

PROJECT MANUAL

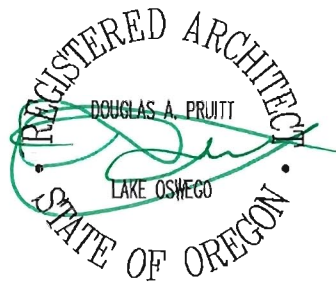
for

**DAVID DOUGLAS SCHOOL DISTRICT  
DAVID DOUGLAS HIGH SCHOOL KILT KITCHEN  
REMODEL**

JOB NO. 18039.00.L

OWNER BID NO.

Date: 21 FEBRUARY 2019



**ARCHITECTS**

BBL Architects  
200 North State Street  
Lake Oswego, Oregon 97034  
(503) 635-4425

**STRUCTURAL/CIVIL ENGINEER**

Miller Consulting Engineers  
9570 SW Barbur, Suite 100  
Portland, Oregon 97219-5412  
(503) 246-1250 TEL  
(503) 246-1395 FAX

**MECHANICAL-ELECTRICAL ENGINEERS**

System Design Consultants Inc.  
333 SE 2<sup>nd</sup> Avenue, Suite 100  
Portland, Oregon 97214  
Tel: (503) 248-0227  
Fax: (503) 248-0240

**FOOD FACILITIES CONSULTANT**

Halliday Associates  
656 NW Norwood  
Camas, Washington 98607  
(360) 834-6657



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NOTE: Division and Section numbers listed in the Table of Contents and items of work included in each Section conform in general to CSI's MasterFormat, 2010 Upgrade Edition. Section numbers listed are merely for identification and may not be consecutive. Users of this Project Manual shall check the specification with the Table of Contents to be sure each Section is included and shall check each Section to be sure each consecutively numbered pages within each Section is included. The last page of each Section has the statement "END OF SECTION".

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**ADVERTISEMENT FOR BIDS**

David Douglas School District, Multnomah County, Portland, Oregon will receive sealed bids for DAVID DOUGLAS HIGH SCHOOL KILT KITCHEN, 1001 SE 135th Ave, Portland, OR 97233, in writing until 2:00 PM., Pacific Daylight Time, Thursday, March 14, 2019, for materials/services described within the Drawings and Specification prepared by BBL Architects. All interested persons are entitled to attend the bid opening to be held at the Administration Office, 11300 NE Halsey St., Portland, Oregon 97220 at 2:00 PM., Pacific Daylight Time, Thursday, March 14, 2019.

The Work consists of the renovation of the existing commercial kitchen facility for the Culinary Education Program. The project scope includes interior finishes, doors and windows, food service equipment, plumbing, mechanical, electrical, the addition of roof top mechanical equipment, and addition of outside walk-in cooler/freezer.

The Contract Documents may be examined at the District Administration Office, 11300 NE Halsey St., Portland, Oregon 97220 and at the office of BBL Architects, 200 North State Street, Lake Oswego, OR 97034 (503) 635-4425. Contract Documents are available to each Bidder through ARC, 1732 NW Johnson St, Portland, Oregon 97209 (503) 227-3424. ([www.e-arc.com](http://www.e-arc.com)).

A mandatory pre-bid meeting / tour will be held promptly at 4:00 PM, Pacific Daylight Time, Thursday, February 28, 2019, at David Douglas High School, 1001 SE 135th Ave, Portland, OR 97233. Attendance will be taken. Bids will only be considered from those contractors attending the mandatory pre-bid meeting and tour. All other bids will be returned unopened. The requirements for this project and its bid package will be discussed. The site will be immediately toured following this meeting. Questions will be taken, and decisions will be distributed by Addenda.

This contract is for a public works subject to ORS 279C.800 to 279C.870 (Prevailing Rate of Wage).

All bids shall comply with the requirements of Oregon Revised Statutes and the District's local Public Contract Rules, latest editions.

Bids must be fully completed upon the Bid Proposal provided herein in the manner provided in the "Instructions to Bidders".

Bids will not be considered unless accompanied by certified check, cashier's check, or surety bond made payable to David Douglas School District in an amount equal to 10% of the Base Bid. Interest will not be allowed on bid security.

David Douglas School District reserves the right to reject all and any bids not in compliance with all prescribed public procedures and requirements and to waive informalities in this bid.

Published: February 22, 2019 and February 25, 2019

Published in: Daily Journal of Commerce

**END OF SECTION**



**INSTRUCTIONS TO BIDDERS**

**ARTICLE 1 DEFINITIONS**

- 1.1 Addenda: Written or graphic instructions issued prior to the execution of the Contract which modify or interpret the Bidding Documents including Drawings and Specifications, by additions, deletions, corrections, or clarifications. Addenda will become part of the Contract Documents when the Construction Contract is executed.
- 1.2 Architect: BBL Architects.
- 1.3 Bidder: One who submits a Bid for a Contract with the Owner for the Work described in the proposed Contract Documents.
- 1.4 Bidding Documents: Include the Advertisement for Bids, Instructions to Bidders, the Bid Proposal, and the proposed Contract Documents including Addenda issued prior to the receipt of Bids.
- 1.5 Construction Management Company: R&C Management Group LLC.
- 1.6 Definitions: Includes all definitions set forth in Section 00 72 00, Conditions of the Contract, or in other Contract Documents are applicable to the Bidding Documents.
- 1.7 Owner: David Douglas School District, Multnomah County, Oregon.
- 1.8 Project: David Douglas High School Kilt Kitchen Modifications at 1001 SE 135th Avenue, Portland, OR 97233.

**ARTICLE 2 BIDDER'S REPRESENTATION**

- 2.1 Each Bidder, by making their Bid, represents the following:
  - A. Has read and understands the Bidding Documents and his/her Bid is made in accordance therewith.
  - B. Has visited the site and familiarized themselves with the local conditions under which the Work is to be performed.
  - C. Their Bid is based upon the products and systems described in the Bidding Documents without exceptions.

**ARTICLE 3 OBTAINING CONTRACT DOCUMENTS**

- 3.1 Contract Documents are available to each Bidder through ARC, 1732 NW Johnson St, Portland, Oregon 97209 (503) 227-3424. ([www.e-arc.com](http://www.e-arc.com)).

**INSTRUCTIONS TO BIDDERS**

**ARTICLE 4 EXAMINATION OF BIDDING DOCUMENTS**

- 4.1 Sets of Contract Documents may be examined at the following.
- A. David Douglas School District  
11300 NE Halsey,  
Portland, Oregon 97220  
(503) 261-8212
  - B. BBL Architects  
200 North State Street  
Lake Oswego, Oregon 97034  
(503) 635-4425
- 4.2 Complete sets of Bidding Documents are to be used in preparing Bids; neither the Owner nor the Architect assume any responsibility for misinterpretations or errors resulting from the use of incomplete sets of Bidding Documents.
- 4.3 Requests for Clarification / Protest of Bidding Documents. Each Bidder shall examine the Bidding Documents carefully. Not later than 10 days prior to the date for receipt of Bids, shall make written request to the Architect for interpretation or correction of any ambiguity, inconsistency, or error therein which may have been discovered. Interpretations and corrections will be issued in the form of an Addendum by the Architect. Only interpretations and corrections by Addendum shall be binding. No Bidder shall rely upon any correction or interpretation given by any other method. Failure to raise any issue with the Bidding Documents that could have been raised pursuant to this Section will preclude protest of award based upon that issue.
- 4.4 All inquiries related to procedure or the actual Bid proposal should be directed to Patt Komar, Director of Administrative Services, (503) 261-8212.
- 4.5 All inquiries regarding construction drawings and technical specifications in this Bid should be directed to Doug Pruitt, Architect, (503) 635-4425.

**ARTICLE 5 BIDDING PROCEDURE**

- 5.1 Pre-Bid Conference: A mandatory pre-Bid conference and walk-through will be held on Thursday February 28, 2019, 4:00 PM, Pacific Time. The conference will convene at David Douglas High School, 1001 SE 135th Ave, Portland, OR 97233. Only contractors who attend and register at the pre-Bid conference will be eligible to Bid on the Project. Statements made by the District's representatives at the conference are not binding unless confirmed by written addendum.
- 5.2 Each Bid shall be made in accordance with the Bid Proposal, Section 00 41 00, and all blank spaces on the Proposal shall be filled.

**INSTRUCTIONS TO BIDDERS**

- 5.3 If Bid is made by a partnership, it shall contain names of each partner and shall be signed in the firm name followed by signature of partner signing for firm. If Bid is made by a corporation, the corporate seal shall be affixed there to, and it shall be signed in the name of the corporation, followed by signature of officer authorized to sign for corporation and printed or type written designation of office held in corporation, and signature shall be properly attested to by secretary of corporation. Address of the Bidder, street number (or post office box number), city and state, shall be typed or printed on the Bid Proposal.
- 5.4 The Bid Proposal invites Bids on definite Drawings and Specifications. Only amounts and information asked for on the Bid Proposal will be considered as the Bid. Each Bidder shall Bid upon the work as specified and provided in the Bid Proposal
- 5.5 Addenda: The Architect will issue any District approved interpretation or correction as an Addendum prior to receipt of Bids. Addenda will be numbered consecutively. Addenda will be mailed or delivered to each plan center, person, or firm recorded as having received Bidding Documents. Contractors submitting a Bid shall acknowledge receipt of each Addendum in the Bid Proposal, Section 00 41 00, and be responsible for determining that all subcontractors, material suppliers, etc., have knowledge of said Addenda and that their Bid to the Contractor includes same. No Addenda will be issued later than five days prior to the date for receipt of Bids except an Addendum, if necessary, postponing the date for receipt of Bids or withdrawing the request for Bids.
- 5.6 Bid Security Required: Each Bid shall be accompanied by a Bid Surety Bond, cashier's check, or certified check, executed in favor of David Douglas School District (the District), in an amount not less than 10 percent of the total Bid, based on the total Base Bid amount for those items Bid upon. The amount of the Bid security shall be forfeited to the District as liquidated damages, not as a penalty, pursuant to ORS 279C.385, should the Bidder refuse to enter into such contract or fail to furnish Performance Labor and Materials Payment Bonds and Certificates of Insurance as required by the General Conditions within 15 working days after the contract forms are provided to the Bidder. The Surety Bond shall be written by a bonding company authorized and licensed by the Oregon Insurance Commissioner. The bonding company must be listed on the most current U.S. Government Treasury List, Department Circular 750, or approved prior to Bid submission by the District. The attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified copy of their power of attorney. The Certified Check or Bid Bond of the Bidder with whom the contract is entered into will be returned when said contract has been properly executed, has been delivered to and accepted by the School District. The Certified Check or Bid Bond of each Bidder, who was not awarded the contract, will be returned immediately thereafter.
- 5.7 Bid Submittal: Each Bid shall be sealed in an opaque envelope containing the Bid Proposal. The outside, front face of the envelope shall show the following information. In addition, the name and address of the Bidder MUST appear on the outside of the envelope. If forwarded by mail, the envelope containing the Bid must be enclosed in another envelope addressed as specified in the Bid Proposal with the notation, "BID ENCLOSED" on the face.

DAVID DOUGLAS SCHOOL DISTRICT  
David Douglas High School Kilt Kitchen Modifications  
Attention: Patt Komar, Director of Administrative Services  
11300 SE Halsey Street  
Portland, Oregon 97220

**INSTRUCTIONS TO BIDDERS**

- 5.8 Bid Deadline / Opening: Bids must be received by the District at the address set forth in Section 5.7 no later than 2:00 p.m., Pacific Time, on Thursday, March 14, 2019. Late Bids will not be accepted. Bids will be publicly opened at 2:00 p.m., Pacific Time, on Thursday, March 14, 2019., at the address set forth in Section 5.7.
- 5.9 First-Tier Subcontractor Disclosure: First-Tier Subcontractor Disclosure Forms must be submitted by 4:00 p.m., Pacific Time, Thursday, 3 May 2018 in the same manner and at the same location where Bids were submitted. Disclosure Forms submitted after 4:00 p.m., Pacific Time, Thursday, March 14, 2019. will not be accepted. The Disclosure Form and Instruction is in Section 00 41 13.
- 5.10 Withdrawal. Any Bidder may withdraw their Bid, either personally or by written request, at any time prior to the opening of the Bid. After opening, a Bid is a firm Bid, and is irrevocable, valid and binding on the Bidder for 45 days, and for any extension beyond 45 days as may be agreed to by the Bidder and the District.
- 5.11 Amendment: A Bid may be modified, amended or supplemented until the deadline for submission. No material changes may be made to a Bid after the deadline for its submission. The District reserves the right to seek clarifications of each Bid, in clarifying or elaborating on an Bid, a Bidder explains or amplifies what is already there; a Bidder may not supplement, change, alter, or correct its Bid.
- 5.12 Bid Development Costs: Submission of a Bid to the District does not obligate the District to pay any expenses incurred by the Bidder in preparation of its bid, nor does it obligate the District in any other respect. The District will not reimburse the cost of a successful protest. It is a condition of submission that costs of submitting a Bid are solely the cost of the Bidder.
- 5.13 Bid Ownership: All Bids become the property of the District and will not be returned to the Bidder. Bids that are not opened may be returned to the Bidder or disposed of by the District at the District's discretion once the time to protest the refusal to consider the Bid has passed and Bid bonds are returned.
- 5.14 Public Record:
- A. At the conclusion of the selection process, the contents of all Bids received and opened will be made available for public inspection (ORS 192.410 to 192.505). Trade secrets or proprietary information that are recognized as such and are protected by law (ORS 646.461 to 646.475) may be withheld, if clearly identified as such in the Bid submitted. If an Bid contains any proprietary information that the Bidder does not want disclosed to the public or to be used by the District for any purpose other than evaluation of their Bid, each sheet of such information shall be readily separable from the remainder of the Bid and must be marked with the legend:

"CONFIDENTIAL," "PROPRIETARY" or "TRADE SECRET"

- B. The legend shall be red in color on original documents and shall appear on each page of the original and any copy in which the information to be protected appears and shall be in block capital letters at least 0.5" in height. Pages shall be marked to indicate the information for which the claim of protection from disclosure is made and to separate the material to be protected from other information appearing on that page. Bidders are cautioned that the information sought to be exempt from disclosure must qualify for exemption under ORS 192.501, ORS 192.502 or another provision of law. The District reserves the right to waive the exemption from disclosure if the exemption is waivable and it is in the public interest to do so.

Bidders are further informed that final determinations concerning the withholding of information from public disclosure rest with the District Attorney, the Attorney General or the

**INSTRUCTIONS TO BIDDERS**

Courts and not with the District. The District may not disclose information that the law forbids it to disclose and may not withhold information the law requires it to provide. Failure to mark information, documents or data shall be conclusive proof that the Bidder claims no exemption for it.

- C. Prices, makes, model or catalog numbers of items Bided, scheduled delivery dates, and terms of payment shall be publicly available regardless of any designation to the contrary. Any response marked as a trade secret in its entirety shall be considered non-responsive and shall be rejected.
- D. All submissions and additional information, if any, shall become public record after award of contract.

- 5.15 Proof of Insurance / Performance and Payment Bonds: The successful Bidder shall within 15 calendar days furnish insurance certificates as specified in the Contract and a Performance Labor and Materials Payment Bonds in compliance with ORS 279C.380, Oregon Revised Statutes. Work shall not commence until all insurance and bonding requirements have been met and bonds and certificates have been filed with Patt Komar, Director of Administrative Services.

**ARTICLE 6 REQUIRED CERTIFICATIONS / LICENSES**

- 6.1 Nondiscrimination: Each Bidder must certify that the Bidder has not and will not discriminate against a subcontractor in the awarding of a subcontract because the subcontractor is a minority, women, or emerging small business enterprise certified under ORS 200.055.
- 6.2 Resident Bidder: Each Bidder must identify whether the Bidder is a resident Bidder, as defined in ORS 279A.110 (4) and ORS 279C.375.
- 6.3 Construction Contractors / Landscape Contractors Board: The District will not receive or consider Bids unless the Bidder is licensed with the Construction Contractors Board or the State Landscape Contractors Board, as applicable.
- 6.4 Only "General Contractor - All Structures" or "Specialty Contractor - All Structures" classifications are allowed on District public works projects.
- 6.5 Public Works Bond: The contractor and every subcontractor must have a Public Works Bond pursuant to ORS 279C.936 filed with the Construction Contractors Board before starting work on the Project, unless exempt under ORS 279C.836 (7) or (8).
- 6.6 Asbestos Abatement: The Contractor or a subcontractor is not required to be licensed under ORS 468A.720 regarding asbestos abatement projects.
- 6.7 The successful bidder will be required to comply with all applicable laws and rules applicable to public contract as set forth in the form of Agreement.

**INSTRUCTIONS TO BIDDERS**

**ARTICLE 7 SUBSTITUTIONS**

- 7.1 The materials, products, installers, and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance, and quality to be met by any proposed substitution.
- 7.2 Each Bidder represents that his/her Bid is based upon the materials and equipment described in the Bidding Documents.
- 7.3 No substitution will be considered unless written request has been received by the Architect for acceptance no later than 12:00 pm Pacific Time, Monday, 23 April 2018. Each such request shall include the name of the material, installer, or equipment for which it is to be substituted and a complete description of the proposed substitute including drawings, cuts, performance and test data, and any other information necessary for an evaluation. A Statement setting forth any changes in other materials, installer, equipment, or work that incorporation of the substitute would require shall be included. The burden of proof of the merit of the proposed substitute is upon the proposer. The Architect's decision of acceptance or disapproval of a proposed substitution shall be final. The use of the CSI Substitution Request Form is encouraged.
- 7.4 Electronic email form of substitutions is acceptable. Literature sent with the substitution request is to be specific to the product being substituted. Facsimile transmissions will not be accepted.
- 7.5 If the Architect accepts any proposed substitution, such acceptance will be set forth in Addenda listing manufacturers, materials, installers, and equipment accepted for substitution. Bidders shall not rely upon any acceptances made in any other manner.

**ARTICLE 8 ACCEPTANCE OR REJECTION OF BIDS**

- 8.1 The Owner will review the Bids and shall award a Contract for the Work to the responsible Bidder submitting the lowest responsive Bid.
- 8.2 The Bidder acknowledges the following rights of the District to:
  - A. Reject any Bid that does not comply with prescribed public contracting procedures and requirements, including the requirement to demonstrate the Bidder's responsibility under ORS 279C.375(3)(b), and to reject all Bids for good cause after finding that doing so is in the public interest.
  - B. Postpone award of the contract for a period not to exceed 45 days from the date of the Bid opening.
  - C. Waive informalities in the Bids.
  - D. Exercise additive or deductive alternates to adjust the accepted Bid amount.
  - E. To reject a Bid if a Bidder failed to submit data required by the Bidding Documents or if a Bid is in any way incomplete or irregular.
- 8.3 The District may award a contract by drawing of lots between the Bidders involved if two or more Bids shall be for the same amount for the same Work, and to return Bid unopened if only one Bid is received.
- 8.4 If the lowest responsive Bid exceeds David Douglas School District's estimate of the cost of the project and the District's budget therefore (the "available funds" as determined by the District in its sole



**INSTRUCTIONS TO BIDDERS**

desecration), the District and the lowest Bidder may enter into negotiations as to value engineering and other options to reduce the contract price to an amount within available funds pursuant to ORS 279C.340.

8.5 Notice of Award / Protest of Award:

- A. The District shall mail a written notice of intent to award to all Bidders. The written notice of award of the contract shall constitute a final decision of the District to award the contract if no written protest of the notice of award is within seven (7) calendar days of the notice of award is mailed. If a protest is timely filed, the notice of award is a final decision of the District only upon issuance of a written decision denying the protest and affirming the award. The notice of award and any written decision denying or approving a protest shall be sent to every Bidder.
- B. Protest of Award: Any actual Bidder who is adversely affected or aggrieved by the District's notice of award of the contract to another Bidder on the same solicitation shall have seven (7) calendar days after the date of notice of award to submit to the District a written protest of the notice of award. The District shall not entertain a protest submitted after the time period established in this provision. A Bidder is "adversely affected or aggrieved" only if the Bidder is eligible for award of the contract as the responsible Bidder submitting the lowest responsive Bid and is next in line for award, i.e., the protester must claim that all lower Bidders are ineligible for award because the Bids are nonresponsive; or because The District committed a substantial violation of a provision in the Bidding Documents or of an applicable procurement statute or rule, and the protesting Bidder was unfairly evaluated and would have, but for such substantial violation, been the responsible Bidder Bidding the lowest Bid. Bidders must submit written protest of award to Patt Komar in the address set forth in Section 5.7 above of this Agreement. The written protest must specify the grounds upon which the protest is based. An issue that could have been, but was not, raised as a request for clarification or protest of a specification pursuant to these instructions shall not be grounds for a protest of award.

**ARTICLE 9 FORM OF AGREEMENT**

- 9.1 The Form of Agreement will be the David Douglas School District Small Construction Projects Contract attached at Section 00 52 00.

**ARTICLE 10 PREVAILING WAGES**

- 10.1 This Contract is subject to payment of prevailing wages under ORS 279C.800 to 279C.870. Each worker the Contractor, subcontractor or other person who is party to the contract uses in performing all or part of the Contract must be paid not less than the applicable prevailing rate of wage for each trade or occupation as defined by the Director of the State of Oregon Bureau of Labor and Industries ("BOLI") in the applicable publication entitled *Definitions of Covered Occupations for Public Works Contracts in Oregon*. The prevailing wage rates for public works contracts in Oregon are contained in the current Prevailing Wage Rates for Public Works Projects in Oregon and the January PWR Apprenticeship Rates. Such publications can be reviewed electronically at [http://www.boli.state.or.us/BOLI/WHDPWR/pwr\\_state.shtml](http://www.boli.state.or.us/BOLI/WHDPWR/pwr_state.shtml) and are hereby incorporated as part of the Contract Documents.

**INSTRUCTIONS TO BIDDERS**

- 10.2 Payment of Prevailing Wages: No Bid will be received or considered by the District unless the Bid contains a statement by the Bidder that "Contractor agrees to be bound by and will comply with the provisions of ORS 279C.840 or 40 U.S.C. 27a. "See paragraph **Error! Reference source not found.** above of these instructions for prevailing wage requirements."

