. The Contractor is responsible for maintaining the integrity of all existing utilities during construction.
- D. Damaged electrical and telecommunications (telephone, computer/data, television, fiber, copper, etc.) cables shall be replaced in their entirety. Splicing will not be allowed.
- E. Provide a spotter at all times when excavation occurs by use of a backhoe, excavator or other mechanical equipment.
- F. Shore and brace excavations where necessary to prevent cave-ins and in accordance with all safety laws and codes.
- G. During excavations and backfilling, extreme care shall be taken to keep rocks and other rough material away from conduits and cables. Pack a minimum of 6 inches of soft fill material (free from stones, rocks and other rough material that might be forced against the conduits and cables during backfilling, or when

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settling or frost-heaving disturbs the surrounding earth) around conduits and cables. Wash in to avoid air gaps.

- H. Backfill shall be good compactable material without large rocks, chunks or sticks. Backfill in all excavations shall be progressively compacted in maximum 12 inch lifts to 95% of maximum density, and shall be without voids.
- I. Prior to excavation, the Contractor shall mark or otherwise show the location of all equipment and vaults, and obtain specific approval from the Owner and Engineer for the location of each prior to installing equipment, boxes, raceways, etc.
- J. Maintain all bench marks, control monuments and stakes, whether newly established by Surveyor or previously existing. Protect from damage and dislocation. If necessary to disturb existing benchmark, re-establish in a safe place.
- K. The clearance between the underground conduit systems and other underground items, such as water and sewer lines shall be as large as necessary to permit maintenance of any of the systems without damage to the other items.
- L. Keep all excavations, pits, trenches, etc., entirely free from water. Protect excavations from rain or water from any source during construction. Use suitable pumping equipment or other means as required by conditions. Continue pumping as necessary until completion of work.
- M. When operations are interrupted by unfavorable weather conditions, prepare areas by grading and compaction to avoid ponding and erosion.
- N. Dirt shall not be permitted to accumulate on roads or adjacent green belts, nor to be washed into drainage ditches.
- O. Appropriate steps, such as the application of water, shall be taken to prevent airborne dust due to the work, particularly during excavation and moving of materials.
- P. Trenches, excavations and any damage to adjoining areas shall be repaired/restored to existing or better condition to the approval of the Owner, Architect and Engineer.

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#### **3.03. LABELING & IDENTIFICATION**

- A. Junction boxes concealed in ceiling spaces and exposed in electrical, mechanical, utility rooms, and the like shall be marked with the panel and circuit numbers contained within. Marking shall be legibly hand-written with black indelible ink marker.
- B. In each junction and pull box, neutral conductors shall be grouped with associated phase conductors by taping the conductors together.
- C. Interior spare, C.O., etc. conduits shall be labeled with their destination. Labeling shall be made by neatly hand writing on the conduits or enclosures with indelible marker.
- D. Exterior below grade conduits entering electrical rooms, communications rooms, enclosures, vaults, etc. shall be labeled with their destination. Labeling shall be made by neatly hand writing on the conduits or enclosures with indelible marker.
- E. Color coding for power cable shall be as follows:
  - 1. 480Y/277 volt, 3 phase, 4 wire:  
Phase A = brown, B = orange, C = yellow, N = gray;
  - 2. 208Y/120 volt, 3 phase, 4 wire:  
Phase A = black, B = red, C = blue, N = white;
  - 3. Equipment ground cables shall be green.
  - 4. Switch legs shall be the same color as the phase conductors. Switch travelers shall be purple.

#### **3.04. BOXES**

- A. Boxes shall be installed plumb and true and be firmly supported either directly or indirectly by a sound and safe structural member of the building with approved anchors and fasteners, and shall be readily accessible for maintenance.
- B. Pull boxes or fittings shall be provided in conduit runs as required to prevent excessive stress on the cables during pulling and to allow the minimum required bending radius.
- C. Where an accessible ceiling space exists, locate above the ceiling; otherwise locate in an unobtrusive location to the approval of the Architect, Engineer and Owner.

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#### 3.05. WIRE AND CABLE

- A. All wire and cable shall be enclosed within the raceway system; except:
  - 1. "Open cable wiring" approved for the purpose shall be permitted for Class 2 signal and control circuits, fire alarm system cable, telecommunications cable, etc. when run concealed in an accessible location above the ceilings.
- B. Floor and ceiling penetrations by "open" cables will not be allowed. Provide conduit sleeves, minimum 2" EMT, as required plus a spare (with fire and dust stopping and sealing) where "open" cable passes through floors, walls, partitions, etc.
- C. Inspect cable prior to installation to verify that it is identified properly on the reel or box identification label, that it is of proper gauge, containing correct number of pairs, etc. Note any buckling of the jacket which would indicate possible problems. Damaged cable or any other components failing to meet specification shall not be used in the installation.
- D. Conductors of different voltages, systems, functions, etc. shall not be combined in the same raceway or cable unless specifically noted otherwise.
- E. Wire and cable shall not be exposed to weather or mechanical damage longer than necessary. Cut ends of the cable shall be immediately sealed to protect from moisture. Duct tape is not an acceptable means of sealing.
- F. The contractor shall not receive cable from the supplier if it arrives onsite with the cable ends unsealed.
- G. Cable shall be unrolled from reels, or removed from cartons, and installed so as to not damage the insulation or cable sheath and in a manner which will prevent kinking, crushing or excessive tension on conductors and insulation. Use only guides, rollers, sheaves, etc. that are free-turning and clean. Cable shall not be dragged on the ground or over sharp edges or abrasive surfaces. Slack wire shall be provided at all pull points.
- H. All cables to be installed in a raceway shall be pulled together. The pulling means (fish tape, cable, rope, etc.) shall be of a type that will not damage the raceway.
- I. Cable shall be installed or drawn into the raceway system only after all work of any nature that might cause injury to the cable is completed. The raceway system shall be complete, snaked and cleaned before pulling any cable.



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- J. Cord drops from ceilings or similar shall have suitable stainless steel basket weave support/strain relief grips, Kellems or approved equal. Cord connectors shall liquidtight type.
- K. Provide conduits, boxes, etc. for all "open" cable wiring where penetrating from one floor to the next and through rated fire walls.
- L. Provide conduits, boxes, etc. for telecommunications and other ancillary systems (where required by the ancillary system provider) "open" cable wiring within walls up to an accessible location above the ceiling.
- M. Protect "open" cables during installation. Provide suitable covers on supports, structural members, etc. with sharp edges. Remove all added coverings, protection, etc. after installation of the cable.
- N. All cables shall terminate in an approved enclosure or fitting.
- O. Provide wire/cable markers (Brady type or equivalent/better) identifying its circuit number and/or final destination on all cables/conductors (power, telephone/computer, and other ancillary systems) at panels, devices, junction points, etc.
- P. Cable pulling lubricants shall be used to minimize pulling stresses on cable pulled into raceways.
- Q. All cable is subject to subtle damage that may degrade future performance, if abused during installation. In all cable installation, set reels and use sufficient pulleys and manpower so that cables are not pulled around corners or against material that might cause chafing.