**ARTICLE 11 EQUAL EMPLOYMENT COMPLIANCE REQUIREMENTS**

- 11.1 By submitting this Bid, the Bidder certifies conformance to the applicable Federal Acts, Executive Orders and Oregon Statutes and Regulations concerning Affirmative Action toward equal employment opportunities.
- 11.2 All information and reports that are required by the Federal or Oregon Governments having responsibilities for the enforcement of such laws shall be supplied to the District upon request, for purposes of investigation to ascertain compliance with such acts, regulations and orders.

**ARTICLE 12 TIME OF COMPLETION**

- 12.1 The Bidder must agree to commence Work on or before the date specified in Section 01 11 00, Summary of Work, and to substantially complete the Project within the time period stated in Section 01 11 00, Summary of Work. On this date, the Contractor shall have all systems in operation so as to render the building usable for "its intended use" by the District. Attention is directed to the General Conditions stipulating conditions for withholding payments in relation to Contract time.

**ARTICLE 13 SUBCONTRACTS**

- 13.1 The Bidder is specifically advised that any person, firm, or other party to whom it is proposed to award a Contract under this Contract, must be acceptable to the District.
- 13.2 Change of Subcontractor requested by District or Architect shall be on demand. Contract financial adjustment shall be negotiated through the General Contractor.

**ARTICLE 14 CRIMINAL BACKGROUND CHECK, DRUG TESTING, TOBACCO / ALCOHOL POLICIES**

- 14.1 The District is committed to maintaining a drug-free work place and strictly complies with the Drug Free Work Place Act of 1988 and the Drug-Free Schools and Communities Act amendments of 1989. No alcohol, drugs, firearms or weapons are allowed on any District property. In accordance with District policy, smoking and the use of all tobacco products are prohibited on all District property.
- 14.2 In order to comply with ORS 279C.505 (2) and to enable the District to determine that a Bidder will comply with the District's above noted policies, **Bidders shall submit copies of their Employee Criminal Background Check and Drug/Alcohol Testing Programs/Policies with their proposals.** Describe the Criminal Background Check performed of employees who will work at the school site with students. Define the criteria for qualification / disqualification of employment of an employee with the above policies.

**INSTRUCTIONS TO BIDDERS**

**ARTICLE 15 DATA SECURITY**

- 15.1 The Contractor needs to provide a Statement of Data Security. This statement will document procedures and protocols used by the Contractor to secure and safeguard confidential District information. The Contractor will also certify the information provided from the District will not be released or shared in any manner without the written permission of the District. The Contractor will also specify the information life cycle including how and when confidential District information will be destroyed or archived following use. Statement of Data Security must be approved by the District.

**ARTICLE 16 HOLD HARMLESS**

- 16.1 The Contractor shall hold harmless, indemnify, and defend the District, its officers, agents, and employees for all claims, suites or actions of any nature arising out of any act, error, or omission of the Contractor, its officers, subcontractors, agents or employees whether actual or alleged, and resulting in bodily injury, property damage, or personal injury, during or resulting from the work described under this contract except liability arising out of the sole negligence of the District.

**ARTICLE 17 ANTITRUST CLAIMS**

- 17.1 The Contractor hereby assigns to the David Douglas School District fully, finally, and in their entirety, any and all federal and/or state antitrust claims that the Contractor now has or may here after acquire as a result of or in connection with any and all goods and services in the contract. Further, the Contractor shall cause similar working in favor of the District to be made a part of any and all contracts entered into with subcontractors or suppliers as a result of the primary contract.
- 17.2 Claims shall include price-fixing, monopolization, and any other violation of state or federal antitrust law.

**ARTICLE 18 TRANSFER OR ASSIGNMENT**

- 18.1 Neither the Contract, nor any interest herein shall be transferred to any other party or parties, without the District's prior written consent.

**END OF SECTION**



**BID PROPOSAL**

**PROPOSAL TO DAVID DOUGLAS SCHOOL DISTRICT  
DISTRICT ADMINISTRATION OFFICE  
11300 SE HALSEY STREET  
PORTLAND, OREGON 97220**

The undersigned hereby proposes to furnish all necessary materials, superintendence, labor, plant, equipment, tools, and accessories to perform David Douglas High School Kilt Kitchen Modifications in full conformity with Contract Documents as prepared by BBL Architects, 200 North State Street, Lake Oswego, Oregon 97034.

Per the Contract Documents associated with this project, the District reserves the right to award contracts, or to reject all bids as may be determined to be in the best interest of the District.

Total Base Bid \$ \_\_\_\_\_ Dollars

Bidder's Name: \_\_\_\_\_

The undersigned has attached the required 10% Bid Security to this Bid.

If awarded the Contract, the undersigned agrees to be bound by the Agreement with the Owner, to present the required performance and payment bonds within 15 days of Notification to Proceed and to substantially complete the work within the time stipulated in Section 01 11 00, Summary of Work.

Addenda: Receipt is hereby acknowledged of Addendum \_\_\_\_\_ through \_\_\_\_\_.

The Undersigned certifies that: (1) This Bid has been arrived at independently and is being submitted without collusion with and without any agreement, understanding, or planned common course of action with any other vendor of materials, supplies, equipment or services described in the invitation to bid designed to limit independent bidding or competition; and (2) The contents of the Bid have not been communicated by the Undersigned or its employees or agents to any person not an employee or agent of the Undersigned or its surety on any Bond furnished with the Bid and will not be communicated to such person prior to the official opening of the Bid.

Insurance: Is your insurance equal to or greater than required?

Liability & Property Damage      \_\_\_\_\_ Yes      \_\_\_\_\_ No      Company: \_\_\_\_\_

Vehicle Liability      \_\_\_\_\_ Yes      \_\_\_\_\_ No      Company: \_\_\_\_\_

Worker's Compensation      \_\_\_\_\_ Yes      \_\_\_\_\_ No      Company: \_\_\_\_\_

Representations and Certifications:

1. It is understood that the Bidder, before signing his/her proposal, has made a careful examination of the plans, specifications, and character of work required; that he/she has made a careful examination of the location and condition of the work, verified all measurements at the job site, and sources of supply of materials.

**BID PROPOSAL**

2. Oregon Business Registration: To transact business in the State of Oregon, a Bidder must be registered with the State of Oregon Corporations Division. Please indicate your business' current registration type with an "X" in the appropriate space:

Corporate Registration \_\_\_\_\_

Assumed Business Name Registration \_\_\_\_\_

3. Oregon Reciprocal Preference Law (ORS 279.029): In compliance with ORS 279.029, each Bidder must state in its proposal whether it is a resident or non-resident bidder. **Bids that fail to provide this information will be considered nonresponsive and will be rejected.**

DEFINITION - RESIDENT BIDDER: A bidder that has paid unemployment taxes or income taxes in this state during the 12 calendar months immediately preceding submission of the bid, has a business address in this state and has stated in the bid whether the bidder is a "resident bidder."

DEFINITION – NON-RESIDENT BIDDER: A bidder who is not a resident bidder as defined above.

Indicate by an "X" in the appropriate space whether you are an Oregon resident bidder or non-resident bidder:

Oregon Resident Bidder \_\_\_\_\_

Non-Resident Bidder \_\_\_\_\_

4. The Undersigned agrees to be bound by and will comply with the provisions of ORS 279C.838 and 279C.840 pertaining to the payment of the prevailing rates of wage.
5. The Undersigned's CCB registration number is \_\_\_\_\_. If applicable, the Undersigned's State Landscape Contractors Board licensed number is \_\_\_\_\_. As a condition to submitting a bid, a Contractor must be registered with the Oregon Construction Contractors Board in accordance with ORS 701.035 to 701.055 and/or the State Landscape Contractors Board licensed number, and disclose the appropriate numbers. Failure to register and disclose the numbers, as applicable, will make the bid unresponsive and it will be rejected.
6. The Undersigned hereby certifies that all subcontractors who will perform construction work as described in ORS 701.005 are or will be registered with the Construction Contractors Board in accordance with ORS 701.035 to 701.055 or State Landscape Contractors Board, as applicable, at the time the subcontractor(s) made a bid to work under the contract.
7. The Undersigned certifies that it has not discriminated against minority, women, or emerging small businesses in obtaining any subcontracts for this project as required by ORS 279A.110(4).

By signature below, Contractor agrees to be bound by this Bid.

FAX NO. \_\_\_\_\_

Attested: Secretary of Corporation

(SEAL)

### 3-Employee Criminal Background Check and Drug / Alcohol Testing Programs / Policies

Page 3 of 3





**FIRST-TIER SUBCONTRACTOR DISCLOSURE FORM  
(OAR 137-049-0360)**

Bidders are required to disclose information about certain first-tier subcontractors when the contract value for a Public Improvement is greater than \$100,000 (see ORS 279C.370). Specifically, when the contract amount of a first-tier subcontractor (those entities that would be contracting directly with the prime contractor), is greater than or equal to: (i) 5% of the project bid, but at least \$15,000, or greater than \$350,000 regardless of the percentage, you must disclose the following information about that subcontract within two (2) hours of bid closing:

- 1) The subcontractor's name;
- 2) The category of the work; and
- 3) The subcontract dollar value.

If you will not be using any subcontractors that are subject to the above disclosure requirements, you are required to indicate "NONE" on the accompanying form.

**THE DISTRICT MUST REJECT A BID IF THE BIDDER FAILS TO SUBMIT THE DISCLOSURE FORM WITH THIS INFORMATION BY THE STATED DEADLINE (OAR 137-047-0460).**

To determine disclosure requirements, the District recommends that you disclose subcontract information for any subcontractor as follows:

Determine the lowest possible contract price as follows:

- 1) Invitation to Bid (ITB) solicitation document issued by David Douglas School District for the David Douglas High School Kilt Kitchen Modifications will include the base bid amount.

Provide the required disclosure information for any first-tier subcontractor whose potential contract services (subcontractor base bid amount plus all additive alternate bid amounts, exclusive of any options that can only be exercised after contract award, if any) are greater than or equal to:

- (1) 5% of that lowest contract price, but at least \$15,000, or
- (2) Greater than \$350,000 regardless of the percentage.

Total all possible work for each subcontractor in making this determination (e.g., if a subcontractor will provide \$15,000 worth of services on the base bid and \$40,000 on an additive alternate, then the potential amount of subcontractor's services is \$55,000. Assuming that \$55,000 exceeds 5% of the lowest contract price, provide the disclosure for both the \$15,000 services and the \$40,000 services).

- (3) SUBMISSION. A Bidder shall submit the disclosure form required by OAR 137-049-0360 within two (2) working hours of Bid Closing in the manner specified by the Invitation to Bid (ITB). See highlighted ITB instructions on the accompanying FIRST-TIER SUBCONTRACTOR DISCLOSURE FORM.

**FIRST-TIER SUBCONTRACTOR DISCLOSURE FORM  
(OAR 137-049-0360)**

- (4) **RESPONSIVENESS.** Compliance with the disclosure and submittal requirements of ORS 279C.365(2) and this rule is a matter of Responsiveness. Bids which are submitted by Bid Closing, but for which the separate disclosure submittal has not been made by the specified deadline, are not Responsive and shall not be considered for Contract award.

<b>PROJECT NAME:</b>	<b>David Douglas High School Kilt Kitchen Modification</b>			
<b>BID #:</b>	<b>BID CLOSING DATE:</b> <b>15 March 2019</b>	<b>BID CLOSING TIME:</b> <b>2:00 p.m., Pacific Time</b>	<b>AM</b>	<b>PM</b> <b>X</b>
<b>DISCLOSURE DEADLINE DATE:</b> <b>15 March 2019</b>	<b>DISCLOSURE DEADLINE TIME:</b> <b>4:00 PM, Pacific Time</b>		<b>AM</b>	<b>PM</b> <b>X</b>

This form must be submitted at the location specified in the Invitation to Bid, within two (2) working hours after the advertised bid closing date and time.

List below the name of each subcontractor that will be furnishing labor or furnishing labor and materials and is required to be disclosed, the category of work that the subcontractor will be performing, and the dollar value of the subcontract. Enter "NONE" if there are no subcontractors that need to be disclosed. (ATTACH ADDITIONAL SHEETS IF NEEDED).

	<b>NAME</b>	<b>DOLLAR VALUE OF WORK</b>	<b>CATEGORY</b>
1)	_____	\$ _____	_____
2)	_____	\$ _____	_____
3)	_____	\$ _____	_____
4)	_____	\$ _____	_____
5)	_____	\$ _____	_____
6)	_____	\$ _____	_____

The above listed first-tier subcontractor(s) are providing labor or labor and materials with a Dollar Value equal to or greater than:

- a) 5% of the total Contract Price, but at least \$15,000 (including all alternates). If the Dollar Value is less than \$15,000, do not list the subcontractor above; or
- b) Greater than \$350,000 regardless of the percentage of the total Contract Price.

**FAILURE TO SUBMIT THIS FORM BY THE DISCLOSURE DEADLINE WILL RESULT IN A NONRESPONSIVE BID. A NONRESPONSIVE BID WILL NOT BE CONSIDERED FOR AWARD.**

**FIRST-TIER SUBCONTRACTOR DISCLOSURE FORM  
(OAR 137-049-0360)**

Form Submitted By (Bidder Name): \_\_\_\_\_

Contact Name: \_\_\_\_\_ Phone : \_\_\_\_\_

**Deliver Form to:**

DAVID DOUGLAS SCHOOL DISTRICT  
DAVID DOUGLAS HIGH SCHOOL KILT KITCHEN REMODEL  
Attention: Patt Komar, Director of Administrative Services  
11300 NE Halsey Street,  
Portland, Oregon 97220

**UNLESS OTHERWISE STATED IN THE ORIGINAL SOLICITATION, THIS DOCUMENT SHALL NOT BE FAXED. IT IS THE RESPONSIBILITY OF BIDDERS TO SUBMIT THIS DISCLOSURE FORM AND ANY ADDITIONAL SHEETS, WITH THE BID NUMBER, (if applicable), AND PROJECT NAME CLEARLY MARKED, AT THE LOCATION INDICATED BY THE SPECIFIED DISCLOSURE DEADLINE. SEE INSTRUCTIONS TO BIDDERS.**



**DAVID DOUGLAS SCHOOL DISTRICT  
DAVID DOUGLAS HIGH SCHOOL KILT KITCHEN REMODEL  
18039.00.L**

**SECTION 00 43 13**

**BID SURETY BOND**

A Bid Surety Bond must be accompanied with each bid as indicated in Articles 5, Bidding Procedure, Item 5.6, of Section 00 20 13, Instructions to Bidders, for not less than 10% of the total bid, based on the total Base Bid amount for those items bid upon. The Bid Surety Bond does not include any Alternates or Unit Prices.

**END OF SECTION**



**WAGE RATES**

This Contract is subject to payment of prevailing wages under ORS 279C.800 to 279C.870. Each worker the Contractor, subcontractor or other person who is party to the contract uses in performing all or part of the Contract must be paid not less than the applicable prevailing rate of wage for each trade or occupation as defined by the Director of the State of Oregon Bureau of Labor and Industries ("BOLI") in the applicable publication entitled *Definitions of Covered Occupations for Public Works Contracts in Oregon*. The prevailing wage rates for public works contracts in Oregon are contained in the following publications: The January 1, 2019, Prevailing Wage Rates for Public Works Projects in Oregon and the January PWR Apprenticeship Rates. Such publications can be reviewed electronically at [http://www.boli.state.or.us/BOLI/WHDPWR/pwr\\_state.shtml](http://www.boli.state.or.us/BOLI/WHDPWR/pwr_state.shtml) and are hereby incorporated as part of the Contract Documents.

**END OF SECTION**





**OWNER-CONTRACTOR AGREEMENT**

The "David Douglas School District Small Construction Projects Contract" will be used in executing this Contract.

A sample of this contract has been herein attached to these Specifications as follows.

**END OF SECTION**





David Douglas School District

Learn – Grow – Thrive

DDSD  
Contract ID#

Contractor  
Contract ID#

**DAVID DOUGLAS SCHOOL DISTRICT NO. 40J  
SMALL CONSTRUCTION PROJECTS CONTRACT**

This Contract is between DAVID DOUGLAS SCHOOL DISTRICT NO. 40J, Portland, Oregon ("District") and \_\_\_\_\_ ("Contractor").

Project: \_\_\_\_\_

The parties agree as follows:

**Date of Commencement and Substantial Completion.** The date of commencement of the Work shall be \_\_\_\_\_ or the date on which each party has signed this Contract, whichever is later.

The Contract Time shall be measured from the date of commencement. Contractor shall achieve Substantial Completion of the entire Work no later than \_\_\_\_\_, with final completion no later than \_\_\_\_\_.

**Contractor's Agreement to Perform Work.** Contractor agrees to perform the Work described in Exhibit 2.

**Statement of Work.** Contractor shall perform the Work described in Exhibit 2.

**Payment for Work.** District agrees to pay Contractor in accordance with Exhibit 2 and this Contract.

**Contract Documents.** The Contract Documents consist of the following documents, which are listed in descending order of precedence: this Contract; exhibits to this Contract, including Exhibit 1 (District's Solicitation Document and attachments); Exhibit 2 (Statement of Work, Compensation, Payment and Renewal Terms); Exhibit 3 (Certification Statement for Corporation or Independent Contractor); Exhibit 4 (Contractor's Solicitation Response).

A conflict in the Contract Documents shall be resolved in the priority listed above with this Contract taking precedence over all other documents. The Contract Documents are the entire Contract between the parties and shall supersede any prior representation, written or oral.

**STANDARD TERMS AND CONDITIONS**

1. **Time is of the Essence.** Time is of the essence in the performance of this Contract
2. **Subcontracts.** District reserves the right to reject in writing any proposed subcontractor, without cause, in which case Contractor shall promptly propose a substitute subcontractor. Any difference in price arising out of such substitution shall be reflected in a Change Order. In addition to any other provisions District may require, Contractor shall require of any permitted subcontractor under this Contract that subcontractor be bound by all the same terms and conditions of this Contract. Such subcontracts are solely between Contractor and subcontractor and shall not have any binding effect on District.
3. **Assignment.** This Contract is not assignable by Contractor, either whole or in part, unless Contractor has obtained the prior written consent of District.
4. **Other Contractors.** District may undertake or award other contracts for additional or related work, and Contractor shall fully cooperate with such other contractors and with any District employees concerned with such additional or related work, and shall coordinate its performance under this Contract with such additional or related work. Contractor shall not commit or permit any act that will interfere with the performance of work by any other contractor or by District employees.
5. **Independent Contractor Status.** Contractor shall certify status in accordance with Exhibit 4.
6. **No Third-Party Beneficiaries.** District and Contractor are the only parties to this Contract and are the only parties entitled to enforce its terms. Nothing in this Contract gives or provides any benefit or right, whether directly, indirectly, or otherwise, to third persons unless such third persons are individually identified by name in this Contract and expressly described as intended beneficiaries of this Contract.
7. **Successors in Interest.** The provisions of this Contract shall be binding upon and inure to the benefit of the parties and their successors and approved assigns, if any.
8. **Nonperformance.** In the event of nonperformance under this Contract, District, after seven (7) days' written notice, shall have the

right to obtain from other sources such services as may be required to accomplish the Work not performed, and it is agreed that the difference in cost, if any, for said Work or goods shall be borne by Contractor. For purposes of this section, nonperformance shall be defined as failure to appear and perform Work as specified and scheduled.

9. **Early Termination.** This Contract may be terminated as follows:
  - a. **Termination by Mutual Agreement:** District and Contractor, by mutual written agreement, may terminate this Contract at any time.
  - b. **Termination for Convenience:** District in its sole discretion may terminate this Contract for any reason on 30 days' written notice to Contractor.
  - c. **Termination for Breach:** Either District or Contractor may terminate this Contract in the event of a breach of the Contract by the other. Prior to such termination, the party seeking termination shall give to the other party written notice of the breach and intent to terminate. If the party committing the breach has not entirely cured the breach within 15 days of the date of the notice, then the party giving the notice may terminate the Contract at any time thereafter by giving a written notice of termination.
  - d. **Termination for Failure to Maintain Qualifications:** Notwithstanding Section 9(c), District may terminate this Contract immediately by written notice to Contractor upon denial, suspension, revocation, or non-renewal of any license, permit, or certificate that Contractor must hold to provide services under this Contract.
  - e. **Payment on Early Termination:** Upon termination pursuant to Section 9, payment shall be made as follows:
    - i. If terminated under 9(a) or 9(b) for the convenience of District, District shall pay Contractor for Work performed prior to the termination date if such Work was performed in accordance with the Contract. District shall not be liable for direct, indirect, or consequential damages. Termination shall not result in a waiver of any other claim that District may have against Contractor.

- ii. If terminated under 9(c) by Contractor due to a breach by District, then District shall pay Contractor for Work performed prior to the termination date if such Work was performed in accordance with the Contract.
- iii. If terminated under 9(c) or 9(d) by District due to a breach by Contractor, then District shall pay Contractor for Work performed prior to the termination date, provided such Work was performed in accordance with the Contract, less any setoff to which District is entitled.

**10. Payment of Invoices.** Unless otherwise provided in Exhibit 2, the payment period shall be one calendar month. Payments are due and payable thirty (30) days from receipt of Contractor's complete invoice or fifteen (15) days after payment is approved by District, whichever is earlier. District may withhold 5% of each payment as retainage pursuant to ORS 279C.570. Retainage will be paid within 30 days of final completion and acceptance by District.

**11. Changes in the Work.** District reserves the right to adjust the scope of the Work by written Change Order. No Change Order will be effective unless approved in writing by District and signed by Contractor. Agreement on any Change Order shall constitute a final settlement of all matters relating to the change in the Work that is the subject of the Change Order, including but not limited to all direct and indirect costs associated with such change and any and all adjustments to the Contract Sum and the construction schedule. The following terms apply to any Change Order:

- a. **Prices.** Every price stated in a Change Order must be inclusive of all costs to complete the work associated with that price.
- b. **Costs.** The prices in a Change Order may consist only of the following costs as they relate to the Work required by the Change Order:
  - i. **Direct Labor Costs.** The labor-related costs may include only (1) the hourly wage (without markup or labor burden) and fringe benefits paid by Contractor to employees, based on actual payroll receipts, and (2) direct contributions for employee-related insurance, including industrial and medical insurance and supplemental pension, FICA, FUTA, and state-unemployment-compensation-act payments. Overtime wages may only be included if preapproved in writing by District.
  - ii. **Direct Materials Costs.** The cost for materials may include only the net cost of materials, including freight costs, after applying all applicable discounts or rebates. No lump-sum costs are allowed unless preapproved in writing by District.
  - iii. **Construction Equipment Costs.** The cost of equipment rentals must be based on the lower of the local prevailing rate published in the Rental Rate Blue Book by Dataquest (the "Blue Book") or the actual rate paid to unrelated third parties for such equipment, as evidenced by rental receipts. If equipment is required for which there is no rental rate published in the Blue Book, the rate must be approved by District before renting the equipment. If more than one rate may apply, the lower rate must be used. Any equipment-rental rate or quantity exceeding the local fair-market rental value must be approved in writing by District. The rate for equipment that is necessarily standing by for use may not exceed 50% of the rate established by the foregoing terms, and the rental charge for any equipment may not exceed 75% of the fair-market purchase price of that equipment. The rental cost may include reasonable mobilization costs only if the equipment is delivered to the worksite solely because of changes in the Work required by a Change Order.
  - iv. **Insurance or Bond Premium Costs.** The cost of a change in an insurance or bond premium may be only the actual cost of any change in Contractor's liability insurance arising directly from changes in the Work required by a Change Order.

- v. **Subcontractor Costs.** The costs of or incurred by any subcontractor in connection with a Change Order will be calculated in accordance with the foregoing terms of this Section 11b. For avoidance of doubt, no costs under this Section 11b may include fees for consultants, attorneys, or claim preparation.

- vi. **Fees.** The maximum amount that may be charged for the overhead, profit, or any other cost of Contractor or any subcontractor is as follows, reflected as percentages of the amounts that may be charged in accordance with the foregoing under this Section 11b:

1. Contractor may charge up to 15% of the cost of any materials that it supplies or work that it properly performs using its own forces.
2. Contractor may charge up to 8% of the cost that it directly owes to a subcontractor or supplier for materials supplied or work properly performed by that subcontractor or supplier.
3. Each subcontractor may charge up to 12% of the cost of any materials that it supplies or work that it properly performs using its own forces.
4. Each subcontractor may charge up to 8% of the cost that it owes for materials supplied or work properly performed by its lower-tiered subcontractors or suppliers.
5. The total fee owed to Contractor and all subcontractors, as calculated in accordance with the foregoing, for work performed by all lower-tiered subcontractors that are not in privity of contract with Contractor or a subcontractor may not exceed 25% of the total amount owed to all lower-tiered subcontractors. Additionally, District will not owe any fee related to the direct settlement of any claim between Contractor and any subcontractor.

If a change in the Work involves both additive and deductive items, the fees charged in accordance with this section will be calculated based on, and then added to, the net difference of the items. If the net difference is negative, no fee will be added to the negative figure. The parties acknowledge that the fees listed in this section are substantially greater than the fees and overhead normally included in determining the Contract Sum bid; that these higher percentages are a sufficient amount to compensate Contractor for all effects of changes in the Work; and that the resulting overcompensation of Contractor for these changes compensates Contractor for all changes in the Work for which Contractor believes that the percentage is otherwise insufficient.

**12. Inspection and Acceptance of Work.** District shall inspect Contractor's Work and advise Contractor of any deficiencies, or if there are none, that the Work has been accepted. Contractor shall perform all additional Work necessary to correct any deficiencies without undue delay and without additional cost to District.

**13. Right to Withhold Payments.** District shall have the right to withhold from payments due Contractor such sums as necessary, in District's sole opinion, to protect District against any loss, damage, or claim that may result from Contractor's performance or failure to perform under this Contract or the failure of Contractor to make proper payment to any suppliers or subcontractors.

**14. Liquidated Damages.** The parties acknowledge that District will incur serious and substantial damage if Substantial Completion of the Work does not occur within the Contract Time. The parties further acknowledge that the amount of the damage would be difficult if not impossible to determine. The damage may include, for example, personnel and overtime costs, transportation costs, governmental fees, storages costs, portable rental costs, loss of use, and lost opportunities. Consequently, the Contract Documents may include provisions for

liquidated damages as a reasonable estimate of losses that District might incur. District's right to liquidated damages is not affected by partial completion, occupancy, or beneficial occupancy. If a liquidated damages provision is contained in any Contract Document and Contractor has violated a provision related to it, District may withhold from payments due Contractor such sums as are required to satisfy District's claims under the liquidated damages provision. This section does not affect District's right to withhold payment under Section 13.

**15. Knowledge of Site Conditions.** Contractor shall, as a condition precedent to commencement of the Work (a) become familiar with the Project site and review all analyses, studies, and test data available to Contractor concerning the conditions of the Project site, (b) inspect the location of the Work and satisfy itself as to the condition thereof, including all structural, surface, and observed subsurface conditions, and (c) determine (i) that the Contract Sum is just and reasonable compensation for all the Work, including all foreseen and foreseeable construction risks, hazards, and difficulties in connection therewith, (ii) that the Contract Time is adequate for the performance of the Work, and (iii) that the Work shall not result in any lateral or vertical movement of any adjacent structure. Contractor will notify District in writing in advance of commencement of the Work if it determines that it cannot satisfy these conditions.

**16. Special Care.** Contractor shall exercise special care in executing subsurface work in proximity of known subsurface utilities, improvements, and easements.

**17. District's Right to Stop the Work.**

- a. If Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents or fails to carry out Work in accordance with the Contract Documents, District may issue a written order to Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated.
- b. If suspension of the Work is warranted by reason of unforeseen conditions that may adversely affect the quality of the Work if such Work were continued, District may suspend the Work by giving written notice to Contractor. In such event, the Contract Time shall be adjusted accordingly, and the Contract Sum shall be adjusted to the extent, if any, that additional costs are incurred by reason of such suspension.
- c. Notwithstanding any other provision, District's authorized representative may, in his or her complete discretion, stop all of the Work, or any portion of the Work, if the Work creates a safety hazard or if a life/safety threat exists to the facility or its occupants. Any cost to correct deficiencies in Contractor's Work will be borne solely by Contractor.

**18. Performance of the Work.** Contractor shall supervise, coordinate, and perform the Work in accordance with the Contract Documents in a professional, safe, and workmanlike manner and in accordance with all laws, codes, and professional standards applicable to the industries and trades involved, including without limitation compliance with all applicable federal, state, and local building codes, District's construction and life safety policies and procedures, certification requirements applicable to the Work, and other policies or standards incorporated or referenced in the Contract Documents. Unless otherwise noted or directed, Contractor will perform all Work in accordance with product manufacturers' recommendations or directions for best results. No preparatory step or installation procedure may be omitted unless specifically authorized by the Contract Documents or at the direction of Architect or District's Representative. Conflicts between manufacturers' directions shall be resolved by Architect.

**19. Remedies.** In the event of breach of this Contract, the parties shall have the following remedies:

- a. If terminated under 9(c) by District due to a breach by Contractor, District may complete the Work either itself, by agreement with another Contractor, or by a combination thereof. If the cost of completing the Work exceeds the remaining unpaid balance of the total compensation provided under this Contract, then Contractor shall pay to District the amount of the reasonable excess.
- b. In addition to the remedies in Sections 9 and 13 for a breach by Contractor, District also shall be entitled to any other equitable and legal remedies that are available.
- c. If District breaches this Contract, Contractor's remedy shall be limited to termination of the Contract and receipt of Contract payments for which Contractor has completed the Work.

**20. Claims.**

- a. Time Limits on Claims: Claims by either party must be made within 10 days after occurrence of the event giving rise to such Claim or within 10 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later. Claims must be made in writing to Architect and the other party, and must identify the known bases for each Claim and the nature and amount of the relief sought. Failure to timely file a written claim constitutes a waiver of the claim.
- b. Continuing Contract Performance: Pending final resolution of a Claim except as otherwise agreed in writing, Contractor shall proceed diligently with performance of the Contract and District shall continue to make payments in accordance with the Contract Documents.
- c. Claims for Additional Costs: If Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property. In an emergency affecting the safety of persons or property, Contractor shall act to prevent threatened damage, injury, or loss and shall immediately notify District. The prices in any Claim must conform to the terms of Section 11.
- d. Claims for Additional Time: If Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

**21. Compliance With Applicable Law.** Contractor shall comply with all federal, state, and local laws applicable to the Work under this Contract, and all regulations and administrative rules established pursuant to those laws, including without limitation the following:

- a. ORS 279A.110: Contractor certifies that Contractor has not discriminated and will not discriminate against a subcontractor in awarding a subcontract because the subcontractor is a disadvantaged business enterprise, a minority-owned business, a women-owned business, a business that is owned by a service-disabled veteran, or an emerging small business that is certified under ORS 200.055.
- a. ORS 279C.380: Unless exempted by District in writing pursuant to District's Public Contracting Rules, prior to starting Work under this Contract, Contractor shall execute and deliver to District a good and sufficient performance bond, in a form acceptable to District, in a sum equal to 100% of the Contract Price for the faithful performance of the Contract, and shall execute and deliver to District a good and sufficient payment bond, in a form acceptable to District, in a sum equal to 100% of the Contract Price solely for the protection of claimants under ORS 279C.600.

- b. ORS 279C.505: Contractor shall make payment promptly, as due, to all persons supplying to such Contractor labor or material for the prosecution of the Work provided for in such Contract; pay all contributions or amounts due the Industrial Accident Fund from such Contractor or subcontractor incurred in the performance of the Contract; not permit any lien or claim to be filed or prosecuted against the state, county, school, municipality, municipal corporation or subdivision thereof, on account of any labor or material furnished; and pay to the Department of Revenue all sums withheld from employees pursuant to ORS 316.167. Contractor shall further demonstrate that an employee drug-testing program is in place.
- c. ORS 279C.510: If this Contract includes demolition work, Contractor shall salvage or recycle construction and demolition debris, if feasible and cost-effective. If this Contract includes lawn or landscape maintenance, Contractor shall compost or mulch yard waste material at an approved site, if feasible and cost-effective.
- d. ORS 279C.515: If Contractor fails, neglects, or refuses to make prompt payment of any claim for labor or services furnished to Contractor or a subcontractor by any person in connection with this Contract as such claim becomes due, District may pay such claim to the person furnishing the labor or services and charge the amount of the payment against funds due or to become due Contractor by reason of this Contract. The payment of a claim in the manner authorized in this section shall not relieve Contractor or Contractor's surety from any obligation with respect to any unpaid claims.
- Unless the payment is subject to a good-faith dispute as defined in ORS 279C.580, if Contractor or any first-tier subcontractor fails to pay any claim for materials or labor furnished under this Contract within 30 days after being paid by District, interest shall be due on such claim as specified in ORS 279C.515(2) at the end of the 10-day period that payment is due under ORS 279C.580(4). A person with any such unpaid claim may file a complaint with the Construction Contractor's Board unless the complaint is subject to a good-faith dispute as defined in ORS 279C.580.
- e. ORS 279C.520:
- i. Contractor shall not employ any person for more than 10 hours in any one day, or 40 hours in any one week, except in cases of necessity, emergency, or where the public policy absolutely requires it, and in such cases, except in cases of contracts for personal services as defined in ORS 279A.055, the laborer shall be paid at least time and a half pay:
    1. For all overtime in excess of eight hours a day or 40 hours in any one week when the work week is five consecutive days, Monday through Friday; and
    2. For all overtime in excess of 10 hours a day or 40 hours in any one week when the work week is four consecutive days, Monday through Friday; and
    3. For work performed on Saturday and on any legal holiday specified in any applicable collective bargaining agreement or ORS 279C.540.

The requirement to pay at least time and a half for all overtime worked in excess of 40 hours in any one week shall not apply to individuals who are excluded under ORS 653.010 to 653.261 or under 29 U.S.C. Section 201 to 209 from receiving overtime.
  - ii. Contractor shall comply with ORS 652.220 (addressing the prohibition of discriminatory wage rates based on sex and of employer discrimination against an employee who is a complainant). Compliance is a material element of this Contract. Failure to comply is a breach that entitles District to terminate this Contract for cause.
  - iii. Contractor shall not prohibit any of Contractor's employees from discussing the employee's wage, salary, benefits, or other compensation with another employee or another person, and Contractor shall not retaliate against an employee who does so.
  - iv. Contractor shall and shall require its subcontractors to give notice to their employees who work under this Contract in writing, either at the time of hire or before commencement of Work on the Contract, or by posting a notice in a location frequented by employees, of the number of hours per day and days per week that the employees may be required to work.
- f. ORS 279C.525: State law requires that solicitation documents for a public improvement contract make specific reference to federal, state, and local agencies that have enacted ordinances, rules, or regulations dealing with the prevention of environmental pollution or the preservation of natural resources that may affect the performance of this Contract. These agencies include, but are not limited to:
- i. Federal Agencies: Department of Agriculture, Forest Service, Soil and Water Conservation Service, Coast Guard, Department of Defense, Army Corps of Engineers, Department of Emergency, Federal Energy Regulatory Commission, Environmental Protection Agency, Department of Health and Human Services, Department of Housing and Urban Development, Solar Energy and Energy Conservation Bank, Department of Interior, Bureau of Land Management, Bureau of Indian Affairs, Bureau of Mines, Bureau of Reclamation, Geological Survey, Minerals Management Service, U.S. Fish and Wildlife Service, Department of Labor, Mine Safety and Health Administration, Occupation Safety and Health Administration, Department of Transportation, Federal Highway Administration, Water Resources Council.
  - ii. State Agencies: Department of Administrative Services, Department of Agriculture, Soil and Water Conservation Commission, Columbia River Gorge Commission, Department of Energy, Department of Environmental Quality, Department of Fish and Wildlife, Department of Forestry, Department of Geology and Mineral Industries, Department of Human Resources, Department of Consumer and Business Services, Land Conservation and Development Commission, Department of Parks and Recreation, Division of State Lands, Department of Water Resources.
  - iii. Local Agencies: City councils, county courts, county boards of commissioners, metropolitan service district councils, design commissions, historic preservation commissions, planning commissions, development review commissions, special district boards of directors, and other special districts and special governmental agencies such as Tri-Met, urban renewal agencies, and port districts.
  - iv. Tribal Governments.
- g. ORS 279C.530: Contractor shall promptly, as due, make payments to any person, copartnership, association, or corporation furnishing medical, surgical, and hospital care or other needed care and attention, incident to sickness or injury, to the employees of such Contractor, of all sums that Contractor agrees to pay for such services and all moneys and sums that Contractor collected or deducted from the wages of employees pursuant to any law, contract, or agreement for the purpose of providing or paying for such service.

To the extent any of Contractor's employees are covered by the Oregon employment laws, Contractor, its subcontractors, if any, and all employers working under this Contract are subject employers under the Oregon Workers' Compensation Law and shall comply with ORS 656.017, which requires them to provide workers' compensation coverage for all their subject workers. See Contractor Exemption Certification – Exhibit 4 if you believe you may be exempt from this requirement.

- h. ORS 279C.545: Workers employed by Contractor shall be foreclosed from the right to collect for any overtime under this Contract unless a claim for payment is filed with Contractor within 90 days from the completion of the Contract, providing Contractor has:
  - i. Caused a circular clearly printed in blackface pica type and containing a copy of this section to be posted in a prominent place alongside the door of the timekeeper's office or in a similar place that is readily available and freely visible to any or all workers employed on the work, and
  - ii. Maintained such circular continuously posted from the inception to the completion of the Contract on which workers are or have been employed.
- i. ORS 279C.580(3): Contractor shall include in each subcontract for property or services with a first-tier subcontractor a clause that obligates Contractor to pay the first-tier subcontractor for satisfactory performance under its subcontract within 10 days out of such amounts as are paid to Contractor by District. Contractor shall also include in each subcontract a clause that states that if Contractor fails to pay any claim for materials or labor furnished under this Contract within 30 days after being paid by District, interest shall be due on such claim as specified in ORS 279C.515(2) at the end of the 10-day period that payment is due under ORS 279C.580(3). Contractor shall require each first-tier subcontractor to include a payment clause and interest clause conforming to the requirements of ORS 279C.580 in each of its subcontracts, and to require each of its subcontractors to include a similar clause in each contract with a lower-tiered subcontractor or supplier.
- j. ORS 279C.800 to 279C.870:
  - i. This Contract is subject to payment of prevailing wages under ORS 279C.800 to 279C.870. Each worker that Contractor, any subcontractor, or other person who is party to the contract uses in performing all or part of the Contract must be paid not less than the applicable prevailing rate of wage for each trade or occupation as defined by the Director of the State of Oregon Bureau of Labor and Industries ("BOLI") in the applicable publication entitled *Definitions of Covered Occupations for Public Works Contracts in Oregon*. The prevailing wage rates for public works contracts in Oregon are contained in the following publications: The January 1, 2018 *Prevailing Wage Rates for Public Works Projects in Oregon*, the January 1, 2018 PWR Apprenticeship Rates, and the most current Prevailing Wage amendment. Such publications can be reviewed electronically at [http://www.boli.state.or.us/BOLI/WHDPWR/pwr\\_state.shtml](http://www.boli.state.or.us/BOLI/WHDPWR/pwr_state.shtml) and are hereby incorporated as part of the Contract Documents.
  - ii. This Contract is not subject to payment of prevailing wages under the federal Davis-Bacon Act (40 U.S.C. 3141 et seq.). Notwithstanding subsection j(i) of this section, if this Contract is subject to payment of prevailing wages under the Davis-Bacon Act, Contractor and any subcontractors must pay the higher of the federal prevailing wage rate or the state prevailing wage. The latest state prevailing wages can be reviewed as set forth in subsection j(i) of this section. The latest federal prevailing wage rates can be reviewed electronically at <http://www.wdol.gov/Index.aspx> (Search for Oregon, Multnomah County, Building Construction Type) and are hereby incorporated by reference as part of the Contract Documents. Contractors shall follow all prevailing wage rules including posting the Davis Bacon Poster at the worksite and submitting certified payroll records. The poster is available at <http://www.dol.gov/whd/regs/compliance/posters/fedprojc.pdf>. The payroll form is at <http://www.dol.gov/whd/forms/wh347instr.htm>.
- iii. District shall pay a fee to the Commissioner of the Oregon Bureau of Labor and Industries as provided in ORS 279C.825. The fee shall be paid to the Commissioner under the administrative rule of the Commissioner.
- iv. Contractor and any subcontractors shall post the prevailing wage rates in a conspicuous and accessible place in or about the Project.
- k. ORS 279C.836: If this Contract is subject to payment of prevailing wages under ORS 279C.800 to 279C.870, Contractor shall:
  - i. File a public works bond with the Construction Contractors Board pursuant to ORS 279C.836 before starting Work on the Project, unless exempt under ORS 279C.836(2), (7), or (8).
  - ii. Include in every subcontract a provision requiring the subcontractor to file a public works bond with the Construction Contractors Board pursuant to ORS 279C.836 before starting work on the project, unless exempt under ORS 279C.836(2), (7), or (8).
- l. ORS 279C.845: If this Contract is subject to payment of prevailing wages under ORS 279C.800 to 279C.870:
  - i. Contractor or Contractor's surety and every subcontractor or subcontractor's surety shall file with District a certified statement on a form provided by BOLI certifying the hourly rate of wage paid each worker employed by Contractor or subcontractor on the Work and that no such worker has been paid less than the prevailing rate of wage or wage specified under the Contract.
  - ii. Notwithstanding ORS 279C.555 or 279C.570(7), District shall retain 25% of all amounts earned by Contractor until Contractor has filed the certified statements as required by ORS 279C.845. In addition, Contractor shall retain 25% of any amount earned by a first-tier subcontractor until such subcontractor has filed the certified statements with District. District and/or Contractor shall pay any such retained amounts within 14 days after such certified statements are filed.
- m. ORS 468A.710: If this Contract requires asbestos abatement, Contractor or subcontractor must possess an asbestos abatement license as required by ORS 468A.700 et seq.
- n. ORS 671.560, 701.055: If Contractor is performing work as a landscape contractor as defined in ORS 671.520(2), Contractor must have a current, valid landscape contractor's license issued under ORS 671.560. If Contractor is performing work as a construction contractor as defined in ORS 701.005(2), Contractor must have a current, valid construction contractor's license issued under ORS 701.701.055. Contractor shall maintain in effect all licenses, permits, and certifications required for the performance of the Work. Contractor shall notify District immediately if any license, permit, or certification required for performance of this Contract shall cease to be in effect for any reason.

**23. When Work Is Performed on District Property (Including Schools) Contractor Shall Comply With the Following:**

- a. Identification Contractor performing work on District Property or for District shall carry photo identification and will present such, to anyone on request. Contractors that do not have specific uniforms for employees, shall provide identification tags as described above, and or any other mechanism, the District in its sole discretion determines is required to easily identify Contractors.
- b. Sign-in Required. As required by schools and other District locations, each day of work Contractor's employees shall sign into the Main Office to receive an in-school identification/visitors tag to be displayed on the person at all times they are in the school or other location.
- c. No Smoking. Smoking or other use of tobacco is prohibited on the District property..
- d. No Weapons or Firearms. Except as provided by Oregon Statutes and District policy, weapons and firearms are prohibited on District property.