OBSERVATION OF IMPROPER CABLING HANDLING TECHNIQUES MAY CAUSE THE CONSULTANT/ENGINEER AND/OR OWNER TO REQUIRE THE CONTRACTOR TO DISCARD AFFECTED CABLES, INCLUDING ANY OTHERS ALREADY INSTALLED BY THE PERSONNEL FOUND USING INCORRECT PROCEDURE.

- R. Conductor connections shall be made with connectors of the proper size and type. Compression connections shall be made with the correct die and number of crimps, or the correct tightening torque in the case of mechanical connectors, according to manufacturer's instructions and recommendations. Use suitable oxide inhibiting joint compound on all aluminum terminations. Termination of insulated conductors shall be made so that the stripped length of bare conductor is not longer than required for the terminal or connector. Care shall be taken to not nick conductors during insulation removal.

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- S. At pulling points, the cables shall be neatly bundled by circuit.
- T. Taps and splices shall be kept to a minimum; and are not allowed in cables larger than #8 AWG, control cable, ancillary systems cable, etc. and below grade without prior approval from the Engineer.
- U. Field wiring shall not contact live parts.
- V. Cables shall not be supported by their terminations. Suitable cable ties and/or supports shall be utilized in switchboards, panelboards, terminal boxes, junction boxes, vaults, etc. to group and support conductors. All cable shall be fanned-out to terminals and identified by labels; or, if terminated on circuit breakers or control devices, by typewritten indexes or nameplates.
- W. Insulated cable supports shall be provided to relieve any strain imposed by cable weight or movement, and to secure cable as required to withstand the effects of fault currents.

#### **3.06. PENETRATIONS**

- A. Wall, ceiling and floor penetrations by raceways (both inside and outside the raceway), cables, etc. shall be sealed to maintain the original moisture, dust and fire resistance to the approval of the Architect.
- B. Do not cut, notch or drill structural framing members for the installation of raceways without the Architect's approval in each case. Holes and penetrations where allowed in studs, joists and other structural members for raceways and cables shall be of a size to allow for a tight fit.
- C. Provide conduit sleeves as required, plus a spare of the same size, where "open" cable passes through floors, walls, partitions, etc.
- D. Floor and ceiling penetrations by "open" cables and/or cable trays will not be allowed.
- E. Contractor shall x-ray or otherwise determine the exact location of existing structural components, conduits, piping, wiring, ducts and the like prior to making any new penetrations or openings (or expanding existing openings) in any floor, wall or ceiling.

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#### 3.07. PULL STRINGS AND ROPES

- A. Provide pull ropes in all below grade telecommunications (with and without cables), spare, etc. conduits.
- B. Provide pull strings in all above grade telecommunications (with and without cables), spare, etc. conduits.

#### 3.08. ANCILLARY SYSTEMS

- A. The Contractor shall coordinate with ancillary systems suppliers and provide conduit, boxes, cables, etc. in accordance with their requirements; except, minimum as indicated and/or specified.

END OF SECTION

**DIVISION 26 - ELECTRICAL**  
**Section 26 05 26 – Grounding and Bonding**

---

PART 1 - GENERAL

1.01. APPLICABLE PROVISIONS

- A. The General, Supplementary and other Conditions of the Contract, modifications to the General Conditions, the Drawings, and the applicable provisions of the other Divisions are hereby made a part of this Division and all its sections.

1.02. SUMMARY

- A. The requirements of this Section and the other Division 26, 27 & 28 Sections apply to all the grounding work.
- B. Coordinate grounding work with related work shown and specified elsewhere.
- C. Provide all materials necessary for the proper execution and completion of the work as herein specified or called for on the drawings. Required items not specifically mentioned in the specifications or indicated on the drawings shall be provided as necessary to produce the intended results.
- D. In the event that any item is not available exactly as specified, the Contractor shall so notify the Engineer in writing as early as possible to allow ample time for an alternate item to be selected without delay to the project.

PART 2 - PRODUCTS

2.01. GROUNDING

- A. Ground clamps, nuts, washers, etc. shall be corrosion resistant high copper alloy or silicon bronze; except, below grade and foundation rebar ground connections shall be exothermic welded (Cadweld or approved equal) or copper compression type.

2.02. WIRE AND CABLE

- A. Ground wire and cable sizes indicated and/or specified are minimums only and shall be increased as required due to NEC, system, load, voltage drop, etc. requirements.
- B. Ground electrode conductors shall be copper, bare below grade.

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### **Section 26 05 26 – Grounding and Bonding**

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- C. Equipment ground cable shall be single conductor copper with 600 volt type XHHW or THWN/THHN insulation. Conductor size shall match feeder, branch circuit, etc. conductor size unless noted otherwise. Conductors shall be stranded, except #12 AWG lighting and general purpose receptacle branch circuit conductors may be solid.

#### **PART 3 - EXECUTION**

##### **3.01. GROUNDING**

- A. All electrical equipment, enclosures, boxes, devices, etc. shall be provided with a ground fault return path by means of an insulated grounding conductor installed with the circuit conductors, and the integrity of the raceway system if applicable. Bond raceway system as required.
- B. Ground terminals of all equipment, devices, etc. shall be grounded by the equipment ground conductor.
- C. Raceways shall be closely and tightly fitted in couplings, connectors, boxes, etc. to provide an electrically continuous low resistance ground fault return path. Threaded joints shall be made up with at least 5 threads fully engaged.
- D. Building steel and interior metal piping systems shall be suitably bonded.
- E. Grounding conductors exposed to mechanical damage shall be protected with PVC conduit sleeves with bushings.
- F. Before grounding connections are made, contact surfaces shall be thoroughly cleaned and anti-oxidant solution applied.
- G. Connections shall be both mechanically and electrically secure. Torque connecting hardware in accordance with the manufacturer's instructions and recommendations.
- H. Tests shall be made to verify the continuity of the ground system and all ground fault return paths.
- I. After completion of the grounding system, the resistance of the grounding network to earth shall be measured using a ground megger using a fall of potential test method. Driven ground rods shall be disconnected and tested separately from the grounding system. The minimum ground earth resistance shall be maximum 25 ohms.