**24. When Work Is Performed in or on School Sites, Contractor Shall Comply With the Following:**

- a. No Unsupervised Contact with Students. Unsupervised contact with students means contact with students that provide the person opportunity and probability for personal communication or touch when not under direct supervision. Contractor will ensure that Contractor, any subcontractors, and their officers, agents and employees will have no direct unsupervised contact with students while on District property. Contractor will work with the District to ensure compliance with this requirement. If Contractor is unable to ensure through a security plan that none of its officers, agents or employees will have direct, unsupervised, contract with students in a particular circumstance or circumstances, Contractor shall so notify the District prior to beginning any Work that could result in such contact. Contractor authorizes District to obtain information about Contractor and Contractor's history and to conduct a criminal background check, including fingerprinting, of any officer, agent or employee of Contractor that will have unsupervised contact with students. Contractor also agrees to cause Contractor's employees and/or subcontractors, if any, to authorize District to conduct such background checks. Contractor shall pay all fees assessed by Oregon Department of Education for processing the background check. District may deduct the cost of such fees from a progress or final payment to Contractor under this contract, unless Contractor elects to pay such fees directly.
- b. Confidentiality. The Parties recognize that the Federal Education Privacy Rights Act (FERPA) imposes strict penalties for improper disclosure or re-disclosure of confidential student information including but not limited to denial of access to personally identifiable information from education records for at least five years (34 CFR 99.33(e)). Therefore, consistent with the requirements of FERPA, personally identifiable information obtained by Contractor in the performance of this contract: may not be re-disclosed to third parties without written consent of the students' parents/guardians; and must be used only for the purposes identified in this contract.

**25. Quality of Goods and Services.** Unless otherwise specified, all materials shall be new and both workmanship and materials shall be of the highest quality. All workers and subcontractors shall be skilled in their trade.

**26. Staffing; Delay.** Contractor shall furnish sufficient staffing and equipment and work such hours, including night shifts, overtime, and weekend and holiday work, as may be necessary to insure the production of the Work in accordance with the date of Substantial

Completion and the approved construction schedule. If Contractor fails to perform in a timely manner in accordance with the Contract Documents and, through the fault of Contractor or any subcontractor, fails to meet the approved construction schedule, then Contractor shall take such steps as may be necessary to immediately improve its progress by increasing the number of workers, shifts, overtime operations, or days of work, all without additional cost to District. District will not be liable for any damages or extra costs resulting from any delay in Contractor's work not caused by District. All such damages or costs shall be paid by Contractor.

**27. Errors.** Contractor shall perform such additional work as may be necessary to correct errors in the Work required under this Contract without undue delay and without additional cost.

**28. Access to Records.** Contractor agrees that District and its authorized representatives shall have access to the books, documents, papers, and records of Contractor that are directly pertinent to the specific Contract for the purpose of making audit, examination, excerpts, and transcripts.

**29. Maintenance of Records.** Contractor shall maintain all fiscal records directly relating to this Contract in accordance with generally accepted accounting principles. In addition, Contractor shall maintain any other records pertinent to this Contract in such a manner as to clearly document Contractor's performance. Contractor acknowledges and agrees that District's duly authorized representatives shall have access to such fiscal records and other books, documents, papers, plans, and writings of Contractor that are pertinent to this Contract to perform examinations and audits and make excerpts and transcripts. Contractor shall retain and keep accessible all such fiscal records, books, documents, papers, plans, and writings for a minimum of three (3) years, or such longer period as may be required by applicable law, following final payment and termination of this Contract or until the conclusion of any audit, controversy, or litigation arising out of or related to this Contract, whichever date is later.

**30. Ownership of Work.** All work products created by Contractor as part of Contractor's performance of this Contract, including background data, documentation, and staff work that are preliminary to final reports, shall be the exclusive property of District. If any such work products contain intellectual property of Contractor that is or could be protected by federal copyright, patent, or trademark laws, Contractor hereby grants District a perpetual, royalty-free, fully paid-up, non-exclusive, and irrevocable license to copy, reproduce, deliver, publish, perform, dispose of, use, re-use, in whole or in part, and to authorize others to do so, all such work products. District shall have no rights in any pre-existing work product of Contractor provided to District by Contractor in the performance of this Contract except to copy, use, and re-use any such work product for District use only. If this Contract is terminated by either party or by default, District, in addition to any other rights provided by this Contract, may require Contractor to transfer and deliver such partially completed work products, reports, or other documentation that Contractor has specifically developed or specifically acquired for the performance of this Contract.

**31. Warranty.**

- a. Contractor warrants to District and Architect that materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the Work will be free from defects not inherent in the quality required or permitted, and that the Work will conform to the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. Contractor's warranty excludes remedy for damage or defect caused by abuse, modifications not executed by Contractor,



- improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by Architect or District, Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.
- b. Contractor guarantees all work against defects in material or workmanship for a period of one (1) year from the date of acceptance or final payment from District, whichever is later.
  - c. If, after 10 days' notice, Contractor fails to proceed to cure any breach of this warranty, District may have the defects corrected and Contractor and its surety shall be liable for all expenses incurred. In case of an emergency where, in the opinion of District or Architect, delay would cause serious loss or damage, corrective work may be undertaken without advance notice to Contractor, but Contractor and its surety shall remain liable for all expenses incurred. The remedies stated in this subsection are not exclusive, but are cumulative of any other remedies District may have.
  - d. Contractor shall assign all manufacturers' warranties to District and all guarantees and warranties of goods supplied under this Contract shall be deemed to run to the benefit of District. Contractor shall provide District with all manufacturers' warranty documentation and operations and maintenance manuals not later than the date of final acceptance of the Work by District.
- 32. Employees of Contractor.** At the direction of District, Contractor will immediately remove any employee of Contractor from all District premises where District determines, in its sole discretion, that removal of such employee would be in the best interests of District.
- 33. Security.** Any disclosure or removal of any matter and/or property, not in conjunction with the specifications, on the part of Contractor or Contractor's employees shall be cause for immediate cancellation of the Contract. Any liability, including but not limited to attorney fees, resulting from any action or suit brought against District as a result of Contractor's or Contractor's employees' willful or negligent release of information, documents, or property contained in or on District property shall be borne by Contractor. All information, documents, and property contained within these facilities shall be considered privileged and confidential.
- 34. Indemnification.**
- a. To the fullest extent permitted by law, Contractor shall indemnify and hold harmless District, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorney fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of Contractor, a subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this section.
  - b. In claims against any person or entity indemnified under this section by an employee of Contractor, a subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under subsection a. of this section shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for Contractor or a subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.
- 35. Insurance.** Unless otherwise provided below, Contractor shall at all times maintain in force at Contractor's expense, the following insurance coverage:
- a. **Workers' Compensation:** As required by ORS 656.017, subject employers shall provide workers' compensation coverage in accordance with ORS Chapter 656 for all subject workers. Contractor and all subcontractors of Contractor with one or more employees shall have this insurance unless exempt under ORS 656.027.
  - b. **Commercial General Liability:** Contractor shall purchase and maintain CGL insurance with occurrence-based coverage on ISO Form CG 0001 (12/04 or later) or an equivalent form approved in advance by District. The CGL insurance shall include all major coverage categories including bodily injury, property damage, and completed operations coverage maintained for at least six years following final payment. The CGL insurance will also include the following: (1) separation of insured; (2) incidental medical malpractice; and (3) personal injury with employment exclusion deleted. Contractor shall maintain CGL insurance coverage of at least \$2 million for each claim, incident, or occurrence, and at least \$3 million annual aggregate coverage.
  - c. **Motor Vehicle Liability:** Contractor shall purchase and maintain motor vehicle liability insurance with coverage for owned, hired, and non-owned vehicles on ISO form CA 00 01 or an equivalent form approved in advance by District. The automobile liability insurance shall include pollution liability coverage with vehicle overturn and collision. Contractor shall maintain motor vehicle liability insurance of at least \$1 million for each claim, incident, or occurrence, and at least \$2 million annual aggregate coverage.
  - d. **Builders All-Risk:** Not required – District provides coverage.
  - e. **Additional Requirements:** All insurance coverage shall be provided by an insurance company having an A.M. Best rating of at least A- and/or licensed to do business in Oregon. Contractor alone is responsible for paying all deductibles and retentions. A cross-liability clause or separation of insureds condition shall be included in all general liability policies required by this Contract. Contractor's coverage shall be primary in the event of loss.
  - f. **Certificate of Insurance:** Contractor shall furnish to District a current certificate of insurance for each of the above required coverages prior to conducting Work under this Contract. Additional insured endorsements must be written on ISO Form CG 2010 (11/85) or CG 2037 (07/04) together with CG 2033 (07/04), or their equivalent. Each certificate must provide that there shall be no cancellation, termination, material change, or reduction of limits of the insurance coverage without 30 days' prior written notice from Contractor or its insurer to District. Each certificate shall also state the relevant deductible or retention level. For general and automobile liability coverage, the certificate shall also provide that District, its agents, officers, and employees are additional insureds with respect to Contractor's services provided under this Contract. If requested by District, Contractor shall also provide complete copies of insurance policies to District.
- 36. Notice of Injury or Damage to Person or Property.** If any person suffers physical injury or property damage arising from the Work regardless of the cause, Contractor shall give notice of such injury or damage, whether or not insured, immediately to District's authorized representative and Contractor's authorized representative. The notice shall provide sufficient detail to enable District and any other party affected to investigate the matter.
- 37. Waiver.** Waiver of any default under this Contract by District shall not be deemed to be a waiver of any subsequent default or a modification of the provisions of this Contract.

**38. Arbitration.**

- a. Any Claim arising out of or related to the Contract, except those waived as provided for in Section 20, shall, after decision by Architect or 30 days after submission of the Claim to Architect, be subject to arbitration. At any time, party(ies) may endeavor to resolve disputes by mediation.
- b. Claims shall be decided by arbitration that, unless the parties mutually agree otherwise, shall be in accordance with the rules of the Arbitration Service of Portland, Inc. The demand for arbitration shall be filed in writing with the other party to the Contract and with the Arbitration Service of Portland, Inc., and a copy shall be filed with Architect. Exclusive venue for arbitration shall be in Portland, Oregon.
- c. A demand for arbitration shall be made within a reasonable time after the Claim has arisen, and in no event shall it be made after the date when institution of legal or equitable proceedings based on such Claim would be barred by the applicable statute of limitations.

**39. Governing Law.** The provisions of this Contract shall be construed in accordance with the laws of the State of Oregon and the Public Contracting Rules of the District as they exist at the time of execution of this Contract or any subsequent amendment. Any legal action involving this Contract not subject to arbitration must be brought in Multnomah County Circuit Court. If the Claim must be brought in a federal forum, then it shall be brought and conducted in the United States District Court for the State of Oregon.

**40. Severability.** If any term or provision of this Contract is declared by a court of competent jurisdiction to be illegal or in conflict with any law, the validity of the remaining terms and provisions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if the Contract did not contain the particular term or provision held invalid.

**41. Merger Clause.** This Contract and the attached exhibits constitute the entire agreement between the parties. All understandings and agreements between the parties and representations by either party concerning this Contract are contained in this Contract. No waiver, consent, modification, or change in the terms of this Contract shall bind either party unless in writing signed by both parties. Any written waiver, consent, modification, or change shall be effective only in the specific instance and for the specific purpose given.

**42. Anti-discrimination Clause.** Contractor must comply with all applicable requirements of federal and state civil rights law and rehabilitation statutes and shall not discriminate based on race, religion, color, sex, sexual orientation, marital status, familial status, national origin, age, mental or physical disability, or political affiliation in programs, activities, services, benefits, or employment.

**43. Attorney Fees.** If a suit or action is filed to enforce any of the terms of this Contract, including a request for arbitration under Section 37 of this Contract, the prevailing party shall be entitled to recover from the other party, in addition to costs and disbursements provided by statute, any sum that a court, including any appellate court, or arbitrator may adjudge reasonable as attorney fees. In the event the prevailing party is represented by "in-house" counsel, the prevailing party shall nevertheless be entitled to recover reasonable attorney fees based on the reasonable time incurred and the attorney fee rates and charges reasonably and generally accepted in the metropolitan Portland, Oregon, area for the type of legal services performed.

**44. Rule of Construction.** The rule of construction that a contract is construed against the drafter shall not apply to any dispute over the interpretation of application of the Contract.

**45. Removal of Debris.** Contractor shall remove all trash and debris from the site for disposal. Contractor shall clean the work area and remove all trash, debris, and tools at least daily prior to leaving the job site and as needed to maintain a safe work area.

---

*[Signature page follows]*

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## Business Name: \_\_\_\_\_

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

Is Contractor a nonresident alien? ☐ Yes ☐ No

Federal tax ID numbers or Social Security numbers are required pursuant to ORS 305.385 and will be used for the administration of state, federal, and local laws. Payment information will be reported to the Internal Revenue Service under the name and federal tax ID number or, if none, the Social Security number provided above.

Signature	Title
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Name (please print)	Date
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NOTE: Contractor must also sign Exhibit 4 and (if applicable) Exhibit 5.

David Douglas School District No. 40

**SIGNATURE**

(This Contract is not binding on District until signed by the appropriate signing authority)

Signature	Title	Date
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Name (please print) \_\_\_\_\_



**EXHIBIT 2**  
**DAVID DOUGLAS SCHOOL DISTRICT NO. 40**  
**SMALL CONSTRUCTION PROJECTS CONTRACT**  
**STATEMENT OF WORK, COMPENSATION,**  
**PAYMENT, and RENEWAL TERMS**

1. Contractor shall perform the following Work: [Describe or reference solicitation documents]
2. The total Contract Price shall be \_\_\_\_\_.
3. District shall pay Contractor as described in Section 10 of the Contract.

**Payments shall be made to the address below:**

**Name:** \_\_\_\_\_  
**Title:** \_\_\_\_\_  
**Address:** \_\_\_\_\_

4. Contractor will invoice District for the Work as follows:

**Invoices shall be submitted to the address below:**

**Name:** \_\_\_\_\_  
**Title:** \_\_\_\_\_  
**David Douglas School District No. 40**  
**Address:** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



**EXHIBIT 3**  
**DAVID DOUGLAS SCHOOL DISTRICT NO. 40**  
**SMALL CONSTRUCTION PROJECTS CONTRACT**  
**CERTIFICATION STATEMENT FOR CORPORATION**  
**OR INDEPENDENT CONTRACTOR**  
**NOTE: Contractor Must Complete A or B below**

**A. CONTRACTOR IS A CORPORATION, LIMITED LIABILITY COMPANY, OR A PARTNERSHIP.**

**I certify under penalty of perjury that Contractor is a [check one]:**

☐ Corporation ☐ Limited Liability Company ☐ Partnership authorized to do business in the State of Oregon.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

\_\_\_\_\_  
Date

**OR**

**B. CONTRACTOR IS A SOLE PROPRIETOR WORKING AS AN INDEPENDENT CONTRACTOR.**

**Contractor certifies under penalty of perjury that the following statements are true:**

1. If Contractor is providing labor or services under this Contract for which registration is required under ORS Chapter 701, Contractor has registered as required by law, **and**
2. If Contractor performed labor or services as an independent contractor last year, Contractor filed federal and state income tax returns last year in the name of the business (or filed a Schedule C in the name of the business as part of a personal income tax return), **and**
3. Contractor represents to the public that the labor or services Contractor provides are provided by an independently established business, **and**
4. All of the statements checked below are true.

**NOTE: Check all that apply. You must check at least four (4) to establish that you are an Independent Contractor.**

- ☐ A. The labor or services I perform is primarily carried out at a location that is separate from my residence or is primarily carried out in a specific portion of my residence that is set aside as the location of the business.
- ☐ B. I purchase commercial advertising or I have business cards for my business, or I am a member of a trade association.
- ☐ C. My business telephone listing is separate from my personal residence telephone listing.
- ☐ D. I perform labor or services only under written contracts.
- ☐ E. Each year I perform labor or services for at least two different persons or entities.
- ☐ F. I assume financial responsibility for defective workmanship or for service not provided by purchasing performance bonds, errors and omission insurance, or liability insurance, or providing warranties relating to the labor or services I provide.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date





**DAVID DOUGLAS SCHOOL DISTRICT  
DAVID DOUGLAS HIGH SCHOOL KILT KITCHEN REMODEL  
18039.00.L**

**SECTION 00 61 13**

**PERFORMANCE AND PAYMENT BONDS**

Contractor shall furnish Performance and Payment Bonds in accordance with Article 5, Bidding Procedure, Item 5.6 of Section 00 20 13, Instructions to Bidders.

**END OF SECTION**



**GENERAL CONDITIONS**

The Standard Terms and Conditions portion of the "David Douglas School District Small Construction Projects Contract", will be made a part of this Contract.

A sample of these conditions has been herein attached to these Specifications as the "David Douglas School District Small Construction Projects Contract".

**END OF SECTION**



**SUMMARY OF WORK**

**PART 1 - GENERAL**

**1.1 WORK COVERED BY CONTRACT DOCUMENTS**

- A. The Work of the Contractor consists of Construction of Kilt Kitchen Modifications at David Douglas High School, 1001 SE 135<sup>th</sup> Avenue, Portland Oregon as indicated on Contract Documents prepared by BBL ARCHITECTS. The Drawings and Specifications are dated February 21, 2019.
- B. Descriptive Summary: Without force and effect on requirements of contract documents, the description of the work of the contract can be summarized as follows:

The renovation of the existing commercial kitchen facility for the Culinary Education Program. The project scope includes interior finishes, doors and windows, food service equipment, plumbing, mechanical, electrical, the addition of roof top mechanical equipment, and addition of outside walk-in cooler/freezer.
- C. Contract Documents: Requirements of the work are contained in the contract documents, and include cross-references to published information, which is not necessarily bound within the documents.

**1.2 CONTRACTS**

- A. Construct the Work under a Stipulated Sum Contract, furnished by the Owner.

**1.3 PERMITS AND FEES**

- A. Permits and Fees: Refer Section 00 73 00, Supplementary Conditions.

**1.4 WORK SEQUENCE**

- A. Coordinate the construction schedule and operations with the Owner's Designated Representative.
- B. All Work shall be substantially complete on or before September 9, 2019.

**1.5 CONTRACTOR USE OF PREMISES**

- A. General: Owner will occupy portions of the building during the construction period. Do not interfere with the Owner's operations. Coordinate use of premises under the direction of the Owner.
- B. Use of the Site:
  - 1. Assume full responsibility for the protection and safekeeping of Products under this Contract, stored on the Site.
  - 2. Confine operations at the site to the areas permitted. Portions of the site beyond areas on which work is indicated are not to be disturbed.
  - 3. Move any stored Products, under Contractor's control, which interfere with operations of Owner or separate contractors.
  - 4. Keep existing driveways and entrances serving the premises clear and available at all times. Do not use for parking for storage of materials.
  - 5. Maintain continuity of utility services to existing building.
  - 6. Lock automotive type vehicles and other mechanized or motorized construction equipment, when parked and unattended. Do not leave vehicles or equipment unattended with the motor running or ignition key in place.

**SUMMARY OF WORK**

7. Do not encumber the site with materials or equipment. Confine stockpiling of materials and location of storage sheds to the areas indicated.
  8. Additional storage or Work areas needed for operations shall be made available at . Verify exact area with Owner.
- C. Contractor's Use of the Existing Building:
1. Maintain the existing building in a safe and weathertight condition throughout the construction period. Repair damage caused by construction operations. Take all precautions necessary to protect the building and its occupants during the construction period.
  2. Keep public areas such as hallways, stairs, elevator lobbies and toilet rooms free from accumulation of waste material, rubbish, or construction debris.
  3. Smoking or open fires will not be permitted within the building enclosure or on the premises.
- D. Contractor's Site Conduct:
1. Identifying name tags will be worn at all times.
    - a. No loitering in the school buildings.
    - b. The site is a tobacco-free site. This means no smoking or chewing on the property.
    - c. Beyond courtesy, there should be no interaction between staff and faculty.
    - d. Keep the project free of pop cans, lunch wrappers, etc.
    - e. The supervisor will review the scheduling of any work that is excessively noisy.
    - f. Be considerate of the client, the students, and faculty at the site.
    - g. Think! Always consider prior to an act, the safety of students, faculty, and other co-workers.
    - h. Profanity is not acceptable.
    - i. The wearing of clothing with logos displaying alcohol, tobacco, illegal substances, or suggestive themes are not acceptable attire.
    - j. Photographing students or faculty members is not allowed.
    - k. Finally, take pride in all work.

1.6 OWNER OCCUPANCY

- A. Owner Occupancy:
1. The Owner will occupy the site and the existing building during the entire period of construction.
  2. Cooperate fully with the Owner or his representative during construction operations to minimize conflicts and to facilitate Owner usage.
- B. Scheduling Requirements:
1. Contractor shall organize and coordinate work in a manner that does not interfere with the normal operations of areas of the facility being occupied and used by the Owner.
  2. Contractor shall maintain safe and convenient public access to the toilet rooms at all times that the facility is normally open to the public.
  3. Contractor shall continuously maintain public entry to the portions of the building being used by the Owner. The Contractor shall also continuously maintain safe, direct and legal exiting routes from all areas of the building to the outside.
  4. Contractor may usually perform work in the building during evening hours. However, the Contractor shall be bound by the local, State and Federal regulations pertaining to such overtime work as required by the Contract Documents. Make necessary arrangements for such evening access with The Owner's Project Representative. Occasional activities may preclude Contractor's access on some evenings. Cooperate with the Owner so as not to interfere with the Owner's use of building areas being occupied by the public.

**SUMMARY OF WORK**

5. The Owner shall permit public closure of the kitchen area from June 17, 2019 through September 13, 2020. The Contractor shall not delay the reopening of the area to the public beyond the time specified.
6. Normal operating hours of the building are:
  - a. Weekdays: 7:00 a.m. to 5:00 p.m.
  - b. The building is closed to the public on Weekends and legal holidays.
  - c. Heaviest usage of the building is generally on Mondays through Fridays, between 8:00 a.m. and 4:00 p.m.

**PART 2 – PRODUCTS (Not Used)**

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

**END OF SECTION**





**CONTRACTOR'S REQUEST FOR INFORMATION**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This Section covers the general requirements for Contractor's Request for Information (RFI) and pertains to all portions of the Contract Documents.

**1.2 DEFINITION**

- A. Request for Information: A request from the Contractor or one of its subcontractors, to the Architect, seeking an interpretation or a clarification of some requirement of the contract documents. The Contractor shall clearly and concisely set forth the issue for which it seeks clarification or interpretation and why a response is needed from the Architect. The Contractor shall, in the written request, set forth its interpretation or understanding of the contract's requirements along with reasons why it has reached such an understanding. Responses from the Architect will not change any requirements of the contract documents.
- B. Drawing Clarification: An answer from the Architect, in response to an inquiry from the Contractor, intended to make some requirements of the Drawings clearly understood. Drawing Clarifications may be sketches, drawings, or in narrative form and will not change any requirements of the Drawings. Responses to Contractor inquiries shall be as outlined in "Request for Information".

**1.3 CONTRACTOR'S REQUESTS FOR INFORMATION**

- A. When field conditions or contents of the contract documents require clarification or verification by the Architect, the following procedure is required.
  - 1. Present item or items requiring clarification/verification at Project Meeting for discussion. (Critical or emergency items contact Architect at once.)
  - 2. If it is determined that item or items do not require RFI submittals, the Architect shall include the determination of the clarification/verification within the Project Meeting Report.
  - 3. If it is determined that item or items do require written RFI submittal, prepare each RFI on a copy of form bound at end of this Section. Design Clarification/Variation Request (DCVR) or other forms are unacceptable.
  - 4. Number RFI's sequentially from the number 1. The Architect will make the RFI form available upon request.
  - 5. Record each RFI in a log, identifying each RFI-#, subject, date submitted, date of response, and disposition.
- B. The Contractor shall endeavor to keep the number of RFI's to a minimum. In the event that the process becomes unwieldy, in the opinion of the Architect, because of the number and frequency of RFI's submitted, the Architect may require the Contractor to abandon the process and submit all requests as either submittals, substitutions or requests for change.
- C. RFI's may be submitted on a copy of the form provided at the end of this section, or other form acceptable to the Owner and Architect. Forms shall be completely filled in, and if prepared by hand, shall be fully legible after copying by xerographic process. Each page of attachments to RFI's shall bear the RFI number in the upper left corner.
- D. The Contractor shall endeavor to answer all RFI's from its subcontractors. Only RFI's the Contractor cannot answer shall be submitted through, reviewed by, numbered sequentially by and signed by the Contractor prior to submittal to the Architect.

CONTRACTOR'S REQUEST FOR INFORMATION

- E. The Contractor shall carefully study the Contract Documents to assure that the requested information is not available therein. RFI's that request information that is available in the Contract Documents, will not be answered by the Architect.
- F. In all cases where RFI's are issued to request clarification or coordination or coordination issues, for example, pipe and duct routing, clearances, specific locations of work shown diagrammatically, and similar items, the Contractor shall fully lay out a suggested solution using drawings or sketches drawn to scale and submit same with the RFI. RFI's that fail to include a suggested solution will not be answered.
- G. RFI's shall not be used for the following purposes:
  - 1. To request approval of submittals.
  - 2. To request approval of substitutes.
  - 3. To request changes which entail additional cost or credit.
  - 4. To request different methods of performing work than those drawn and specified.
- H. In the event the Contractor believes that the clarification by the Architect results in additional cost, the Contractor shall not proceed with the work indicated by the RFI until a Construction Change Directive or Change Order is prepared and approved. **ANSWERED RFI'S SHALL NOT BE CONSTRUED AS APPROVAL TO PERFORM EXTRA WORK.**
- I. Unanswered RFI's will be returned with a stamp or notation: Not Reviewed.
- J. The Contractor shall prepare and maintain a log of RFI's, and at any time requested by the Architect, the Contractor shall furnish copies of the log showing all outstanding RFI's. The Contractor shall note all unanswered RFI's in the log.
- K. The Contractor shall allow for 14-days review and response time for RFI's.

1.4 REQUEST FOR INFORMATION LOG

- A. Maintain and update, as required, a log of all Requests for information. Include the number and date of the request, the date information was returned by the Architect, and actions taken or required. Submit the Request for Information Log to the Architect and Owner for review at each Project Meeting.

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

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

**END OF SECTION**

### REQUEST FOR INFORMATION

RFI No.: Architect's Job No.: Date:

Project Name:

Contractor: Architect:

Initiated By: Spec Section: Dwg./Detail:  
Title:

Signature:

1. QUESTION

Potential Cost Impact: Potential Time Impact:  
Response Needed within days

2. RESPONSE

Signature: Date:  
Title:



**PROJECT COORDINATION**

**PART 1 - GENERAL**

**1.1 GENERAL COORDINATION**

- A. Coordinate various elements of the work and entities engaged to perform work.
- B. Coordinate the work with existing facilities/conditions, and with work by separate contractors (if any) and by the Owner.

**1.2 INSTALLER INSPECTIONS**

- A. Require installer of each major unit of work to inspect substrate and conditions for installation and to report unsatisfactory conditions in writing.
- B. Correct unsatisfactory conditions before proceeding with installation.
- C. Inspect each product immediately before installation.
- D. Do not install damaged or defective products, materials or equipment.
- E. Start of installation shall be understood as acceptance of substrate conditions by the installer.

**1.3 CLEARANCES**

- A. Provide adequate clearance between Architectural, Structural, Mechanical, and Electrical Systems. Verify physical dimensions of equipment and its available space. Check access routes through concealed or existing spaces for installation of systems or equipment.
- B. Review the Construction Documents for possible conflicts prior to rough-in. Contractor is responsible for verification that equipment will fit in the space provided. Resolve conflicts with the Architect prior to rough-in work.

**1.4 CUTTING AND PATCHING FOR MODIFICATION OF EXISTING AND NEW WORK**

- A. Execute cutting, fitting, or patching of work required to remove and replace defective Work or Work not conforming to Contract Documents.
- B. Inspect existing conditions of work, including elements subject to movement or damage during cutting and patching.
- C. Provide shoring, bracing, and support as required to maintain structural integrity of the Project.
- D. Execute cutting, product removal, and patching by methods which will prevent damage to other work, will provide proper surfaces to receive installation of repairs, and comply with specified tolerances and finishes.
- E. Fill openings cut oversized to install equipment systems or sleeves until finished surface is tight against the equipment, system, or sleeve installed in the opening.
- F. Repair surfaces adjacent to cut areas to match the adjacent finish.
- G. Refer also to Section 01 73 29 CUTTING AND PATCHING.

**PROJECT COORDINATION**

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

**PART 3 - EXECUTION**

**3.1 PREPARATION**

- A. Pre-Installation Conference:
  - 1. Prior to starting installation of each major component of the work, hold a pre-installation conference attended by each entity involved or affected by planned installation.
  - 2. Include technical representatives of product manufacturers and others recognized as expert or otherwise capable of influencing success of the installation.
  - 3. Review significant aspects of requirements for the work. Record discussion and distribute as plan of action.

**3.2 INSTALLATION**

- A. Comply with manufacturer's instructions and recommendations to the extent printed information is more detailed or stringent than requirements contained directly in the contract documents.
- B. Timing: Install work during time and under conditions which will ensure best possible results, coordinated with required inspection and testing.
- C. Anchor work securely in place, properly located by measured line and level, organized for best possible uniformity, visual effect, operational efficiency, durability, and similar benefit to Owner's use. Sufficiently isolate non-compatible materials from contact to prevent deterioration.
- D. Mount individual units of work at industry-recognized mounting heights, if not otherwise indicated. Refer uncertainties to Architect before proceeding.

**3.3 CLEANING AND PROTECTION**

- A. Clean each element of work at time of installation.
- B. Provide sufficient maintenance and protection during construction to ensure freedom from damage and deterioration at time of Substantial Completion.

**END OF SECTION**

**PROJECT MEETINGS**

**PART 1 - GENERAL**

**1.1 PRE-BID CONFERENCE**

- A. A Mandatory Pre-Bid Conference will be held at the Project Site at 4:00 p.m. (PDT) Thursday, 28 February 2019. The Conference shall convene at the David Douglas High School Horner Performing Arts Center Parking Lot, 1400 SE 130th Ave, Portland, OR 97233.
- B. No Bid will be accepted from General Contractors or Abatement Contractors who did not attend the Pre-Bid Conference. Attendance by subcontractors is not required. However, subcontractors are strongly encouraged to attend. Other opportunities to inspect building will be limited and at the Owner's discretion.

**1.2 PRE-CONSTRUCTION CONFERENCE**

- A. Purpose:
  - 1. To discuss items of interest in such detail that the Contractor shall have a clear understanding of the Owner's requirements, Contract Documents, and conditions affecting the Work. Items to be discussed include, but are not limited to:
    - a. Roles of Architect, Owner, Contractor, and Inspectors.
    - b. Procedures for handling change orders, requests for payment, and other administrative details.
    - c. Procedures for handling shop drawing, substitutions, inspections, etc.
    - d. Scheduling of the work.
    - e. Contractor's comments on any inaccuracies or ambiguities found in the Contract Documents.
    - f. To discuss any and all questions by the Contractor to make sure that the Contractor is aware of all conditions affecting the work prior to the awarding of the Contract.
  - 2. For the General Contractor to discuss with the Owner, Architect, subcontractors, and other interested parties the design, methods, organization, schedule of the work, contract requirements, mutual understandings relative to the Contract Documents, and procedures of the Administration of the Contract. Items to be discussed include, but are not limited to:
    - a. Construction Schedule.
    - b. Project Coordination: Designation of responsible personnel.
    - c. Procedures and processing of submittals, pay requests, change orders.
    - d. Record Document maintenance.
    - e. Hazardous materials.
    - f. Review of existing building conditions.
- B. Date of Conference: Before actual construction begins, when scheduled by the Architect.
- C. Attendance: The Owner, Architect, Contractor, and his superintendent shall attend as well as subcontractors and suppliers designated by the Owner, Architect, or Contractor.
- D. Place: To be designated by the Architect.

**1.3 PROGRESS MEETINGS**

- A. Purpose: Project meetings will be held each week, from beginning of construction to final acceptance, to discuss items of mutual interest regarding coordination and progress of the work.

**PROJECT MEETINGS**

- B. Day of Week: To be mutually determined by the Architect, Owner, and the Contractor.
- C. Attendance: The Owner, Architect, Contractor, and his superintendent shall attend, or their representatives. Other subcontractors, suppliers, or manufacturer's representatives shall attend when requested by the Contractor, Owner, or Architect.
- D. Place: Project site or as otherwise designated by the Architect.
- E. Chairman: The Architect shall chair the meeting.
- F. Meeting Date Changes: Only the Architect can change the meeting date after 24 hour notice. The Architect will set the new date.
- G. Meeting Report: The Architect will later issue a meeting report to the Contractor and Owner.
- H. The Contractor shall be responsible for notifying subcontractors and other representatives of scheduled construction meetings where their attendance is requested.

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

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

**END OF SECTION**



**SUBMITTAL PROCEDURES**

**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Submit overall construction schedule, 3-week work schedule, shop drawings, product data, samples, schedule of values, record documents, and products list as specified.
  - 1. Submit to Architect only through Contractor.
  - 2. Do not submit directly to Consulting Engineers without prior approval by the Architect for each individual submittal.

**1.2 QUALITY ASSURANCE**

- A. Within 15 days of the Award of Contract, submit schedules of values, list of principal subcontractors and suppliers, progress schedule, copies of building permits, and similar start-up authorization.

**PART 2 – PRODUCT**

**2.1 CONSTRUCTION SCHEDULE**

- A. Content: Within 15 days of the award of contract, submit a comprehensive progress schedule indicating a time bar for each significant category of work to be performed. Show product and installation dates for major products. Show dates for each construction activity, Substantial Completion and punch list preparation, Final Completion, and Occupancy.
- B. Designate in the Construction Schedule, the dates for submission and review of Shop Drawings, product data and samples that are needed for the product. Show critical submittal dates or prepare a separate coordinated listing of critical submittal dates.
- C. Updating: Indicate progress of each activity and show revised completion dates. Provide listing of current and anticipated accelerations and delays. Describe proposed corrective action when required. Revise at intervals matching payment requests and redistribute with each payment request.

**2.2 SCHEDULE OF VALUES**

- A. Submit a Schedule of Values covering various parts of work including quantities aggregating the total sum of the Contract. Show dollar value and percent of total for each unit of work scheduled. This Schedule will be the basis for the Contractor's Application for Payment.
- B. Submit on the latest edition of AIA Document G703, Continuation Sheet, within 15 days of Award of Contract and with each payment request. Revise each time schedule is affected by change order or other revision.
- C. Upon request by the Architect, support values given with data that will substantiate their correctness.

**2.3 PAYMENT REQUESTS**

- A. Submit a request each calendar month. Use the latest edition of AIA Document G702, Application and Certificate for Payment, fully completed, notarized, and executed.

**SUBMITTAL PROCEDURES**

**2.4 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES**

- A. General:
  - 1. Review, stamp with Contractor's stamp, and sign each submittal to certify Contractor has reviewed submittal for compliance with Contract Documents prior to submitting to the Architect. Submittals issued without the Contractor's review may be returned to the Contractor without being reviewed by the Architect.
  - 2. Provide 3" x 4" clear space on each submittal for the Architect's stamp.
  - 3. Provide additional copies as required by governing authorities.
  - 4. The Architect will not mark-up more copies than the number established at the Pre-Construction meeting.
  - 5. Submit electronic submittals (pdf's) when possible and practical.
- B. Shop Drawings:
  - 1. Submit shop drawings showing connections, details, dimensions, finishes, fasteners, etc.
  - 2. Submit 4 blackline prints. Maintain 1 print as a mark-up copy for the "Record Drawings".
    - a. Electronic submittals (pdf's) may be substituted for blackline prints when possible and practical.
  - 3. In the event that the submittal is a partial submittal, identify related shop drawings to be submitted at a later date.
- C. Product Data:
  - 1. Submit manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations, and other description data on manufactured products and systems.
  - 2. Mark each copy to indicate the actual product to be provided. Show selections from among options in the manufacturer's printed product data.
  - 3. Submit 4 copies to Architect. Submittal is for information and record purposes only. Maintain 1 copy at the project site for reference purposes.
  - 4. Submit electronic submittals (pdf's) when possible and practical.
- D. Office Samples:
  - 1. Submit 3 sets of samples; 2 sets will be returned. Maintain one returned set at the project site for purposes of quality control comparisons.
  - 2. Sample submittals are for Architect's observation of color, texture, pattern, and "kind".
- E. Miscellaneous Submittals: Provide copies of miscellaneous submittals as follows:
  - 1. Warranties: Submit 3 executed copies, plus additional copies as required for maintenance manual.
  - 2. Field Records: Submit 3 copies, including 1 copy that will be returned for inclusion in the submittal of "Record Documents".
  - 3. Maintenance Manuals: Submit 3 bound copies.
  - 4. "Record Drawings": Submit original maintained marked-up prints.
  - 5. Construction Schedule and Schedule of Values: Submit 4 copies to the Architect.
  - 6. In addition, submit electronic submittals (pdf's) of above items.

**2.5 3-WEEK WORK SCHEDULE**

- A. Each week, provide to the Architect a 3-Week Work Schedule on a form approved by the Architect. Each 3-Week Work Schedule is to show the description of all phases of the work to be accomplished during the week submitted and the 2 following weeks. The 3-Week Work Schedule is to be updated every week and presented to the Architect.

## SUBMITTAL PROCEDURES

### PART 3 - EXECUTION

#### 3.1 CONTRACTOR'S SUBMITTAL

- A. Review submittals prior to submission and provide stamp of approval signed or initialed by the Contractor indicating the Contractor has inspected the submittals and certifying that they are complete, correct, in compliance with the Contract Documents and suitable for the Project.
- B. Verify field measurements and other field construction criteria.
- C. Submit submittals required by each Specification Section to the Architect. Notify the Architect in writing at time of submission of deviation in submittals from requirements of the Contract Documents.

#### 3.2 ARCHITECT'S REVIEW

- A. Architect will review submittals for design concept and conformance with the Contract Documents and return submittals to the Contractor for distribution with corrections noted thereon.
- B. Stamp: The Architect will stamp each submittal to be returned with a uniform, self explanatory action stamp, appropriately marked and executed to indicate the status of the submittal. The stamp indicates and requires the follow action:
  - 1. No Exception Taken: No further action is required.
  - 2. Make Corrections Noted: Make the corrections upon fabrication of the material only.
  - 3. Rejected: The material submitted is not acceptable and another material submission is required.
  - 4. Revise and Resubmit: The material submittal is not acceptable and it is to be elaborated upon or corrected and resubmitted prior to material fabrication.
  - 5. Submit Specified Item: Submittal is rejected and the material specified is to be submitted.
  - 6. Checking is only for general conformance with the design concept of the Project and general compliance with the information given in the Contract Documents. Any action shown is subject to the requirements of the plans and specifications. Contractor is responsible for dimensions which shall be confirmed and correlated at the job site, fabrication processes and techniques of construction, coordination of his work with that of all other trades and the satisfactory performance of his work.
- C. Contractor's responsibility for deviations in submittals from requirements of the Contract Documents is not relieved by the Architect's review of submittals unless the Contractor has made written request for the deviations and the Architect gives written acceptance of specific deviations requested.

#### 3.3 CORRECTIONS

- A. Immediately incorporate all required corrections in the submittals and resubmit for further review, if required.

#### 3.4 TIME SCHEDULE FOR SUBMITTALS

- A. Construction Schedule: Submit to the Architect no later than 5 calendar days after receipt of the Notice to Proceed.
- B. Shop Drawings: Submit to the Architect for review. The Architect will review within 15 calendar days. Schedule submissions to allow ample time for ordering and delivery of materials after review.

**SUBMITTAL PROCEDURES**

- C. Product Data: Submit to the Architect for review. The Architect will review within 15 calendar days. Schedule submissions to allow ample time for ordering and delivery of materials after review.
- D. Office Samples: Submit to the Architect for review. The Architect will review within 15 calendar days. Schedule submissions to allow ample time for ordering and delivery of materials after review.
- E. Schedule of Values: Submit to the Architect no later than 15 calendar days after receipt of the Notice to Proceed.

**3.5 SUBMITTAL SCHEDULE**

- A. Submittals required by Specifications and the Drawings shall be made regardless of whether or not they are scheduled herein. Each specification section should be reviewed for exact submittal requirements. All submittals must be reviewed by the Architect prior to being used and must be submitted in sufficient time to preclude a delay in meeting the approved Construction Schedule.

SECTION NUMBER	SECTION NAME	REQUIRED SUBMITTAL
01 33 00	Submittal Procedures	Construction Schedule, Schedule of Values, 3 Week Work Schedule
01 45 23	Testing Laboratory Services	Test Reports
01 70 00	Execution and Closeout Requirements	Substantial Completion Notice, Final Completion Notice, Project Record Documents, Closeout Manuals, Release of Liens Documents, Certificate of Occupancy
02 83 13	Lead Handling Procedures	Certifications, Lead Compliance Plan, Product Information
02 84 16	Handling of Lighting Ballasts and Lamps Containing PCB's and Mercury	Notices, Work Plan, Disposal Plan
05 59 13	Architectural Metals	Shop Drawings
06 11 00	Wood Framing	Product Data,
06 41 10	Custom Window Sills	Shop Drawings
07 21 00	Thermal Insulation	Product Data
07 26 00	Vapor Barriers	Product Data
07 41 00	Metal Roof Panels	Shop Drawings, Product Data, Guarantee
07 42 13	Metal Wall Panels	Shop Drawings, Product Data, Guarantee
07 60 00	Flashing and Sheet Metal	Shop Drawings, Samples
07 84 00	Firestopping	Product Data

**SUBMITTAL PROCEDURES**

07 92 00	Joint Sealants	Guarantee
08 11 00	Metal Doors and Frames	Shop Drawings, Product Data
08 14 00	Wood Doors	Product Data, Certification Letter, Guarantee
08 31 00	Access Doors and Panels	Shop Drawings, Installation Details
08 43 13	Aluminum Framed Storefronts	Product Data, Shop Drawings, Office Samples
08 51 13	Aluminum Windows	Shop Drawings
08 71 00	Door Hardware	Hardware Schedule, Samples, Templates
08 81 00	Glass Glazing	Product Data
09 23 00	Gypsum Plastering	Office Samples
09 29 00	Gypsum Board	Product Data, Site Finish Sample
09 51 00	Acoustical Ceilings	Office Samples, Design Data
09 67 23	Urethane Resinous Flooring	Product Data, MSD Sheet, Samples
09 91 00	Painting	Product Data, Office Samples
11 40 00	Foodservice Equipment	Product Data, Shop Drawings
12 21 23	Roll-Down Blinds	Product Data, Color Samples
DIVISION 22	PLUMBING	As noted within the specification section
DIVISION 23	HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)	As noted within the specification section
DIVISION 26	ELECTRICAL	As noted within the specification section
DIVISION 27	COMMUNICATIONS	As noted within the specification section

**END OF SECTION**



**TESTING LABORATORY SERVICES**

**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. The Owner will select, employ, and pay for services of an independent testing laboratory to perform inspections, sampling, testing, and other services required by the local building code and the Construction Drawings.
- B. Specific quality control requirements are specified in individual Project Manual Sections.
- C. Inspection and testing services are intended to determine compliance of the Work with requirements specified.
- D. Refer to the General Structural Notes on the Drawings for the special inspection requirements.

**1.2 SUBMITTALS**

- A. Testing Laboratory shall submit a certified written report of each inspection, test, or similar service to the Architect, Structural Engineer, Contractor, and the Owner. Additional copies of each report will be submitted to governing authorities when so directed.
- B. Report Data: Written inspection or test reports shall include:
  - 1. Name of testing agency or test laboratory.
  - 2. Date and location of samples, tests, or inspections.
  - 3. Names of individuals present.
  - 4. Complete inspection or test data.
  - 5. Test results.
  - 6. Interpretations.
  - 7. Recommendations.

**PART 2 - PRODUCTS**

**2.1 SCOPE**

- A. Nature and Scope of Testing Services: In accordance with the requirements of governing authorities having jurisdiction over the work and as otherwise specified and consistent with reasonable standards of engineering practice.

**PART 3 - EXECUTION**

**3.1 TESTING LABORATORY'S RESPONSIBILITIES**

- A. Conduct, interpret tests, and report deviations or conditions that may lead to deviations from the Contract Documents to the Architect immediately by telephone.
- B. State in each test report whether or not tests showed conformance with requirements of the Contract Documents and specifically note deviations, if any, from these requirements.

**3.2 CONTRACTOR'S OBLIGATIONS**

- A. Cooperate with any representative of the Owner or the Testing Laboratory. Furnish tools, materials, equipment, and assistance.