**END OF SECTION**

**DIVISION 26 - ELECTRICAL**  
**Section 26 07 00 – Thermal & Moisture Protection**

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PART 1 – GENERAL

1.01. APPLICABLE PROVISIONS

- A. The General, Supplementary and other Conditions of the Contract, modifications to the General Conditions, the Drawings, and the applicable provisions of the other Divisions are hereby made a part of this Division and all its sections.

1.02. SUMMARY

- A. The requirements of this Section and the other Division 26, 27 & 28 Sections apply to all the thermal & moisture protection work.
- B. Coordinate thermal & moisture protection work with related work shown and specified elsewhere.
- C. Provide all materials necessary for the proper execution and completion of the Work as herein specified or called for on the drawings. Required items not specifically mentioned in the specifications or indicated on the drawings shall be provided as necessary to produce the intended results.
- D. In the event that any item is not available exactly as specified, the Contractor shall so notify the Engineer in writing as early as possible to allow ample time for an alternate item to be selected without delay to the project.

PART 2 - PRODUCTS

2.01. GENERAL

- A. Coordinate the features of materials and equipment so they form an integrated system.

2.02. MOISTURE PROOFING

- A. Moisture proofing systems shall be designed and installed to allow the passage of cable, conduit or pipe through exterior walls, etc. and vaults. They shall provide a barrier seal to prevent the penetration of water and gases into the structure to be penetrated.

**DIVISION 26 - ELECTRICAL**  
**Section 26 07 00 – Thermal & Moisture Protection**

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2.03. FIRE STOPPING AND SEALING MATERIALS

- A. Fire-stop systems shall be designed and installed to allow the passage of cable, conduit or pipe through fire rated walls or floors. They shall provide a barrier seal to prevent the penetration of fire, smoke, water, and gases, with a fire rating to match the rating of the architectural assembly or structure to be penetrated.
- B. Fire-stop systems shall be resistant to direct hose spray.
- C. Fire-stop systems shall consist of one or more of the following materials:
  - 1. Ablative (typical of silicone-based technology).
  - 2. Cementitious (Can be troweled like grout or mortar, but is specifically rated for the purpose. Grout shall not be permitted).
  - 3. Elastomeric (Flexible substance which resembles rubber).
  - 4. Endothermic (Absorbing heat energy.).
  - 5. Intumescent (Swelling under the influence of heat, pillows, etc.).
  - 6. Mechanical (Assemblies that allow additions or deletions).
- D. Fire-stop systems shall be UL classified for the intended use.
- E. Wall, ceiling and floor sleeves and the like shall be metallic raceways with intumescent bags or bricks; except, at the option of the Contractor, sleeves may be metallic wireways (sized to match the required raceways) which contain an intumescent insert material that adjusts automatically to cable additions or subtractions, Specified Technologies EZ Path, 3M Fire Barrier Pass-Through, or approved equal.
- F. Fire-stop material around cable penetrations, within raceways (except wall and floor sleeves), etc. shall be intumescent bags, bricks, or soft, pliable, non-hardening intumescent putty, with high dielectric strength (insulator). Material shall allow removal of the material(s)/system(s) for future cable additions and/or removals.
- G. Drywall joint compound, concrete, and mineral wool shall not be used as fire stopping materials.
- H. Fire-stop products shall be as manufactured by 3M, Dow Corning, Hilti, Nelson, Specified Technologies, Unique Fire Stop Products, or approved equal.

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2.04. DUST SEALING MATERIALS

- A. Dust seal systems shall be designed and installed to allow the passage of cable, conduit or pipe through non-rated ceilings, walls, partitions or floors.
- B. Dust sealant around raceways and the like shall be top grade paintable silicone based or poly-sulfite caulk, or expanding foam type sealant.
- C. Dust sealant around cable penetrations, within raceways, etc. shall allow removal of the material for future cable additions and/or removals.

PART 3 - EXECUTION

3.01. INSTALLATION

- A. Provide all fire-stop sealing for all penetrations through fire-resistance-rated floors, walls and partition construction; including empty openings and openings containing cables, raceways, cable trays, cable racks, sleeves, supports and other penetrating items as required, both new and existing where new cables, raceways and the like have been installed. Contractor is responsible for verifying the fire rating of the barrier to be penetrated.
  - 1. Install fire-stop systems in accordance with manufacturer-tested methods and to manufacturer's instructions. If required, extend fire-stop system through the full thickness of the wall or floor and through the full length of the sleeve.
  - 2. Seal openings with a removable fire-stop material after each shift. Do not leave unattended openings in building fire-resistance-rated walls, partitions and floors at any time during construction.
  - 3. Fire-stopping at penetrations between tunnels and buildings shall include smoke isolation provisions to prohibit smoke migration from one space to the other.
- B. Where sleeves or penetrations are installed through non-rated partitions, provide a dust seal to prevent dust from migrating between the spaces separated by the partition. Also, where fire stop material does not completely fill an opening (e.g. intumescent pillows), provide suitable dust sealant as required.



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- C. Where existing sleeves or penetrations are re-entered for installation of new cables, Contractor shall modify/re-install or provide new fire stop material as required to maintain the original fire rating of the barrier.

#### **3.02. MOISTURE PROOFING**

- A. Conduit terminations at equipment, etc. shall be suitably sealed and/or plugged at both ends to prevent the entrance of moisture.
- B. Underground conduits extending into buildings and at transformers, switchgear, etc. shall be suitably sealed or plugged at both ends. Underground conduits between vaults shall be suitably sealed or plugged at the high end. Sealant shall be removable. Ductseal is not acceptable.
- C. Conduit penetrations through retaining walls and building exterior walls shall be suitably sealed and/or grouted to prevent the entrance of moisture.
- D. PVC conduit shall be solvent welded to prevent the entrance of moisture.
- E. Vault lids, conduit and cable entrances, etc. shall be suitably sealed and/or grouted to prevent the entrance of moisture.
- F. Vaults shall be drained from at, or near, its bottom to the nearest point in a storm drain or drainage ditch below the level of the vault base. Provide suitable rodent screen on the end of each drain.
- G. Comply with manufacturer's installation instructions and recommendations particular to each product for all roof penetrations. Repair existing roofing and flashing altered by work, including restoration of base, insulation, membranes, flashing, adhesives, sealants, and roofing accessories integrally related to roof installations. Clean all effected surfaces prior to roofing work. Flash and counter-flash all roof penetrations.

END OF SECTION

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PART 1 - GENERAL

1.01. APPLICABLE PROVISIONS

- A. The General, Supplementary and other Conditions of the Contract, modifications to the General Conditions, the Drawings, and the applicable provisions of the other Divisions are hereby made a part of this Division and all its sections.