**TESTING LABORATORY SERVICES**

- B. Notify the Architect, Testing Laboratory, and Owner 48-hours prior to each expected placement, installation, or fabrication phase requiring inspection tests as indicated herein.
- C. Where tests reveal defects requiring replacement, retest as required under this Contract at no change in Contract amount and reimburse Owner, Architect, and Consultants costs for preparation and supervision.
- D. When the initial tests indicate non-compliance with the Contract Documents, any subsequent retesting occasioned by non-compliance shall be performed by the same agency and the cost thereof borne by the Contractor.
- E. Representatives of the testing agency shall have access to the work at all times. The Contractor shall provide facilities for such access in order that the agency may properly perform its functions.
- F. Any testing laboratory stand-by time due to the Contractor's delays shall be paid for by the Contractor.
- G. Inspection or testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor.

**3.3 TEST OBSERVATIONS**

- A. If the Architect or Structural Engineer wishes to observe the inspections, tests, or approvals required by this paragraph, he will do so promptly and, where practicable, at the source of supply.
- B. Neither the observations of the Architect or Structural Engineer in their Administration of the Construction Contract, nor inspections, tests, or approvals by persons other than the Contractor shall relieve the Contractor from his obligations to perform the Work in accordance with the Contract Documents.

**3.4 EVALUATION OF TESTS AND INSPECTIONS**

- A. Results of laboratory or field control tests and inspections shall be the principal basis upon which satisfactory completion of the Work shall be judged.
- B. If results of tests and inspections indicate the Work is below requirements of the Contract Documents, that portion of the Work is subject to condemnation.

**3.5 ADJUSTMENTS**

- A. Remove and replace Work so condemned at Contractor's expense including costs of subsequent tests and inspections until the Work meets requirements of the Contract Documents.

**3.6 SCHEDULE OF REQUIRED TESTS AND SPECIAL INSPECTIONS**

- A. Special Inspection and testing shall be performed by an approved inspector employed by the Contractor's testing laboratory based on the requirements of the 2014 Oregon Structural Specialty Code in table (entitled "Structural Test and Special Inspections", Chapter 17) as published in Structural Notes on the Drawings.



**TESTING LABORATORY SERVICES**

**3.7 STRUCTURAL OBSERVATION PROGRAM**

- A. The Structural Engineer of Record (SER) shall perform structural observation based on the requirements of the International Building Code (IBC). Refer to General Structural Notes on Drawings for tabulation of structural observation items and additional requirements. Provide sufficient notice and access to the Structural Engineer of Record (SER) for the SER to perform required observations.

**END OF SECTION**



**TEMPORARY FACILITIES AND CONTROLS**

**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Provide all temporary job site facilities and services as required for use and listed, but not limited to, the following articles. Superintend and coordinate temporary facilities normally furnished and maintained as part of subcontractor's work.
- B. Provide temporary services and facilities ready for use when first needed to avoid delay in the work. Maintain, expand, and modify as needed. Do not remove until no longer needed or replaced by authorized use of permanent facilities.
- C. Use Charges: Usage charges for temporary services or facilities are not chargeable to the Owner and are to be provided under the basic cost of the Work.

**1.2 PERFORMANCE REQUIREMENTS**

- A. Temporary facilities shall comply with building codes, ordinances, and regulations of public authorities and local industry standards in the installation and maintenance of temporary services and facilities.
- B. Inspect and test each service before placing temporary utilities in use. Arrange for inspections and tests by governing authorities and obtain certifications and permits for use.

**PART 2 - PRODUCTS**

**2.1 MATERIALS AND EQUIPMENT**

- A. For the purpose of construction, the Owner will furnish reasonable quantities of water and electricity to the Contractor without charge. The Contractor shall be responsible for both temporary utility connections and disconnects, and shall obtain permission of the Owner's Designated Representative prior to accomplishing either.

**2.2 SANITARY FACILITIES**

- A. Workmen will be permitted to use designated existing toilet facilities of the existing building. Keep facilities clean and in sanitary condition or the privilege may be revoked.
  - 1. Confirm with Owner's Representative which existing toilet facilities may be used.

**2.3 TEMPORARY TELEPHONE**

- A. Provide a separate business cellular type telephone service throughout the construction period. Post a list of operational and emergency telephone numbers.

**2.4 TEMPORARY WATER**

- A. Existing water services may be used. Make temporary connection, as required. Exercise control over usage to conserve water.

**2.5 TEMPORARY ELECTRICAL POWER SERVICE**

- A. Existing electrical services may be used. Make temporary connection, as required. Exercise control over power usage to conserve energy.
- B. Provide temporary lighting throughout construction period as required by governing agencies.

**TEMPORARY FACILITIES AND CONTROLS**

**2.6 TEMPORARY CONSTRUCTION AND SUPPORT FACILITIES INSTALLATION**

- A. Provide a neat and uniform appearance in temporary construction and support facilities acceptable to the Architect and the Owner.
- B. Locate field offices, storage and fabrication sheds, and other support facilities for easy access to the Work.
- C. Make the change-over to use of permanent services and facilities at the earliest feasible date to minimize hazards and interferences with performance of the Work.
- D. Maintain field offices, storage and fabrication sheds, temporary sanitary facilities, waste collection and disposal systems, recycling bins, and project identification and temporary signs until near Substantial Completion. Immediately prior to Substantial Completion remove these facilities. Personnel remaining at the site after Substantial Completion will be permitted to use permanent facilities, under restricted use conditions.

**2.7 TEMPORARY HEAT**

- A. Provide temporary heat where needed for performance of the Work, for curing or drying of recently installed work, or for protection of work in place from adverse effects of low temperatures or high humidity.
- B. Provide UL or FM tested and labeled heating units known to be safe and without adverse effect upon work in place or being installed.
- C. Coordinate with ventilation requirements to produce the ambient condition and minimize fuel or energy consumption.
- D. Maintain a minimum temperature of 45°F in permanently enclosed portions of the building and areas where finished Work has been installed.
- E. Except where use of the permanent heating system is available and authorized, provide properly vented self-contained LP gas or fuel oil heaters with individual space thermostatic control for temporary heat.
- F. Do not use open burning or salamander type heating units.
- G. Minimum Interior Ventilation: Provide local exhaust ventilation to prevent harmful dispersal of hazardous substances into the atmosphere at all times. Provide ventilation for materials being cured.

**2.8 FIELD OFFICES**

- A. Provide standard prefabricated or mobile units, or the equivalent job-built field offices of sufficient size to accommodate required office personnel at the site. Pay for temporary mobile unit permits as required by the local governing authorities.
  - 1. Provide insulated, weathertight units with lockable entrances, serviceable finishes, and foundations adequate for normal loading.
  - 2. Provide resilient floor covering and painted drywall wall and ceiling finishes.
  - 3. Provide operable windows equipped with adjustable blinds and insect screens.
  - 4. Provide mobile unit stair or ramp access acceptable to local governing authorities.
  - 5. Provide mobile unit tie-downs as required by local governing authorities.
- B. Provide vented space heater capable of maintaining an indoor temperature of 68°F and an air-conditioning unit capable of maintaining a maximum indoor temperature of 72°F.

**TEMPORARY FACILITIES AND CONTROLS**

- C. Provide switch controlled fluorescent light fixtures and 110-120 volt duplex outlets spaced at 12'-0" intervals with a minimum of one per wall in each room.
- D. Furnish with a desk, chair, a 4-drawer file cabinet, plan table, plan rack, and a 6-shelf bookcase. Equip with a drinking-water cooler, paper cups, and medicine cabinet unit.

**2.9 STORAGE AND FABRICATION SHEDS**

- A. Install storage and fabrication sheds as required to accommodate the Work. Maintain temperatures and ventilation as required for materials being stored.
- B. Sheds may be open shelters or fully enclosed spaces. Where fully enclosed, provide one ABC Type portable fire extinguisher in each shed.

**2.10 FIRST AID SUPPLIES**

- A. Provide required first aid facilities. Comply with governing regulations and recognized recommendations within the construction industry.

**2.11 WASTE RECYCLING**

- A. Provide a recycling program for the recycling of waste materials that are generated during a construction project. Provide waste recycling bins and containers for metal, glass, cardboard, gypsum, etc. Provide for pick-up on a regular basis so as not to cumbersome the site. Place bins away from any building structures to protect against fires.

**2.12 TEMPORARY ENCLOSURE**

- A. Provide temporary enclosure of materials, equipment, work in progress, and completed portions of the Work to provide protection from exposure, foul weather, other construction operations, and similar activities.
- B. Provide enclosures where temporary heat is needed and the permanent building enclosure is not completed, and there is no other provision for containment of heat.
- C. Coordinate with ventilating, material drying, or curing requirements to avoid dangerous conditions.
- D. Close openings through the floor or roof decks and other horizontal surfaces with substantial load-bearing wood-framed or similar construction.

**2.13 COLLECTION AND DISPOSAL OF WASTES**

- A. Establish a system for daily collection and disposal of waste materials.
- B. Enforce requirements strictly.
- C. Do not retain collected materials longer than 7 days during normal weather or 3 days when the daily temperature is expected to rise above 80°F.
- D. Handle waste materials that are hazardous, dangerous, or unsanitary separately from other waste by containerizing.
- E. Dispose of waste material in a lawful manner.

**TEMPORARY FACILITIES AND CONTROLS**

- F. Burying or burning of waste materials on the site or washing waste material down sewers will not be permitted.
- G. Provide silt bags in catch basins and bio-bags around the basins adjacent to construction work.
- H. Off-Site Disposal: Disposal of all waste materials caused by the construction will be off the site and will be the responsibility of the Contractor.

**2.14 MISCELLANEOUS CONSTRUCTION AIDS, BARRIERS, SERVICES, AND FACILITIES**

- A. Design, construct, and maintain miscellaneous services and facilities as needed to accommodate performance of the work, including temporary stairs, ramps, ladders, staging, shoring, scaffolding, temporary partitions, waste chutes, and similar items. Construct and maintain to requirements of governing agencies. Furnish for safety of public and construction personnel.
- B. Provide barriers to protect materials, equipment, new and existing work, construction personnel, and the public.
- C. Provide temporary dust barriers and other appropriate protection, as required, to prevent dust from entering the existing portions of the building.
- D. Completely remove temporary materials and equipment upon completion of construction.
- E. Repair damage caused by installation of temporary items and restore finishes to specified condition.

**2.15 SECURITY AND PROTECTION FACILITIES INSTALLATION**

- A. Provide a neat and uniform appearance in security and protection facilities acceptable to the Architect and the Owner.
- B. Maintain site in a safe, lawful, and publicly acceptable manner.
- C. Take necessary measures to prevent erosion.
- D. Except for utilization of permanent fire protection facilities, as soon as available, do not change over to use of permanent facilities until Substantial Completion.

**2.16 TEMPORARY FIRE PROTECTION**

- A. Until fire protection needs may be fulfilled by permanent facilities, install and maintain temporary fire protection of the types needed to protect against losses.
- B. Comply with recommendations of NFPA Standard 10.
- C. Locate fire extinguishers where most effective. Provide not less than one on each floor at or near each stairwell.
- D. Provide type "A" fire extinguishers for temporary offices and spaces where there is minimal danger of electrical or flammable liquid fires. Provide type "ABC" dry chemical extinguishers elsewhere.
- E. Store combustible materials in containers in fire-safe locations.
- F. Review fire prevention and protection needs with local fire department officials and establish procedures to be followed in the event of fire.

**TEMPORARY FACILITIES AND CONTROLS**

- G. At temporary water outlets, provide hoses of sufficient length to reach construction areas. Hang hoses with a warning sign indicating that hoses are for fire protection purposes and are not to be removed.
  - H. At the earliest feasible date, complete installation of the permanent fire protection facility, including connected services, and place into operation and use. Instruct key personnel at the site on how to use facilities that may not be self-explanatory.
- 2.17 BARRICADES, WARNING SIGNS, AND LIGHTS
- A. Comply with recognized standards and code requirements for erection of substantial barricades where needed to prevent accidents.
  - B. Paint with appropriate colors and provide warning signs to inform personnel at the site and the public of the hazard being protected against.
  - C. Provide lighting where needed including flashing red lights where appropriate.
- 2.18 ENCLOSURE FENCE
- A. Install an enclosure fence with lockable entrance gates to enclose the entire site or portion sufficient to accommodate the construction operation.
  - B. Install so as to prevent persons, dogs, and similar animals from entering the site except through the entrance gates.
  - C. Provide No. 11 gage galvanized open-mesh, chain-link fabric fencing 6 feet high with galvanized barbed wire top strand and galvanized steel pipe posts, 1-1/2" for line posts and 2-1/2" for corner posts.
  - D. Set posts in precast post blocks or set posts in a compacted mixture of gravel and earth.
- 2.19 SECURITY ENCLOSURE AND LOCKUP
- A. Install substantial temporary enclosure of partially completed areas of construction.
  - B. Provide locking entrances adequate to prevent unauthorized entrance, vandalism, theft, and similar violations of project security.
  - C. Where materials and equipment must be temporarily stored, and are of substantial value or attractive for possible theft, provide a secure lockup.
  - D. Enforce strict discipline in connection with the timing of installation, and release of materials to minimize the opportunity for theft and vandalism.
- 2.20 ENVIRONMENTAL PROTECTION
- A. Conduct construction activities, and by methods that comply with environmental regulations, minimize the possibility that air, waterways, and subsoil might be contaminated or polluted, or that other undesirable effects might result from the performance of work at the site.
  - B. Avoid the use of tools and equipment that produce harmful noise.
  - C. Restrict the use of noise making tools and equipment to hours of use that will minimize complaints.

**TEMPORARY FACILITIES AND CONTROLS**

**2.21 ACCESS, PARKING, AND TRAFFIC**

- A. Parking area for project visitors and construction personnel shall be at location designated by the Owner's Designated Representative.
- B. Provide barricades, warning signs, flagmen, or other traffic regulators that may become necessary for protection of the public, construction personnel, or property.

**2.22 CONSTRUCTION PHASING REQUIREMENTS**

- A. Existing facilities will remain in operation during the Contract. Coordinate any temporary or permanent utility connections that will result in interruptions of utility service with the Owner's Designated Representative, prior to their accomplishment, and design temporary utility by-pass systems. Construct, maintain, and remove the temporary by-pass systems when the requirement no longer exists.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Use qualified tradesmen for installation.
- B. Locate temporary services and facilities where they will serve the project adequately and result in minimum interference with the Work.
- C. Temporary Utility Installation:
  - 1. Engage the local utility company to install temporary service or to make connections to existing service.
  - 2. Arrange with the companies and existing users for an acceptable time when service can be interrupted to make connections.
  - 3. Establish a service implementation and termination schedule. As early as possible change to use of permanent service, to enable removal of the temporary utility, and to eliminate any possible interference with completion of the Work.
  - 4. Provide adequate capacity at each stage of construction.
  - 5. Prior to availability at the site, provide trucked-in services for start up of construction operations.
  - 6. Obtain and pay for easements required to bring temporary utilities to the site where the Owner's easement cannot be utilized for that purpose.

**3.2 OPERATION, TERMINATION, AND REMOVAL**

- A. Supervision:
  - 1. Limit availability of temporary services and facilities to essential and intended uses to minimize waste and abuse.
  - 2. Do not permit temporary installations to be abused or endangered.
- B. Maintenance:
  - 1. Operate and maintain temporary services and facilities in good operating condition and in a safe and efficient manner until removal is authorized.
  - 2. Do not overload services or facilities.
  - 3. Protect from damage by freezing temperatures and similar elements.
  - 4. Do not allow unsanitary conditions, public nuisances, or hazardous conditions to develop or persist on the site.



**TEMPORARY FACILITIES AND CONTROLS**

5. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24 hour basis where required to achieve indicated results and avoid the possibility of damage to the Work or to temporary facilities.

**3.3 PROTECTION**

- A. Prevent water filled piping from freezing.
- B. Maintain markers for underground lines.
- C. Protect from damage during excavation.

**3.4 TERMINATION AND REMOVAL**

- A. Remove each temporary service and facility promptly when need has ended, or when replaced by use of a permanent facility, but no later than Substantial Completion.
- B. Complete, or if necessary, restore permanent work delayed because of interference with the temporary service or facility.
- C. Repair damaged work, clean exposed surfaces, and replace work that cannot be repaired.
- D. At Substantial Completion, clean and renovate permanent services and facilities that have been used to provide temporary services and facilities during the construction period.

**END OF SECTION**



**PRODUCT REQUIREMENTS**

**PART 1 - GENERAL**

**1.1 MATERIAL AND EQUIPMENT SELECTION**

- A. Comply with Standards and these Specifications including size, make, type, and quality specified, or as accepted in writing by the Architect.
- B. Manufactured and Fabricated Products:
  - 1. Design, fabricate, and assemble in accordance with the best engineering and shop practices.
  - 2. Manufacture like parts of duplicate units to standard sizes and gauges and to be interchangeable.
  - 3. Two or more items of the same kind shall be considered identical and by the same manufacturer.
  - 4. Provide products suitable for service conditions.
  - 5. Adhere to equipment capacities, sizes, and dimensions shown or specified unless variations are specifically approved in writing.
- C. Do not use material or equipment for any purpose other than that for which it is designed or is specified.
- D. Fabricate and install equipment to deliver its full rated capacity at the efficiency for which it was designed.
- E. Select and install equipment to operate at full capacity without excessive noise or vibration.
- F. Provide electrical products with Underwriter's Laboratories Label or as approved by the local inspection authority.

**1.2 MANUFACTURER'S INSTRUCTIONS**

- A. Perform work in accordance with manufacturer's printed installation instructions, obtain and distribute copies of such instructions to parties involved in the installation, including 3 copies to the Architect.
- B. Maintain one set of complete instructions at the job site during installation and until completion.
- C. Handle, install, connect, clean, condition, and adjust products in strict accordance with manufacturer's printed instructions and in conformity with specified requirements.
  - 1. Consult with the Architect for further instructions should job conditions or specified requirements conflict with manufacturer's instructions.
  - 2. Do not proceed with work without clear instructions.
- D. Do not omit any preparatory step or installation procedure unless specifically modified or exempted by the Contract Documents.

**1.3 TRANSPORTATION AND HANDLING**

- A. Arrange deliveries of products in accord with construction schedules; coordinate to avoid conflict with work and conditions at the site.
  - 1. Deliver products in undamaged condition and in manufacturer's original containers or packaging with identifying labels intact and legible.
  - 2. Immediately upon delivery, inspect shipments to assure compliance with requirements of the Contract Documents and to assure products are properly protected and undamaged.

**PRODUCT REQUIREMENTS**

- B. Provide equipment and personnel to handle products by methods to prevent soiling or damage to products or packaging.

1.4 STORAGE AND PROTECTION

- A. Store products in accordance with manufacturer's instructions with their seals and labels intact and legible.
  - 1. Store products subject to damage by the elements in weathertight enclosures.
  - 2. Maintain temperature and humidity within the ranges required by the manufacturer's instructions.
  - 3. Protect equipment and systems from moisture, chemical, or mechanical damage before and after installation.
  - 4. Protect shafts and bearing housings from rust.
- B. Exterior Storage:
  - 1. Store fabricated products above the ground on blocking or skids to prevent soiling or staining. Cover products that are subject to deterioration with impervious sheet covering. Provide adequate ventilation to avoid condensation.
  - 2. Store loose granular materials in a well-drained area on solid surfaces to prevent mixing with foreign matter.
- C. Inspection: Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions and free from damage or deterioration.
- D. Protection After Installation:
  - 1. Provide substantial coverings as necessary to protect installed products from damage by traffic or subsequent construction operations.
  - 2. Plug or cap pipe and conduit openings to prevent the entrance of foreign matter.
  - 3. Remove when no longer needed.

1.5 PRODUCT OPTIONS

- A. Compliance with Standards: Where the specifications require only compliance with an imposed standard, code, or regulation, select any product that complies with specified requirements provided no product names are indicated and meet the specified standard.
- B. Single Product Named: For products specified by naming one product or manufacturer and "or accepted substitute", the Contractor must submit a request for substitution for any product or manufacturer not specifically named. Submittal is to be in accordance with this Section.
- C. Two or More Products Named: For products specified by naming several products or manufacturers and "or accepted substitute", select any one of the products or manufacturers named, provided the product selected complies with the specifications. If another product or manufacturer not named is to be used, the Contractor must submit a request for substitution for that product or manufacturer in accordance with this Section.
- D. "Or accepted Substitute" and "Or Equal" Provisions: Where products or manufacturers are specified by name accompanied by the term "or accepted substitute" or "or equal", provide either the product named or comply with the requirements for gaining approval of "substitutions" for the use of an unnamed product.

**PRODUCT REQUIREMENTS**

- E. Performance Requirements: Where the specifications require compliance with indicated performance requirements, the Contractor has the option of selecting any product that complies with the specific performance requirements, provided no product names are indicated.
- F. Visual Requirements: Where the specifications indicate that a product is to be selected from the manufacturer's standard options, without naming the manufacturer, the Architect has the option of making the selection after the Contractor has determined or selected the manufacturer.
- G. Oregon Products: In the selection of equipment, products, and materials specified in the Contract Documents, preference shall be given to those items manufactured or produced in the State of Oregon, if price, fitness, availability, and quality are otherwise equal. Under the same conditions, next preference shall be given to items the major portion of which are manufactured or produced within the State of Oregon
- H. No materials or products containing any hazardous materials are to be used in the construction of this Project. If any material or product specified in this Project Manual is known to contain hazardous materials, it shall be brought to the attention of the Architect before ordering or fabricating that material or product.

1.6 SUBSTITUTION PROCEDURES

- A. Format: Substitution requests will be considered only if they are prepared on a copy of the Northwest Chapter Construction Specifications Institute "Substitution Request Form" included at the end of this Section. Additional copies may be obtained from the Architect.
- B. Supporting Data: Submit a separate request for each product, supported with complete data, drawings, and samples as appropriate. Include the following information, as appropriate, with each request for substitution:
  - 1. Provide complete product documentation, including product data and samples.
  - 2. Provide detailed performance comparisons and evaluation, including testing laboratory reports where applicable.
  - 3. Provide coordination information indicating the effect of the substitution on other work and the time schedule.
  - 4. Provide the Contractor's general certification of the recommended substitution.
- C. Substitution Requests: Mechanical and electrical substitution requests shall be sent directly to respective consulting engineers with a copy to the Architect.

1.7 PRE-BID REQUESTS

- A. Time Limitation: To obtain acceptance of unspecified products, the bidders shall submit requests no later than 5 March 2019. **FAXED SUBSTITUTION REQUESTS WILL NOT BE CONSIDERED WITHOUT PRIOR APPROVAL BY THE ARCHITECT.**
- B. Acceptance: If the bidder complies with the requirements of this Section, and in the Owner's and Architect's opinion the proposed product is acceptable in lieu of the one or more specified, the Architect will include it in an addendum which will be issued to all bidders.

**PRODUCT REQUIREMENTS**

- C. Last Addendum: The last Addendum will be issued no later than 5 calendar days prior to the bid date. Any questions asked after the last Addendum has been issued will not be answered when it would have an effect on the Bids by giving any advantage to a Bidder. An Addendum may be issued during this 5 day period only for the extension of the Bid date and will be faxed to Plan Centers and the registered General Contractors holding plans.

**1.8 AFTER AWARD OF CONTRACT REQUESTS**

- A. Normally, requests for substitutions after the contract has been signed will not be allowed.
- B. Consideration: Requests for substitution of specified products after the construction contract is signed will be considered only when they are reasonable, timely, fully documented, and for any one of the following reasons:
  - 1. Owner's or Architect's request.
    - a. Reduction in contract time or contract sum.
    - b. Specified product is not available from any source.
    - c. Specified product would cause significant delay in the Contract time.
- C. Submittal: Submit requests on Northwest Chapter Construction Specifications Institute "Substitution Request Form" included at the end of this Section. Additional copies may be obtained from the Architect.
  - 1. Include written request for substitution and cite reason(s) for the request.
- D. Acceptance: If the Contractor complies with the requirements of this Section, and in the Owner's and Architect's opinion the proposed product is acceptable in lieu of one or more specified, the Architect will issue an Architect's Supplemental Instructions (AIA G710), where contract sum or time is not effected, or a Change Order (AIA G701) or Construction Change Directive (AIA G714), where contract sum or time is affected.

**PART 2 - PRODUCTS**

**2.1 MATERIAL**

- A. The Contractor warrants to the Owner that the materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the Work will be free from defects not inherent in the quality required or permitted, and that the Work will conform to the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

**PART 3 - EXECUTION**

**3.1 NAMEPLATES**

- A. Except as otherwise indicated for required labels and operation data, do not permanently attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces or products which will be exposed to view either in occupied spaces or on the exterior of the completed project.

**END OF SECTION**

## SUBSTITUTION REQUEST

**TO:**

**PROJECT:**

**SPECIFIED ITEM:**

Section	Page	Paragraph	Description
---------	------	-----------	-------------

### PROPOSED SUBSTITUTION:

Attached data includes product description, specifications, drawings, photographs, performance and test data adequate for evaluation of request including identification of applicable data portions.

Attached data also includes description of changes to Contract Documents and proposed substitution requires for proper installation.

### Undersigned certifies following items, unless modified by attachments, are correct:

1. Proposed substitution does not affect dimensions shown on drawings.
2. Undersigned pays for changes to building design, including engineering design, detailing, and construction costs caused by proposed substitution.
3. Proposed substitution has no adverse effect on other trades, construction schedule, or specified warranty requirements.
4. Maintenance and service parts available locally or readily obtainable for proposed substitution.

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

**Undersigned agrees, if this page is reproduced, terms and conditions for substitutions found in Bidding Documents apply to this proposed substitution.**

Submitted by:

Name (Printed or typed)	
Signature	
Firm Name	
Address	
City, State, Zip	
Date	
Tel:	Fax:

General Contractor (if after award of Contract)

For use by A/E	
<input type="checkbox"/> Approved	<input type="checkbox"/> Approved as noted
<input type="checkbox"/> Not Approved	<input type="checkbox"/> Received too late
By	
Date	
Remarks	

The Construction Specifications Institute  
Northwest Region

September 1997







**EXECUTION AND CLOSEOUT REQUIREMENTS**

**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Provisions of this Section apply to the procedural requirements for the actual closeout of the Work, not to administrative matters such as Final Payment and the changeover of insurance.
- B. Closeout requirements relate to both Substantial and Final Completion of the Work. They also apply to individual portions of completed work as well as the total Work.
- C. Specific requirements contained in other Sections have precedence over the general requirements contained in this Section.

**1.2 CLOSE OUT AGENDA**

- A. Required Procedures:
  - 1. Notify the Architect when project is ready for substantial completion inspection. Also applies to certain areas completed for use by the Owner prior to completion of the entire project. The first review copy of the O&M Manuals must be submitted prior to request for substantial completion inspection.
  - 2. The Architect will establish the substantial completion inspection date when the Architect determines that the project, or certain Owner requested areas, is ready for Substantial Completion review.
  - 3. The Architect, Contractor, and Owner make substantial completion inspection.
  - 4. The Architect issues written list of items to be completed or corrected. Substantial Completion date is established and noted on prepared form. The contractor is to issue a letter to the Owner confirming that no asbestos products were used in the construction of the facility or addition.
  - 5. The Contractor is normally given adequate time to correct deficiencies shown on correction list.
  - 6. The Contractor returns completed project record documents and final payment request including change order adjustments, and requests final inspection.
  - 7. The Architect reviews project record documents and schedules final inspection.
  - 8. Final inspection made when required submittals are delivered.
  - 9. Final payment forthcoming when work is completed and submittals have been received and approved.

**1.3 SUBSTANTIAL COMPLETION**

- A. Prerequisites: Comply with the General Conditions and commence the following before requesting Architect's inspection of the Work, or a designated portion of the Work, for certification of Substantial Completion.
  - 1. Submit executed warranties, workmanship bonds, maintenance agreements, inspection certificates, and similar required documentation for specific units of work enabling Owner's unrestricted occupancy and use.
  - 2. Submit record documentation, maintenance manuals, tools, spare parts, keys, and similar operational items.
  - 3. Commence instruction of Owner's operating personnel and start-up of systems.
  - 4. Commence final cleaning and remove temporary facilities and tools.

**EXECUTION AND CLOSEOUT REQUIREMENTS**

- B. Submit written notice to the Architect that Work, or designated portion thereof, is substantially complete. The Architect and Owner will review the Work within 7 days.
- C. If the Architect determines that Work is not substantially complete, he will promptly notify Contractor in writing. The Contractor shall complete the Work and submit a second written notice of substantial completion to the Architect. The Architect will again observe the Work.
- D. When the Architect concurs that the Work is substantially complete, he will prepare a Certificate of Substantial Completion on AIA Form G704 with a tentative list of items to be completed or corrected. The Architect will submit the Certificate and tentative list to the Contractor for his written acceptance of responsibilities assigned to him in the Certificate.

**1.4 FINAL COMPLETION**

- A. Submit written certificate that Contract Documents have been reviewed, Project has been inspected, Work is completed in accordance with the Contract Documents, equipment and systems have been tested in the presence of the Owner's Designated Representative and are operational, and Work is ready for review. Architect will review Work within 7 days.
- B. Should the Architect determine that the Work is incomplete or defective, he will notify the Contractor in writing, listing the incomplete or defective Work. The Contractor shall remedy the deficiencies and send a second written certification to the Architect that the Work is complete. The Architect will review the Work.
- C. When the Architect finds that the Work is acceptable under the Contract Documents, he will request the Contractor to make closeout submittals.

**1.5 REOBSERVATION FEES**

- A. Should the Architect perform more than one re-observation due to failure of the Work to comply with the claims of status of completion made by the Contractor,
  - 1. Owner will compensate the Architect for such additional services, and
  - 2. Owner will deduct the amount of such compensation from the final payment to the Contractor.

**PART 2 - PRODUCTS**

**2.1 PROJECT RECORD DOCUMENTS**

- A. Maintain, at the site, 1 copy of the Bid Documents, Contract Forms, Project Manual, Contract Drawings, Construction Change Directives, Addenda, Change Orders, reviewed Shop Drawings, Office Samples, Field Test Records, Architect's Supplemental Instructions, etc.
- B. Store documents and samples in the Contractor's field office separate from documents used for construction.
- C. Keep current record of documents and label "Project Record." Record location of concealed items and utility lines, field changes in dimension or detail, and changes in materials furnished on Project Record Documents. Record changes from the Architect's Supplemental Instructions, Change Orders, Construction Change Directives, and Details not on Contract Drawings.

**EXECUTION AND CLOSEOUT REQUIREMENTS**

- D. Project record documents will be reviewed monthly. The Contractor and his subcontractors are required to update project record documents monthly. The Architect will review the updated project record documents on a monthly basis at the time of the Contractor's application for payment. Failure to have project record documents updated will delay payment. Deliver the project "Record Documents" to the Architect at the end of the project with the Closeout Manuals.
- E. The District shall receive one copy each in hard copy, electronic PDF, and CAD form of all As-Built Drawings. The as-built drawings will be collected from the contractor(s), reviewed for correctness, assembled as one "clean" document and submitted to the District by the project architect/engineer. Notations and comments concerning changes are encouraged. Hand drawn drawings or mark ups are not acceptable for final as-built documents.
- F. The as-built drawings will include an update of all previous work of the building or area with the intention of providing an updated, complete and accurate site conditions drawing. The drawing will be reviewed for correctness, assembled as one "clean" document and submitted to the District by the project architect/engineer. The District shall receive one copy each in hard copy, electronic PDF, and CAD form of all As-Built Drawings. Notations and comments concerning changes are encouraged. Hand drawn drawings or mark ups are not acceptable for final as-built documents.

2.2 CLOSEOUT MANUALS

- A. General:
  - 1. The District shall receive one copy each in hard copy, electronic PDF, and CAD form of all As-Built Drawings, Operation and Maintenance Manuals, and Guarantees/Warranties. Operations and Maintenance Manuals shall be submitted for approval prior to substantial completion. Printed information submitted shall have a minimum 12-pt font size. Facility Operations Director shall sign off on all as-builts as a condition of closeout.
  - 2. The District shall receive one copy each in hard copy, electronic PDF, and CAD form of Approved Shop Drawings. Printed information submitted shall have a minimum 12-pt font size.
  - 3. For hard-copy requirements provided in 1. or 2. above, documents shall be bound in fully-indexed, 3-ring loose leaf binders as applicable. The cover page shall reference the project name, project number, year of construction, name of contractor, and the name of the design firm associated with the element of work. Even in cases which a single Contract includes projects at multiple school locations, there shall be individual documents produced for each School in the Contract, containing only that information pertaining to work at that particular School.
- A. Form of Manuals: Provide 3 complete copies of the manual.
  - 1. Prepare data in the form of instructional manuals for use by the Owner. Use 8-1/2" x 11" manual format in 3-ring binder.
  - 2. Include drawings, indexed tabs, and title for the manual.
- B. Content of Manuals:
  - 1. List products used in the Project. List project installers, maintenance program, and local source of supply for replacement parts.
  - 2. Include product data with specific product clearly identified.
  - 3. Include a copy of the letter to the Owner confirming at no asbestos products were used in the construction of the facility.

**EXECUTION AND CLOSEOUT REQUIREMENTS**

- C. Materials and Finishes: Provide the following information for products to be included with the manuals.
  - 1. Include manufacturer's data, catalog number, color, and texture of finishes used.
  - 2. Include instructions for care and maintenance on finishes including cleaning agents, methods, and cleaning and maintenance schedule.
- D. Warranties and Bonds: Provide the following information for products to be included within the manuals.
  - 1. Assemble warranties, bonds, executed by each manufacturer, supplier, and subcontractor.
  - 2. Include table of contents, beginning date, and duration of warranty, bond, and party to contact in case of claim against warranty.
- E. Spare Parts and Maintenance Materials: Tabulate list of spare parts and maintenance materials showing product description, paragraph in Project Manual listing product, and quantity delivered to the Architect and distribute with the manuals.

**PART 3 - EXECUTION**

**3.1 PAYMENTS AND RELEASE OF LIENS**

- A. Submit 2 executed copies of the Contractor's Affidavit of Payment of Debts and Claims, AIA G706.
- B. Submit 2 executed copies of the Contractor's Affidavit of Release of Liens, AIA G706A including:
  - 1. "Consent of Surety to Final Payment", AIA G707.
  - 2. Contractor's release or waiver of liens.
  - 3. Subcontractors' and suppliers' release or waiver of liens, as requested by the Architect.

**3.2 SCHEDULE OF CLOSEOUT SUBMITTALS**

- A. Submit 3 copies in final form of the Closeout Manuals 15 days prior to final review or acceptance.
- B. Obtain and submit the Certificate of Occupancy.

**3.4 CLEANING PRIOR TO SUBSTANTIAL COMPLETION INSPECTION**

- A. At the time of project close out, clean or re-clean the Work to the condition expected from a normal, commercial building cleaning and maintenance program.
- B. Final clean is to be of the highest professional standard and to include:
  - 1. Floors, walls, ceilings free of dust, dirt, & marks.
  - 2. Cabinet tops, drawers and interiors free of dust and dirt.
  - 3. Counter tops cleaned and streak free.
  - 4. Windows professionally cleaned and free of dirt, streaks, labels and glues.
  - 5. Fixtures cleaned and free of dust, dirt, labels and glues.
  - 6. Exterior walks, decks, roofs, lots and driveways cleaned, washed and swept.
- C. Maintain in cleaned condition until Final Completion or the Owner's occupancy.

**END OF SECTION**

**CUTTING AND PATCHING**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Definition: "Cutting and patching" includes cutting into existing construction to provide for the installation or performance of other work and subsequent fitting and patching required to restore surfaces to their original condition.
- B. Refer to other sections of these specifications for specific cutting and patching requirements and limitations applicable to individual units of work.

**1.2 PERFORMANCE REQUIREMENTS**

- A. Structural Work:
  - 1. Do not cut-and-patch structural work in a manner resulting in a reduction of load-carrying capacity or load/deflection ratio.
  - 2. Submit proposal and request and obtain Engineer's approval before proceeding with cut-and-patch of structural work.
- B. Operational Limitations:
  - 1. Do not cut-and-patch operational elements components in a manner resulting in decreased performance, shortened useful life, or increased maintenance.
  - 2. Submit written requests and obtain the Engineer's approval before proceeding with cutting and patching.
- C. Visual/Quality Limitations:
  - 1. Do not cut-and-patch work exposed to view (exterior or interior) in a manner resulting in noticeable reduction of aesthetic qualities of existing or new work.
- D. Limitation on Approvals: The Architect's approval to proceed with cutting and patching does not waive the right to later require removal and replacement of work found to be cut-and-patched in an unsatisfactory manner, as judged by the Architect.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

- A. Use materials for cutting and patching that are identical to existing materials.
- B. If identical materials are not available or cannot be used, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect.
- C. Use materials for cutting and patching that will result in equal-or-better performance characteristics

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Before cutting, examine surfaces to be cut and patched and conditions under which the work is to be performed.
- B. If unsafe or otherwise unsatisfactory conditions are encountered, take corrective action before proceeding with the Work.

**CUTTING AND PATCHING**

**3.2 PROTECTION**

- A. Temporary Support: To prevent failure, provide temporary support of work to be cut.
- B. Protect other work during cutting and patching to prevent damage.
- C. Provide protection from adverse weather conditions for that part of the project that may be exposed during cutting and patching operations.
- D. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- E. Take precautions not to cut existing pipe, conduit, or duct serving the building but scheduled to be relocated until provisions have been made to bypass them.

**3.3 CUTTING**

- A. Cut the work using methods that are least likely to damage work to be retained or adjoining work.
- B. Where possible review proposed procedures with the original installer. Comply with original installer's recommendations.
- C. Where cutting is required, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut through concrete and masonry using a cutting machine such as carborundum saw or core drill. Cut holes and slots neatly to size required with minimum disturbance of adjacent work. Do not over cut edges.
- D. To avoid marring existing finished surfaces, cut and drill from the exposed or finished side into concealed surfaces.
- E. Temporarily cover openings when not in use.

**3.4 PATCHING**

- A. Patch with seams that are durable and as invisible as possible.
- B. Comply with specified tolerances for the work.
- C. Restore exposed finishes of patched areas. Where necessary extend finish restoration into retained adjoining work in a manner that will eliminate evidence of patching and refinishing.

**END OF SECTION**

**SELECTIVE STRUCTURE DEMOLITION**

**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Provide all selective building demolition necessary and preparatory to construction. Refer to the Drawings for location of existing materials requiring removal. Verify existing conditions at the site of the work and include all work evident by inspection.

**1.2 REFERENCES**

- A. Oregon Administrative Rules (OAR), Department of Human Services, Public Health Division: Chapter 333, Division 70 Renovation, Repair and Painting Activities Involving Lead-Based Paint.
- B. Code of Federal Regulations: 40 CFR: Protection of the Environment.

**1.3 QUALITY ASSURANCE**

- A. Regulatory Agency Requirements: Comply with applicable codes and ordinances concerning demolition operations and refuse removal.
- B. Pre-demolition Meeting: Meet at the Site with the Architect and Owner. Review location of service lines. The Contractor shall be responsible for protection from dust and water damage and flying aggregate. Establish location of interior dust barriers.

**1.4 SITE CONDITIONS**

- A. Traffic Control: Do not close or obstruct public streets, walks, or required exit passageways without written permission from authorities having jurisdiction.
- B. Exterior Dust Control: Keep exposed demolition debris damp to control dust.
- C. Interior Dust Control: Provide dust control barriers consisting of curtains or doors to limit the spread of demolition dust and debris in construction work. Use all precautions to confine dust to the work area. Maintain throughout the construction process.

**PART 2 - PRODUCTS**

**2.1 EQUIPMENT**

- A. Sawing Equipment: Use diamond edged saw blades of proper size for depth of cut.
- B. Drilling Equipment: Use non-impact rotary tool with diamond core drills.

**PART 3 - EXECUTION**

**3.1 PREPARATION**

- A. Protection: Provide protection and conduct demolition operations to prevent personal injury or property damage.

**SELECTIVE STRUCTURE DEMOLITION**

- B. Service Disconnection: Disconnect existing service lines to be abandoned and cap exposed service lines to be maintained.
- C. Interior Demolition:
  - 1. Provide slurry control to protect all existing facilities from water damage during sawing and drilling.
  - 2. Provide dust barriers inside the existing building until completion of demolition work.
  - 3. Install bracing and shoring prior to sawing structural components.
  - 4. All floor materials indicated to be removed are to include the striping of the adhesive to the concrete substrate.

3.2 HAZARDOUS MATERIALS

- A. Removal: Any hazardous removal work will be by separate Owner provided contract and not included in the demolition work of this contract. A licensed abatement contractor will remove all accessible hazardous-containing materials prior to the commencement of the building and site demolition work.
- B. Copies of the asbestos surveys and abatement specifications will be provided by the School District for reference by the demolition contractor
- C. During the course of demolition work, additional hazardous materials may be encountered. If hazardous materials are encountered, this contractor shall immediately notify the School District Representative. A hazardous abatement contractor will be retained to complete any hazardous material removal as necessary. **THE DEMOLITION CONTRACTOR SHALL DO NO HAZARDOUS MATERIAL REMOVAL.**
- D. If any hazardous material is damaged during the course of the demolition work, immediately evacuate non-trained personnel. Clean up of the area and decontamination of personnel shall be at the direction of the Owner's hazardous material abatement consultant.
- E. Lead Base Paint: For renovations, repairs and painting (RRP) in "Child-Occupied Facilities" (where kids under the age of 6 regularly spend time and built before 1978), the General Contractor shall follow all Federal, State and local rules (including OSHA and US EPA rules and Oregon Administrative Rules Chapter 333, Division 70) associated with lead-based paints (LBP).
  - 1. The Contractor is responsible for the identification of LBP hazards and providing engineering controls for trigger activities that disturb LBP.
  - 2. Any time painted surfaces are disturbed, the work must be performed by a certified firm with a trained and certified "renovator" in accordance with *40 CFR (including Part 745.82 Lead)*.
  - 3. Post the areas of the building that will be affected with appropriate signage warning of the potential hazard.

3.3 DEMOLITION

- A. Remove existing materials as indicated on the Drawings.
- B. Remove abandoned plumbing and electrical lines to concealed spaces and cap.
- C. Sprinkle and dampen debris and rubbish with water to control dust. Remove debris from the site as demolition progresses and do not allow accumulation on the premises.
- D. Save and protect existing utilities shown to remain. Notify the Architect at once if unknown utilities are found in the work.



**SELECTIVE STRUCTURE DEMOLITION**

- E. Execute the demolition in an orderly and careful manner with due consideration for the Owner and the public. Provide mufflers for compressors and other noisy motors.
- F. Provide shoring and bracing as required at saw cutting areas. Do not over cut corners.
- G. Mechanical Demolition: As indicated on Drawings.
- H. Electrical Demolition: As indicated on Drawings.

**3.4 ADJUSTING AND CLEANING**

- A. Clean-up: Remove all demolition debris, including broken concrete and masonry, from the building as soon as selective demolition has been completed.
- B. Disposal:
  - 1. Do not store, sell, or burn demolished or salvaged materials on the Site.
  - 2. Transport debris to an approved and licensed land fill area.
  - 3. Repairs: Repair damage to existing facilities and adjacent property to meet conditions existing prior to demolition operations.
- C. Cleaning: Broom clean interior surfaces, exterior slabs, and paving that have been soiled by demolition activities. Vacuum ducts and replace air filters at the end of demolition work.

**3.5 SALVAGE SCHEDULE**

- A. Remove and Salvage for Reinstallation:
  - 1. Kitchen equipment as shown on the Food Service Drawings.
- B. Remove and Salvage to Owner:
  - 1. Existing Pot Rack hanging from the ceiling.