1.02. SUMMARY

- A. The requirements of this Section and the other Division 26, 27 & 28 Sections apply to all the electrical work.
- B. Coordinate electrical work with related work shown and specified elsewhere.
- C. Provide all materials necessary for the proper execution and completion of the work as herein specified or called for on the drawings. Required items not specifically mentioned in the specifications or indicated on the drawings shall be provided as necessary to produce the intended results.
- D. In the event that any item is not available exactly as specified, the Contractor shall so notify the Engineer in writing as early as possible to allow ample time for an alternate item to be selected without delay to the project.

1.03. SUBMITTALS

- A. Provide submittals for the following:
  - 1. Circuit breakers.
  - 2. Disconnect switches.
  - 3. Wiring devices & wallplates.

PART 2 - PRODUCTS

2.01. PANELS

- A. Circuit breakers shall be bolt-on in panelboards, molded-case, thermal magnetic, quick make-quick break type with trip indicating handles. Branch circuit breakers for motor loads shall be HACR type. Branch circuit breakers for lighting loads shall be SWD type. Multi-pole breakers shall be single-handle, internal common trip. Tandem breakers shall not be used.

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- B. Provide padlocking devices on circuit breakers where required.
- C. Provide approved handle ties between single pole circuit breakers for all multiwire branch circuits as required.

**2.02. DISCONNECT SWITCHES**

- A. Disconnect switches shall be heavy-duty, horsepower rated, safety switches, suitable for use as service entrance equipment where required. The switches shall have a handle whose position is easily recognizable, lockable in the OFF position, operable from the front and in control of the disconnecting means with the cover open or closed. The switch position shall be non-teasible, positive, quick make-quick break. Line, load, neutral and ground lugs shall be provided as required. Cable terminals shall be suitable for copper and aluminum wire.
- B. Disconnect switches shall be identified with laminated nameplates, black face, white core, engraved with minimum  $\frac{1}{4}$  inch letters describing its function. Nameplates shall identify the equipment that is fed by the disconnect and the source panelboard and circuit number that supplies the disconnect.
- C. Disconnect switches shall be provided with warning nameplates to warn personnel of potential arc flash and shock hazards in compliance with the NFPA 70E standard. Nameplates shall include the voltage system, arc flash boundary limits and PPE category specific to the location.

**2.03. WIRING DEVICES**

- A. Wiring devices shall be specification grade, all of the same manufacturer, ivory colored.
- B. Equipment disconnect type switches shall be toggle, heavy duty manual motor controllers, horsepower rated, with the number of poles and ampere rating indicated and/or required.
- C. Fan variable speed switches will be furnished by the Mechanical Contractor, and shall be installed by the Electrical Contractor.
- D. General purpose receptacles shall be 20 amp, 125 volt, AC, straight blade, 3-wire grounding type.
- E. Ground fault interrupter (GFI) type receptacles shall be duplex, Class A, 20 amp, 125 volt with end of life protection (either by rendering itself incapable of delivery power or by visual indication) and reverse line-load miswire protection. Provide

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individual ground fault interrupter type receptacles at each location indicated or as required. Feed-through type protection of multiple outlets will not be allowed.

- F. Special purpose receptacles shall be of the type, ratings and design for the use intended, NEMA configuration. Provide matching plugs where indicated.
- G. Flush mounted devices (including telecommunications) shall have smooth specification grade high abuse nylon wallplates, color to match devices.
- H. Surface mounted devices shall have raised surface type covers, galvanized steel.
- I. Weather-proof devices (other than receptacles) shall be equipped with stainless steel or cast metal covers and spring-loaded gasketed doors.
- J. Weather-proof receptacles shall be equipped with heavy duty die cast while-in-use covers. Covers shall maintain a weatherproof rating whether or not an attachment plug is inserted. Intermatic WP3110MXD series, or approved equal.
- K. Definite purpose devices shall be labeled with a description of the device's function, rating and circuit identification.
- L. All outlets shall be labeled with the panel and circuit number(s) from which the device is fed. Labels shall be heavy duty adhesive type, clear with black letters on light colored devices and clear with white letters on dark colored devices. Lettering shall be appropriately sized for the application, except minimum  $\frac{1}{4}$  inch. Labels on ceiling mounted devices shall be large enough to read from the floor. Labels shall be as manufactured by Kroy, Brothers, or approved equal. Self-adhesive circuit numbers, masking tape, plastic punch type "Dymo" labels, etc. are not acceptable.

**2.04. EQUIPMENT IDENTIFICATION**

- A. Provide nameplates for all equipment and other devices used for the control of circuits, equipment, etc. Include the panel and circuit number(s) from which it is fed.
  - 1. Emergency Power Systems per NEC and WAC.
  - 2. Panelboards and each feeder circuit breaker within each.
  - 3. Motor starters, contactors, etc.
  - 4. Disconnect switches.

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5. Control stations and their devices.
  - B. All distribution equipment (switchboard, panelboards, motor control centers, etc.) shall be provided with laminated plastic nameplates to identify the system color coding scheme for phase and neutral conductors as required.
  - C. All distribution equipment (switchboard, panelboards, motor control centers, etc.) shall be provided with warning nameplates to warn personnel of potential arc flash and shock hazards in compliance with the NFPA 70E standard. Nameplates shall include the voltage system, arc flash boundary limits and PPE category specific to the location.
  - D. Definite purpose devices shall be labeled with a description of the device's function, rating and include the panel and circuit number(s) from which it is fed.
  - E. All equipment and outlets shall be labeled with the panel and circuit number(s) from which it is fed.
  - F. Labels shall be heavy duty adhesive type, clear with black letters on light colored devices and clear with white letters on dark colored devices. Lettering shall be appropriately sized for the application, except minimum  $\frac{1}{4}$  inch. Labels on ceiling mounted devices shall be large enough to read from the floor. Labels shall be as manufactured by Kroy, Brothers, or approved equal. Self-adhesive circuit numbers, masking tape, plastic punch type "Dymo" labels, etc. are not acceptable.
  - G. Nameplates shall adequately describe the function or operation of the identified equipment, devices, etc. and, where applicable, include the panel and circuit number(s) from which it is fed. Nameplate designations shall be consistent with the project documents. Submit proposed inscriptions for approval.

**PART 3 - EXECUTION**

**3.01. TEMPORARY POWER**

- A. The Contractor shall provide all temporary power services, facilities, equipment, devices, material, etc. required for the construction; including adequate lighting, outlets, balancing, testing, etc. as may be necessary for the proper performance and inspection of the work.

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- B. The temporary power system shall be provided in a neat and safe manner, in compliance with governing codes and good working practice.
- C. The temporary power system shall be removed when no longer required.

3.02. LOCATIONS

- A. The mounting heights and location of similar equipment and devices shall be consistent, in accordance with the requirements of the ADA where applicable. Special purpose items shall be located conveniently for the purpose intended.
- B. Devices shall be located to not interfere with the removal of pipes or equipment for maintenance or repair. All devices shall be kept a minimum of 6 inches away from items producing heat.
- C. Disconnect switches, circuit breakers, etc. shall, in no case, be installed so that the grip of the operating handle, when in its highest position, is more than 6<sup>1</sup>/<sub>2</sub> feet above the floor or working platform.
- D. Outlets (power, telecommunications, etc.) shall be mounted 18 inches to centerline above finished floor unless noted otherwise; except, outlets above counters, etc. shall be mounted 6 inches to centerline above the counter or 3 inches to centerline above the splashboard, whichever is higher.
- E. Locate light switches, etc. 6 inches from door casings (except on center in spaces less than 12 inches), 42 inches to centerline above finished floor. Where light switches are adjacent to countertops, install the switches at the same height as adjacent devices above the countertop.
- F. Prior to rough-in, the Contractor shall mark or otherwise show the location of all equipment and devices, and obtain specific approval from the Owner and Architect for the location of each prior to installing enclosures, boxes, raceways, etc.

3.03. EQUIPMENT AND DEVICES

- A. Equipment, devices, enclosures, etc. shall be installed plumb and true and shall be square with the adjacent walls, ceilings and structural members.
- B. Equipment, cabinets, boxes, etc. shall be accurately mounted and leveled and be firmly supported either directly or indirectly by a sound and safe structural member of the building in accordance with manufacturer's instructions, or as directed. Supports shall be neatly placed and properly fastened.

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- C. The correct lifting, jacking and/or moving gear which will prevent damage to the equipment shall be used.
- D. Bolts, nuts, screws and other fastenings shall be tightened and all covers replaced on equipment and boxes. Electrical connections, particularly those on bus work in panelboards, etc. shall be checked to ensure tightness and electrical conductivity. Gaskets, seals, etc. shall be checked for proper fit.
- E. Follow manufacturer's installation details wherever available. Provide boxes, mountings, wiring or fittings required, standard or special.
- F. The Contractor shall touch-up paint all scratched, marred or damaged factory finish on equipment, devices, enclosures, etc.

**3.04. DEVICES**

- A. Flush mounted switch, outlet, etc. boxes in common non-fire rated walls and facing into different rooms shall be offset a minimum of 6 inches to minimize sound transmission between rooms. Flush mounted switch, outlet, etc. boxes in common rated fire resistive walls and facing into different rooms shall be offset a minimum of 24 inches. Boxes mounted back-to-back will not be allowed. Raceways between boxes in adjoining rooms shall be filled as required to maintain the fire rating (where required) and minimize sound and dust transmission between rooms.
- B. Low voltage cut-in type mounts in a common wall and facing into different rooms shall be offset a minimum of 12 inches and shall be separated by a stud. Area between low voltage cut-in type mounts without boxes shall be filled with insulation or other suitable material to minimize sound and dust transmission between rooms.

**3.05. TESTING**

- A. Before testing, visually inspect equipment thoroughly, and perform mechanical operation and key interlock tests in accordance with manufacturer's instructions.
- B. Before energization, test all equipment in accordance with manufacturer's recommendations; except minimum as described below.
- C. Compare test results with factory-obtained results and results on similar equipment. Investigate variations. Consult manufacturer for recommendations.

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- D. Upon completion, all equipment and systems shall be tested for functional operation, including all intended modes and sequences of operation.
- E. Record the values of each test, along with the description of the instrument, voltage level, temperature, time, and date of the test on the form included in the contract documents. Sign the results.

END OF SECTION



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PART 1 - GENERAL

1.01. APPLICABLE PROVISIONS

- A. The General, Supplementary and other Conditions of the Contract, modifications to the General Conditions, the Drawings, and the applicable provisions of the other Divisions are hereby made a part of this Division and all its sections.

1.02. SUMMARY

- A. The requirements of this Section and the other Division 26, 27 & 28 Sections apply to all the lighting and lighting control work.
- B. Coordinate lighting and lighting control work with related work shown and specified elsewhere.
- C. Provide all materials necessary for the proper execution and completion of the work as herein specified or called for on the drawings. Required items not specifically mentioned in the specifications or indicated on the drawings shall be provided as necessary to produce the intended results.
- D. In the event that any item is not available exactly as specified, the Contractor shall so notify the Engineer in writing as early as possible to allow ample time for an alternate item to be selected without delay to the project.

1.03. QUALITY ASSURANCE

- A. The lighting systems and all controls shall be in accordance with the Washington State Non-Residential Energy Code (NREC), ASHRAE 90.1 as well as LEED certification requirements.

1.04. SUBMITTALS

- A. Provide submittals for the following:
  - 1. Lighting fixtures.
  - 2. Lighting control devices.
  - 3. Emergency lighting inverters.

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PART 2 - PRODUCTS

2.01. GENERAL

- A. Fixtures, luminaires, poles, etc. shall include all necessary mounting and connecting accessories.
- B. Contractor & lighting fixture supplier shall verify description & catalog numbers in Lighting Fixture Schedule on the drawings match and mounting requirements are correct. Advise engineer of any conflicts or discrepancies.

2.02. LIGHTING

- A. Light Emitting Diode (LED) luminaires shall have a luminous efficacy of at least 90 lumens/W, a CRI of at least 80, an estimated life of at least 50,000 hours at 70% lumen maintenance, and shall include a minimum 5-year warranty on the entire luminaire including the driver. The luminaire and LEDs shall have been tested in accordance with LM-79 and LM-80.

2.03. EMERGENCY LIGHTING

- A. Emergency lighting power units shall be self-contained, designed to provide power to fixtures automatically upon interruption of normal electric power for a minimum of 90 minutes. Emergency power source shall be a rechargeable, maintenance free, sealed, spill proof pure lead or lead-calcium battery system. The units shall incorporate a regulated solid-state charger with filtered output and low voltage disconnect.
- B. Controls shall include circuitry to provide continuous self-diagnostic monitoring of the units operation, programmed discharge cycles, charger mode indicator light, unit malfunction indicator lights, and a test switch.
- C. Emergency lighting inverters shall be self contained, remote mounted, NEMA 1 enclosure, designed to provide AC power to fixtures automatically upon interruption of normal electric power for a minimum of 90 minutes. Emergency power source shall be a rechargeable, maintenance free, sealed, spill proof pure lead or lead-calcium battery system. The units shall incorporate a regulated solid-state charger with filtered output and low voltage disconnect. Controls shall include circuitry to provide continuous self-diagnostic monitoring of the units operation, programmed discharge cycles, charger mode indicator light, unit malfunction indicator lights, and a remote mounted test switch. Inverters shall be Dual-Lite or equal.

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2.04. LIGHTING CONTROLS

- A. Occupancy sensors and photosensors shall be by the same manufacturer and shall form a single integrated system in each room.
- B. Occupancy sensors:
  - 1. Occupancy sensors shall be combination passive infrared and ultrasonic type, ceiling mounted, with adjustable time delay, adjustable sensitivity, and an LED indicator. Lenses shall be as required for the application (e.g. wide angle for open areas and the like and long range for corridors). The sensors shall be able to detect the difference between a human body and the background space. Occupancy sensors shall be Watt Stopper DT-300, or approved equal.
  - 2. Occupancy sensors on high ceiling areas shall be designed specifically for high mounting (15' – 40') and large area applications. Lenses shall be as required for the application.
  - 3. Relays/power packs for use with low voltage switching shall be remote mounted, 120 or 277 volt AC input (as required), 24 volt DC output, with single or multiple relays and contacts rated minimum 20 amps as required. Relays/ power packs shall be capable of controlling and/or being controlled by up to minimum 3 sensors and shall be capable of selection between automatic on mode and manual on mode. Power packs shall be capable of being connected to a momentary contact switch for manual switching of connected loads. Occupancy sensors relays/power packs shall be of the same manufacturer and specifically designed for use with the occupancy sensors, Watt Stopper BZ-150, or approved equal.
  - 4. Where required due to the quantity of occupancy sensors, provide additional remote power supplies. Power supplies shall be of the same manufacturer and specifically designed for use with the occupancy sensors.
- C. Lighting level photosensor controls shall be dimming type, capable of dimming the ballasts or LED driver in response to varying light levels, consisting of a photosensor, relays/power packs and utilizing handheld remote control for setup and adjustments. Photosensor shall be ceiling mounted, be accurate to +/- 5% over the footcandle range, and shall have a linear response to light input. Power packs shall be shared with the occupancy sensors, remote mounted, 120 or 277 volt AC input (as required), 24 volt DC output, with contacts rated minimum 20 amps. Photosensors shall be Watt Stopper type LS-301, with LRS-301S remote control and power packs, or approved equal.

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2.05. LIGHTING CONTROL DEVICES

- A. Low voltage toggle switches shall be toggle type, single pole-double throw, momentary contact, ivory color, normally open, rated minimum 3 amps, 24 VAC, with mounting bracket and suitable for use in standard single-gang openings. Switches shall be Leviton model 1081, Greengate model GMT, or equal.

2.06. WIRE AND CABLE

- A. Fixture whips provided as an assembly by the fixture manufacturer with the fixtures shall be #14 AWG.
- B. Fixture cable, where supplied by the Contractor, shall be stranded copper with 600 volt type PF insulation.

2.07. NAMEPLATES AND LABELS

- A. Provide nameplates for all lighting switches in classrooms as indicated on the drawings.
- B. Nameplates shall adequately describe the function or operation of the identified equipment, devices, etc. Nameplate designations shall be consistent with the project documents. Submit a sample of nameplates for approval.

PART 3 - EXECUTION

3.01. LOCATIONS

- A. The mounting heights and location of similar equipment and devices shall be consistent, in accordance with the requirements of the ADA where applicable. Special purpose items shall be located conveniently for the purpose intended.
- B. Disconnect switches, circuit breakers, etc. shall, in no case, be installed so that the grip of the operating handle, when in its highest position, is more than 6<sup>1</sup>/<sub>2</sub> feet above the floor or working platform.
- C. Prior to rough-in, the Contractor shall mark or otherwise show the location of all equipment and devices locations, and obtain specific approval from the Owner

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and Architect for the location of each prior to installing enclosures, boxes, raceways, etc.

- D. Outlets shall be mounted 18 inches to centerline above finished floor unless noted otherwise.
- E. Locate light switches, lighting control stations, etc. 6 inches from door casings (except on center in spaces less than 12 inches), 42 inches to centerline above finished floor.

**3.02. EQUIPMENT, LUMINAIRES AND DEVICES**

- A. Equipment, luminaires, devices, etc. shall be installed plumb and true and shall be square with the adjacent walls, ceilings and structural members.
- B. Unless noted or indicated otherwise, orientation of luminaires within a space shall be consistent.
- C. Occupancy sensors shall be mounted and aimed in accordance with manufacturer's recommendations. All necessary adjustments and settings shall be made in order to ensure the lights will operate when the room is occupied.
- D. Photoelectric controls shall be mounted and aimed in accordance with manufacturer's recommendations. All necessary adjustments and settings shall be made in order to ensure the controls will operate properly.
- E. The correct lifting, jacking and/or moving gear which will prevent damage to the equipment shall be used.
- F. All bolts, nuts, screws and other fastenings shall be tightened and all covers replaced on equipment and boxes. All electrical connections shall be checked to ensure tightness and electrical conductivity. All gaskets, seals, etc. shall be checked for proper fit.
- G. Follow manufacturer's installation details wherever available. Provide any special mountings, wiring or fittings required.
- H. Provide complete manufacturer's schematic drawings for each system. Any deviations between schematic drawings and contract documents shall be outlined in a separate cover letter. Said deviations will be subject to approval by the Engineer.
- I. Provide gaskets, seals, etc. as required to prevent the entrance of moisture, debris, insects, etc. Check for proper fit.

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- J. Repair damaged corrosion protection and touch-up paint all scratched, marred or damaged factory finish on equipment, devices, fixtures, enclosures, etc.

3.03. SUPPORTS

- A. Provide all necessary supports and backing for all fixtures, boxes, enclosures, etc. Attach to wood with wood or lag screws, to metal with machine screws or bolts and to concrete with carbon steel wedge or sleeve type expansion anchors or self-drilling metal anchors and machine screws or bolts. Use size and number of attachments as required to support equipment, fixtures, etc. weight with a safety factor of at least four.
- B. Powder actuated fasteners, plastic expansion type anchors, nails and toggle bolts are not permitted.
- C. Brace all equipment, etc. as required to meet the requirements of seismic zone 3.
- D. Fixtures, luminaires, etc. shall be accurately mounted and leveled and be firmly supported either directly or indirectly by a sound and safe structural member of the building in accordance with manufacturer's instructions, or as directed. Supports shall be neatly placed and properly fastened.
- E. Ceiling mounted recessed light fixtures, etc. shall be connected both to the ceiling system with proper "earthquake" clips and to the building structural system with a minimum of 2 suitable earthquake chains or "tie wires" at diagonally opposite corners.
- F. Follow manufacturer's installation details wherever available. Provide all supports, mountings, etc. required, standard or special.

3.04. WIRES AND CABLES

- A. Inspect cable prior to installation to verify that it is identified properly on the reel or box identification label and that it is of proper gauge, containing correct number of pairs, etc. Note any buckling of the jacket which would indicate possible problems. Damaged cable or any other components failing to meet specification shall not be used in the installation.
- B. Line voltage cable within poles shall be routed in electrical nonmetallic tubing as required to maintain separation of line and low voltage cabling.

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- C. All concealed power limited systems cable may be run “open” in accessible ceilings; except, where indicated otherwise and where penetrating through ceilings, floors, walls, draft-stops, etc.
- D. "Open" cables shall be bundled and supported from permanent structural members of the building, either directly or indirectly, with suitable hooks. Support spacing shall not exceed 5 feet. Protect “open” cables during installation in ceiling spaces. Cables shall not interfere with the removal of pipes or equipment for maintenance or repair. All "open" cable shall be kept a minimum of 6 inches from pipes, ducts, and other items producing heat. Support “open” cables a minimum of 6 inches above T-bar ceilings. Tape and cable ties are not approved methods of fastening cables.
- E. Floor and ceiling penetrations by “open” cables will not be allowed. Provide conduit sleeves, as required plus a spare (with fire and dust stopping and sealing) where “open” cable passes through floors, walls, partitions, etc.
- F. Cable shall be unrolled from reels, or removed from cartons, and installed in a manner which will prevent kinking, crushing or excessive tension on conductors and insulation. Slack wire shall be provided at all pull points.
- G. Cable shall be installed or drawn into the raceway system only after all work of any nature that might cause injury to the cable is completed. The raceway systems shall be complete (including the installation of bushings, grommets, etc.), snaked and cleaned, and approval of the installation is obtained from the Owner and Engineer, before pulling any cable.
- H. Cable pulling lubricants shall be used to minimize pulling stresses on cable pulled into raceways.
- I. All cable is subject to subtle damage that may degrade future performance, if abused during installation. In all cable installation, set reels and use sufficient pulleys and manpower so that cables are not pulled around corners or against material that might cause chafing.
- J. Replace or rework cables showing evidence of improper handling including stretches, kinks, short radius bends, and over tightened bindings.

**3.05. EQUIPMENT TESTING**

- A. Before testing, visually inspect equipment thoroughly, and perform mechanical operation tests in accordance with manufacturer’s instructions.

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B. Emergency Lighting Standby Power System:

1. The completed installation shall be initially started-up and checked-out for operational compliance by a factory-trained representative of the manufacturer.
2. Operating Load Tests:
  - a. Upon completion of initial start-up and system checkout, perform field tests (with the Owner and Engineer notified in advance) to demonstrate load carrying capability, and voltage and frequency stability. With the emergency load at normal operating level, a power failure shall be initiated by turning off the circuit breaker supplying normal power to the UPS.
  - b. Records shall be maintained throughout the tests of time-of-day, temperature, time required to come up to operating voltage and frequency, time required to achieve steady-state conditions, voltage, frequency, current, ambient air temperature, kilowatts, power factor, battery charge rate, etc.
  - c. Continue load tests for 90 minutes, observing and recording load changes and the resultant effect on voltage and frequency, then return normal power.
3. Tests shall be performed to demonstrate the operation of the unit and all monitoring and safety devices.

C. Lighting Control Devices:

1. Stand-alone occupancy sensors shall be individually tested and the test results documented. Verify that the occupancy sensors turn on the lights in the controlled space immediately when the room is entered. Record the amount of time that the lights stay on after the room is vacated. Delay times shall be programmed as follows:
  - a. Offices: 30 minutes.
  - b. Manufacturing: 30 minutes.



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3.06. DEMONSTRATION & TRAINING

- A. The person(s) who conduct these instructions and demonstrations shall be a qualified representative(s) of the manufacturer with substantial training and operating experience on this equipment and project, and shall be versed in the operating theory as well as practical operation and maintenance work. Instructor(s) shall have the necessary educational and interpersonal skills, as well as proven ability to effectively perform the training. Their qualifications shall be submitted to the Architect before conducting the instruction period.
  
- B. All training material shall be furnished and supplied by the Contractor.

END OF SECTION

## **DIVISION 28 - SECURITY**

### **Section 28 16 00 – Access Control & Intrusion Detection System**

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#### **PART 1 – GENERAL**

##### **1.01. APPLICABLE PROVISIONS**

- A. The General, Supplementary and other Conditions of the Contract, modifications to the General Conditions, the Drawings, and the applicable provisions of the other Divisions are hereby made a part of this Division and all its sections.

##### **1.02. SUMMARY**

- A. The requirements of this Section and the other Division 26, 27 & 28 Sections apply to all the security system work.
- B. The access control system shall be an expansion and modification to the existing system.
- C. The intrusion detection system shall be an expansion and modification of the existing system.
- D. Coordinate security system work with related work shown and specified elsewhere, including but not limited to:
  - 1. Doors and door hardware systems.
- E. Provide equipment, devices and all necessary accessories for complete and functional modifications to both systems. Provide all materials necessary for the proper execution and completion of the Work. Required items not specifically mentioned in the specifications or indicated on the drawings shall be provided as necessary to produce the intended results.
- F. The system shall connect to the owners existing access control for remote programming and database management.

##### **1.03. SUBMITTALS**

- A. Submit complete documentation for the added equipment, devices, materials, etc. showing the model number, type, rating, size, style, manufacturer's names, and manufacturer's catalog data sheets for all items. Include data on features, rating, and performance.
- B. If requested by the Owner, provide samples of materials for evaluation.

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#### 1.04. QUALITY ASSURANCE

- A. Security system shall be installed by, or under the direct supervision of, a qualified representative of the manufacturer. Contractor and Contractor's personnel shall be experienced, thoroughly trained and completely familiar with intrusion detection systems and the required methods of installation.
- B. Programming, testing, etc. shall be by a qualified representative of the manufacturer.

#### 1.05. RECORD DOCUMENTS

- A. Submit "as built" record drawings and operation and maintenance manuals at completion of the project in accordance with the specific submittal requirements listed elsewhere in these Specifications.
- B. Provide "as built" documentation consistent with the contract documents as required, in AutoCAD dwg files with "as built" notations for all sheets. (Consultant/Engineer will provide construction drawings AutoCAD files to contractor.)

## **PART 2 - PRODUCTS**

#### 2.01. ACCESS CONTROL SYSTEM

- A. The existing access control system is a Hirsh Identiv system, consisting of multiple interconnected intelligent door controllers and monitored power supplies.
- B. The existing system shall be expanded as required for the addition of new doors.
- C. Card readers shall be proximity type, rated for indoor and outdoor use, vandal resistant with sealed polycarbonate housing. Card readers shall be proximity readers capable of operation with Smart Card chip CAC cards.
- D. Man door position switches shall be recessed magnetic contact type, 2 piece, with contacts as required. Match the existing devices installed elsewhere in the building.

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#### 2.02. INTRUSION DETECTION SYSTEM

- A. The existing intrusion detection system is a DSC Neo security system.
- B. The existing system shall be expanded as required for the addition of new door contacts.
- C. Man door position switches shall be recessed magnetic contact type, 2 piece, with contacts as required. Coordinate with door supplier.
- D. Surface mounted door position switches shall be magnetic contact type, 2 piece, tamper resistant and weatherproof (if required).

#### 2.03. WIRE AND CABLE

- A. All wire and cable installed in below grade raceways shall be suitable for wet locations.
- B. Access control & intrusion detection system cable shall be low voltage (Class 2) control cable, multi-conductor copper with 300 volt insulation and an overall jacket, type CL2, listed as being resistant to the spread of fire. The minimum conductor size shall be #16 AWG.
- C. Access control & intrusion detection system contact monitoring cable shall be low voltage (Class 2) control cable, multi-conductor, shielded, with 300 volt insulation and an overall jacket. Cable shall be type CL2 or CMR, listed as being resistant to the spread of fire. The minimum conductor size shall be #22 AWG.
- D. Access control & intrusion detection system card reader and keypad cable shall be low voltage (Class 2) control cable, multi-conductor, shielded, with 300 volt insulation and an overall jacket. Cable shall be type CL2 or CMR, listed as being resistant to the spread of fire. The minimum conductor size shall be #18 AWG.
- E. Increase cable sizes if/as required to compensate for voltage drop.
- F. All concealed power limited systems cable may be run “open” in accessible ceilings; except, where indicated otherwise and where penetrating through ceilings, floors, walls, draft-stops, etc.

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#### 2.04. IDENTIFICATION

- A. Provide nameplates for all equipment and other devices used for the control of circuits, equipment, etc.

#### PART 3 - EXECUTION

#### 3.01. INSTALLATION

- A. Installation of the intrusion detection system and its components shall be done by, or under the direct supervision of, a factory trained authorized representative of the manufacturer.

#### 3.02. WIRES AND CABLES

- A. Inspect cable prior to installation to verify that it is identified properly on the reel or box identification label and that it is of proper gauge, containing correct number of pairs, etc. Note any buckling of the jacket which would indicate possible problems. Damaged cable or any other components failing to meet specification shall not be used in the installation.
- B. Power limited signalling circuit cable shall be durably and plainly marked in or on junction boxes and other enclosures to indicate that it is a power limited signalling circuit.
- C. All concealed power limited systems cable may be run "open" in accessible ceilings; except, where indicated otherwise and where penetrating through ceilings, floors, walls, draft-stops, etc.
- D. "Open" cables shall be bundled and supported from permanent structural members of the building, either directly or indirectly, with suitable hooks. Support spacing shall not exceed 5 feet. Protect "open" cables during installation in ceiling spaces. Cables shall not interfere with the removal of pipes or equipment for maintenance or repair. All "open" cable shall be kept a minimum of 6 inches from pipes, ducts, and other items producing heat. Support "open" cables a minimum of 6 inches above T-bar ceilings. Tape and cable ties are not approved methods of fastening cables.
- E. Floor and ceiling penetrations by "open" cables will not be allowed. Provide conduit sleeves, minimum 1" EMT, as required plus a spare (with fire and dust

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stopping and sealing) where “open” cable passes through floors, walls, partitions, etc.

- F. Cable shall be unrolled from reels, or removed from cartons, and installed in a manner which will prevent kinking, crushing or excessive tension on conductors and insulation. Slack wire shall be provided at all pull points.
- G. Cable shall be installed or drawn into the raceway system only after all work of any nature that might cause injury to the cable is completed. The raceway systems shall be complete (including the installation of bushings, grommets, etc.), snaked and cleaned, and approval of the installation is obtained from the Owner and Engineer, before pulling any cable.
- H. Cable pulling lubricants shall be used to minimize pulling stresses on cable pulled into raceways.
- I. Replace or rework cables showing evidence of improper handling including stretches, kinks, short radius bends, and over tightened bindings.

#### **3.03. LOCATIONS**

- A. Locate card readers 42 inches to centerline above finished floor, 6 inches from door casings; except, on center in spaces narrower than 12 inches.
- B. Where required, card readers shall be located on the door mullions or in aluminum storefront framing members. Coordinate with door hardware supplier and aluminum storefront supplier to provide for conduit routing through the framing members.
- C. Prior to rough-in, the Contractor shall mark or otherwise show the location of all equipment and devices, and the proposed routing of raceways. Obtain specific approval for the location of each from the Owner, Argens Security, Architect and Engineer before rough-in.

#### **3.04. TESTING**

- B. Testing of the access control system shall be done by a qualified representative of the manufacturer; who, after completion, shall submit a letter that he has tested the system and found it acceptable in all respects.

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- C. Contractor shall notify Owner at least 48 hours in advance of readiness to conduct any tests. The actual time and date of tests shall be acceptable to the Owner and the Contractor.
- D. For all tests not meeting criteria as determined by the Owner and Engineer, Contractor shall determine problem(s) and make corrections as required (including replacement of the cable and/or other components if necessary) at Contractor's expense without increase in Contract Sum. After correction(s), Contractor shall repeat tests.

#### **3.05. TRAINING, INSTRUCTION AND ASSISTANCE**

- E. After the installation is complete and operating, and prior to acceptance of the work, conduct instruction period(s) at the site, to point out locations of service and maintenance, and instruct the Owner's representatives in the operation of all systems and equipment.
- F. The person(s) who conduct these instructions and demonstrations shall be a qualified representative of the manufacturer with substantial training and operating experience on this equipment and project. Their qualifications shall be submitted to the Owner before conducting the instruction period.
- G. Each period shall include preliminary discussion and presentation of information using the actual maintenance manuals required for this project. Contractor shall notify Owner at least 48 hours in advance of readiness to conduct the instruction period. The actual time and date of instruction period shall be acceptable to the Owner and the Contractor.

END OF SECTION