**END OF SECTION**



**LEAD HANDLING PROCEDURES**

**PART - GENERAL**

**1.1 WORK INCLUDED**

- A. This section covers all contractors performing any task such as; demolition, selective demolition, plaster removal, sanding, patching, paint preparation, on-site chemical stripping, torch burning, welding, abrasive blasting or any task performed on painted or varnished surfaces which may result in occupational exposures to lead. All contractors performing tasks as identified under OAR 437-03-001 (Lead for the Construction Industry Standard, Oregon) shall be required to perform work in accordance with the standard and these specifications.
- B. Work Requirements under this section include but are not limited to; Initial testing and evaluation of work practices, development of a written lead compliance program, lead awareness training, employee monitoring, respiratory protection, engineering controls, containment, wash facilities and signage.
- C. Lead-Based Paint and varnishes are located throughout the building. Unless noted otherwise on the plans, contractors are to assume that all painted or varnished surfaces contain lead.
- D. Any Contractor that is subject to potential lead exposure shall provide all labor, materials, equipment, and services necessary to comply with the OSHA standard.
- E. The General Contractor and its subcontractors shall endeavor to select work methods that minimize the creation or spread of lead dust. If work practices or surface preparation methods (e.g. dry sanding, abrasive blasting) create dust that cannot be readily controlled via wet methods or by using basic work area isolation, then full isolation procedures must be utilized.

**1.2 DEFINITIONS**

- A. Action Level: Employee exposure, without regard to the use of respirators, to an airborne concentration of lead of 30 micrograms per cubic meter of air averaged over an 8-hour period.
- B. Air Monitoring: The process of measuring the airborne concentrations of a specific volume of air in a stated period of time.
- C. Atomic Absorption: A laboratory analytical method for measuring elements such as lead. The lead is vaporized at high temperature, usually several thousand degrees, and light of a very specific wavelength is shined through the vapor.
- D. Biological Monitoring: The analysis of a person's blood and/or urine, to determine the level of lead contamination in the body.
- E. Containment: A process for protecting both workers and the environment by controlling exposures to lead dust and debris created during lead handling tasks.
- F. Contractor: The General Contractor, Subcontractor, Abatement Contractor or person performing lead handling procedures specified herein.
- G. Engineering Controls: Measures implemented at the work site to contain, control and/or otherwise reduce exposure to lead dust and debris.
- H. Exposure Monitoring: The personal air monitoring of an employee's breathing zone to determine the amount of contaminant (e.g. lead) to which he/she is exposed.

**LEAD HANDLING PROCEDURES**

- I. Fixed Object: Fixtures that are attached to the building or are too heavy or bulky to remove from the work area.
- J. Independent Testing Laboratory: A qualified AIHA ELPAT laboratory financially independent from and hired by the Owner or Contractor.
- K. Industrial Hygienist: The representative assigned to monitor work progress, perform sampling and visually inspect areas during and after lead handling procedures.
- L. The Industrial Hygienist will be certified by the American Board of Industrial Hygiene or an industrial hygienist in training, or an individual with appropriate education or experience.
- M. Medical Removal: The temporary removal of workers due to elevated blood lead levels as defined in the OSHA Lead Standard.
- N. Micrograms: One millionth of a gram:  
of). Since there are 453 grams in one pound and 16 ounces in one pound, one gram equals 0.035 ounces. A microgram is equal to about 35/1,000,000,000 (thirty-five billionths) of an ounce. □g: The prefix
- O. Movable Object: Furnishings which are not attached to the building structure and can be removed from the work area.
- P. Off-Site Paint Removal: The removal of paint or varnish at a site away from the project such as the stripping of lead paint from the surface of a component at the facilities of a commercial paint-stripping operation occurring in chemical tanks.
- Q. Paint Removal: Stripping or removal of lead paint from surfaces of components.
- R. ppm: Stands for "parts per million", meaning the weight of one part per weight of the total amount of material. For example, a lead concentration of 1 ppm expresses the ratio of one gram of lead dissolved into one million (1,000,000) grams of water.
- S. Public Area: Any area outside the isolated work area. When work area isolation measures are removed, the work area becomes a public area.
- T. Regulated Area: An area where the Permissible Exposure Limit has been or is expected to be exceeded and where only trained personnel with appropriate personal protective equipment are allowed.
- U. TCLP: Toxic Characteristic Leaching Procedure is one of the tests for the determinations of whether a solid waste is classified as a hazardous substance via EPA Method 1311.

**1.3 SUBMITTALS AND NOTICES**

- A. The Contractor shall submit three copies of the following information to the Architect, Owner and Environmental Consultant prior to beginning work on the project.
  - 1. Submit certifications showing that the Contractor and at least one Supervisor are certified and have received training under the Oregon Health Authority, Public Health Division Renovation, Repair and Painting Rule (RRP Rule).
  - 2. Worker Training Programs: Submit written proof indicating that all employees impacting lead-containing materials have received training per OAR 437-03-001.

**LEAD HANDLING PROCEDURES**

3. Lead Compliance Plan: Submit a written "Compliance Plan" satisfactory to the Architect, Owner And Environmental Consultant describing the methods for lead handling procedures, and plans for construction and location of decontamination enclosure systems, worker training and protection measures, engineering controls, dust control and collection techniques, etc. in compliance with the RRP Rule and OAR 437 Division 3-001, these Specifications and applicable regulations. The Contractor shall update the Lead Compliance Plan as necessary while work progresses. The General Contractor may elect to incorporate affected subcontractors individual work plans into an overall project lead compliance program.
  4. Product Information and Material Safety Data Sheets: Submit complete product information for chemical removal agents and for any materials, products and procedures for which the Contractor requests approval for use on this job. The Contractor shall identify any concerns with possible chemical reaction with new materials, coatings, etc. to be installed after chemical stripping.
- B. Contractor shall not begin work until submittals are complete, reviewed and accepted by District and the Environmental Consultant. Allow a five day review period.
- C. During the work the Contractor shall submit all sampling and exposure monitoring data.

1.4 LEAD EXPOSURE MONITORING AND TESTING REQUIREMENTS

- A. Contractors shall perform employee exposure assessments as required under OAR 437-03-001 for any employees performing tasks that may result in exposures above the Action Level.
- B. An Independent Testing Laboratory shall be retained by the contractor. All exposure monitoring analysis shall be performed in accordance with 29 CFR Part 1926.62 as adopted by OR-OSHA.
- C. The District reserves the right to monitor Contractor's performance via air, dust wipe and TCLP samples during removal work, in addition to the Contractor's exposure monitoring and testing.

1.5 QUALITY ASSURANCE

- A. Periodic monitoring of air and surface dust may be analyzed by the Districts Environmental Consultant in occupied spaces and containment areas. The following lead exposure limits shall apply to all areas where lead handling procedures are undertaken.
1. Air Samples:
    - a. 30 µg/m<sup>3</sup> - OSHA Action Level  
(8-hour Time-Weighted Average)
    - b. 50 µg/m<sup>3</sup> - OSHA Permissible Exposure Limit  
(8-hour Time-Weighted Average)
  2. Dust Samples: (Expected levels at completion of major demolition)
    - a. 40 µg/ft<sup>2</sup> - Clearance for Stripped Surfaces, Components, etc.
    - b. 40 µg/ft<sup>2</sup> - Clearance Level for floors
    - c. 250 µg/ft<sup>2</sup> - Clearance Level for interior window sills
    - d. 250 µg/ft<sup>2</sup> - Clearance Level for rough surfaces
    - e. Note: The above noted Dust Sample standards shall only apply to elementary, pre-school and Day Care facilities. The District Representative may modify these standards, if appropriate, in other facilities.
  3. Blood Lead Levels:
    - a. 40 µg/dl (OSHA) permissible blood level for worker
    - b. 50 µg/dl (OSHA) blood level requiring medical removal of worker
  4. Dispose of as Hazardous Waste: 5-ppm Pb (analyzed as "leachable" using Toxicity Characteristic Leachate Procedure - TCLP EPA Method 1311)

**LEAD HANDLING PROCEDURES**

5. Paint: Painted surfaces with lead concentrations greater than the limits of detection as determined by atomic absorption, EPA Method 7420-3050.
  6. Soil: 400-ppm – High Traffic Play Areas; 1,200-ppm – Non-Play Areas
  7. Waste Water: (.7 mg/l Pb or less to dispose of in the sanitary sewer). Verify with the City on local requirements.
- B. If, at any time during the work, analysis of occupied area air or wipe samples taken by the Contractor, District, or District's representative, indicates a concentration in excess of the allowable maximums specified, the contractor shall immediately notify:
1. The General Contractor's Superintendent
  2. The Environmental Consultant: PBS Engineering + Environmental, (503) 248-1939.
- C. Immediately upon being notified of concentrations exceeding the specified maximum allowable levels, the Contractor shall perform the following steps in order presented, at no additional cost to the District:
1. Stop Lead related work.
  2. The Environmental Consultant will determine the affected area and affected adjacent areas considered to be contaminated and will determine the actions to be taken.
  3. Modify work procedures, if feasible and make other changes determined to be the possible cause of high lead concentrations.
  4. Carefully resume work under close supervision and monitoring.
  5. The Contractor shall be responsible for costs of any testing, cleanup, repair, down time loss, etc. that is a result of the Contractor's negligence, poor maintenance of containment areas or improper procedures.

**1.6 PERSONNEL PROTECTION**

- A. Training:
1. When demolition or lead handling activities result or are expected to exceed the Action Level, the Contractor shall follow personnel protection and work area isolation procedures outlined in this section.
  2. Prior to commencement of work, Contractor shall ensure all workers have been adequately trained as specified in 29 CFR 1926.62.
  3. The Contractor shall provide and post at hand wash locations, the decontamination, respirator, and work procedures to be followed by the workers as outlined in the written Lead Compliance Program.
  4. Workers shall not eat, drink, chew gum or apply cosmetics in the established work area. Smoking or using other tobacco products is prohibited.
  5. Workers shall be fully protected with respirators and protective clothing immediately prior to the first disturbance of lead-containing or contaminated material and until final cleanup is completed.
- B. Building Security and Protection:
1. The Contractor shall post adequate warning signs at all potential entrances to work areas as required by EPA and OSHA.
  2. Contractor shall protect all existing fixed equipment, existing building finishes that are to remain, and existing systems and functions from damage. Extra precautions are to be taken in protecting existing electrical panels, light fixtures, etc. Any damage to existing building, services, and/or equipment shall be remedied by the Contractor at his expense.
  3. Contractor shall maintain access and use of existing fire lanes.

**1.7 SAFETY**

- A. With regard to the work of this contract, the safety of the Contractor's employees, the District's employees, and the public is the sole responsibility of the Contractor.

**LEAD HANDLING PROCEDURES**

**1.8 PROTECTION**

- A. Damaged or deteriorating materials shall not be used and shall be removed from the premises by the Contractor. Materials that become contaminated with lead shall be disposed of in accordance with the applicable regulations by the District.

**1.9 SUBCONTRACTORS**

- A. Any Subcontractors employed by the Contractor shall be bound to all the work and safety standards specified elsewhere in this Specification. Subcontractor's personnel shall be fully trained and supervised by the Contractor during performance of this work.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

- A. Plastic Sheet: Plastic sheet shall be fire-retardant polyethylene material sized in lengths and widths to minimize the frequency of joints. The minimum thickness shall be 6-mil.
- B. Plastic Bags: Plastic bags shall be 6-mil polyethylene printed with warning labels per OSHA and EPA regulations.
- C. Tape: Tape shall be capable of sealing joints of adjacent sheets of plastic and for attachment of plastic sheet to finished or unfinished surfaces of dissimilar materials and capable of adhering under dry and wet conditions, including use of amended water.
- D. Disposal Containers: Disposal containers for all listed hazardous waste shall be ODOT-approved #1-A2 55-gallon steel drums unless approved otherwise by the TSD and Environmental Consultant.
- E. Warning Labels and Signs: Warning labels and signs shall be posted as required by OR-OSHA, ODOT and DEQ regulations.
- F. Chemical Strippers: Use of chemical strippers shall require review from the District, Architect, General Contractor and Environmental Consultant.

**2.2 TOOLS AND EQUIPMENT**

- A. Water Sprayer: The water sprayer shall be an airless or other low-pressure sprayer for high phosphate wash water application.
- B. Scaffolding: Scaffolding, as required to accomplish the specified work, shall meet all applicable safety regulations. All special scaffolding shall have drawings and calculations stamped and signed by a civil or structural engineer registered in the state of Oregon.
- C. Electrical: Electrical tools, equipment and lighting shall meet all applicable codes and regulations. Ground fault protection as required by OSHA, shall be in effect at all times. Contractor shall take all additional precautions and measures necessary to insure a safe working environment during wet removal.

**LEAD HANDLING PROCEDURES**

**PART 3 – EXECUTION**

**3.1 WORK AREA CONTAINMENT PREPARATION**

- A. The Contractor shall perform lead handling procedures under full or partial containment when work practices are expected to create exposures greater than the Permissible Exposure Limit (PEL) of 50 µg/m<sup>3</sup>. The following lead handling procedures shall always be performed under full containment: abrasive blasting, welding and torch cutting, grinding or dry sanding, heat gun removal, and chemical stripping of lead paints or varnishes with volatile and caustic chemicals. Partial containment will be acceptable for tasks such as selective demolition, spot chemical removal and patching of surfaces.
- B. Contractor shall perform the following containment procedures in the order in which they are presented. Alternative engineering control methods considered by the Contractor must be proven by historical data and approved by the Environmental Consultant. The liberal use of water spray, ventilation and HEPA air filtration devices are most effective for reducing airborne lead concentrations.

**3.2 PARTIAL CONTAINMENT WORK AREA PREPARATION**

- A. Tasks requiring partial containment include items such as: Selective demolition, exterior paint removal, patching and repair of painted components and other tasks where incidental exposures to airborne lead concentrations are likely to occur. Historical monitoring of similar procedures may alleviate partial containment requirements.
- B. Contractor shall perform the following procedures in the order in which they are presented and describe procedures for exterior paint removal and other work in non-isolated work areas.
  - 1. Seal off airflow HVAC systems serving other building areas.
  - 2. Restrict access to work area and post warning signs.
  - 3. Install localized HEPA exhaust fan in work area if feasible. Locate fan intake to immediate area of work in such a manner that any lead dust released will be drawn away from the worker and into intake duct.
  - 4. Cover floor and other surfaces below work area with 6-mil plastic sheeting.
  - 5. Have emergency cleanup equipment and supplies, including HEPA vacuum, wash water, disposal bags, mop, buckets, towels and sponges, on hand prior to start of abatement work.
- C. When work is complete, the Contractor shall remove all visible debris from the work area. Once area has been cleaned, the Contractor shall notify the District Environmental Consultant to perform Dust Wipe Sampling as specified in this section. If the area is clean and free of dust and debris, but sample analysis shows concentrations above the stated levels, the District may choose to have its Hazardous Materials Abatement Contractor perform additional cleaning.

**3.3 WASTE DISPOSAL**

- A. General: Disposal of building demolition waste coated with lead-based paint will generally not require a hazardous waste determinations (i.e., TCLP testing) if demolition debris is disposed of at a solid waste landfill that is permitted by DEQ and which meets the current design standards for municipal solid waste disposal facilities of 40 CFR Part 258.
- B. Other Contractor generated waste streams shall be tested and properly disposed of by the Contractor. Concentrated lead-based paint waste will require a hazardous waste determinations (i.e., TCLP testing). The Contractor shall properly dispose of concentrated lead-based paint waste that is deemed hazardous.

**END OF SECTION**



**HANDLING OF LIGHTING BALLASTS AND LAMPS CONTAINING PCB's AND MERCURY**

**PART 1 – GENERAL**

**1.1 WORK INCLUDED**

- A. Provide for the removal and proper disposal of PCB-containing light ballasts, mercury-containing lamps and to cleanup PCB spills in areas of work.
- B. The Drawings may indicate general locations and quantities of fluorescent light fixtures. These light fixtures may contain PCBs. The methods for inspection, PCB ballast removal and disposal and PCB cleanup are described in this Specification.
- C. This section of the specification does not address electrical safety issues such as lockout-tagout. All provisions of OSHA 29 CFR 1910.147 and Subpart S are to be followed during the course of this project.

**1.2 DEFINITIONS**

- A. Authorized Visitor: The Owner or designated representative, or a representative of any regulatory or other agency having jurisdiction over the project, and having required training, medical approval, fit test, etc.
- B. Controlled Area: Area which only qualified and properly protected workers or authorized visitors have access.
- C. Decontamination Area (Decon): Enclosed area adjacent and connected to controlled/regulated work area, consisting of an equipment room and clean room, which is used to decontaminate workers, materials, and equipment. Where PCB removal is done in conjunction with asbestos or lead abatement the Decon may be used for this purpose.
- D. Destination Facility: A facility that treats, disposes of, or recycles universal waste. Facilities treating universal waste as allowed under 40 CFR 273.13, 273.33 or OAR 340-112-030(5) are not considered to be destination facilities. A facility at which universal waste is only accumulated, is not a destination facility for purposes of managing universal waste.
- E. Disposal: Procedures necessary to transport and deposit the PCB materials in an approved waste disposal site in compliance with EPA and other applicable regulations. Disposal Site shall be an approved landfill, incinerator or recycler for PCB-containing waste.
- F. Electric Lamp: The bulb or tube portion of a lighting device specifically designed to produce radiant energy, most often in the ultraviolet (UV), visible, and infra-red (IR) regions of the electromagnetic spectrum. Examples of common electric lamps include, but not limited to incandescent, fluorescent, high intensity discharge, and neon lamps.
- G. Environmental Consultant: Environmental consultant specializing in hazardous materials abatement - PBS Engineering + Environmental - or any subcontractor designated by PBS.
- H. Incineration: The destruction of PCBs by an EPA-approved facility. The facility must be a TSCA-permitted incinerator and a licensed TSDF, Transportation Storage and Disposal Facility. All operating permits must be current and valid.
- I. MSDS: Material Safety Data Sheet supplied by manufacturer provides information on a product listed in OSHA 29 CFR 1910.1200(g)(2).

**HANDLING OF LIGHTING BALLASTS AND LAMPS CONTAINING PCB's AND MERCURY**

- J. Mercury Containing Lamp: An electric lamp in which mercury is purposely introduced by the manufacturer to facilitate the operation of the lamp.
- K. Off-site Collection Site: A site that receives and accumulates universal waste from off-site.
- L. Polychlorinated Biphenyls (PCBs): A class of chlorinated hydrocarbon compounds containing a variable number of chlorine atoms. Commercially available products contain mixtures of as many as 40 to 70 PCB compounds (isomers). PCBs range from oily liquids to white, crystalline solids to hard, non-crystalline resins or waxy solids.
- M. PCB Light Ballast: Any fluorescent light ballast that is not labeled "NO PCB".
- N. PCB Bulk Product Waste: For the purpose of disposal, all non-leaking fluorescent light ballasts that are not labeled "NO PCB" are to be considered PCB Bulk Product Waste and must be disposed of in accordance with either 40 CFR 761.62 (a) or (c).
- O. PCB Remediation Waste: Waste that has come in contact with PCBs that have either leaked or spilled including leaking PCB light ballasts, PCB cleanup materials, painted metal light fixtures with PCB spill or leak residues, and all other building materials with PCB spill or leak residues.
- P. Self Implementing On-site Cleanup and Disposal Plan: A cleanup plan developed by the owner that is submitted to EPA for approval. The plan includes documentation of spills and leaks, describes cleanup procedures, testing, disposal, and record keeping.
- Q. Universal Waste: Any waste that is a universal waste listed in 40 CFR 273.1 and OAR 340-113-010 and subject to the universal waste requirements of 40 CFR Part 273 and OAR 340 Division 113.
- R. Waste Shipment Records: Form similar to Uniform Hazardous Waste Manifest, or an EPA approved state form.

**1.3 DOCUMENTS INCORPORATED BY REFERENCE**

- A. The current issue of each document shall govern. Where conflict among requirements or with these Specifications exists, the most stringent requirements shall apply.
  - 1. U.S. Environmental Protection Agency Toxic Substance Control Act, TSCA, (Code of Federal Regulations Title 40, Part 761)
  - 2. U.S. Environmental Protection Agency Office of Toxic Substances Guidance Document, Summary of PCB Regulations, EPA Document Number 910-S-94-002.
  - 3. U.S. Department of Labor, Occupational Safety and Health Administration (OSHA)
  - 4. RCRA, Resource Conservation and Recovery Act, 40 CFR Part 2761, Subpart D., 40 CFR 273
  - 5. Oregon Administrative Rules: Hazardous Waste Regulations, OAR 340-100 through 340-104; Universal Waste Management Regulations, OAR 340-113.

**1.4 SUBMITTALS AND NOTICES**

- A. Contractors shall submit the following information prior to beginning work:
  - 1. Notification: Submit copy of any required notifications including transportation, disposal or incineration.

**HANDLING OF LIGHTING BALLASTS AND LAMPS CONTAINING PCB's AND MERCURY**

2. Work Plan: Submit a written "work plan" satisfactory to the Owner and Environmental Consultant describing the schedule for PCB abatement and mercury-containing lamp abatement, cleanup methods and work practices, worker training and worker protection. The work plan shall also include decontamination procedures and plans for a decontamination area if applicable. Also include emergency control and cleanup procedures and emergency phone number(s).
- B. Disposal Plan: Submit written proof that all required permits and arrangements for transport and disposal of PCB-containing or contaminated materials, supplies, and waste at a site approved by EPA have been obtained. Submit written proof that all required arrangements for transport and disposal by recycling of mercury-containing lamps to a Destination Facility have been obtained.
- C. Prior to making final application for payment the Contractor shall submit Waste Shipment Records completely filled out and signed by all handlers and written proof from the designated waste disposal site that all wastes have been accepted and disposed of per EPA regulations.
- D. Refer to EPA, OSHA, and other standards referenced herein for further information and regulatory requirements not included above.

1.5 TRAINING

- A. All persons that perform work on fluorescent light fixtures must have a minimum of 2-hours of PCB and mercury awareness level training. This training shall include but not be limited to PCB and mercury health effects, identification of PCB spills and leaks, laws and regulations, record keeping, signage and labeling, and storage regulations.
- B. All persons that perform the cleanup of PCBs and/or broken fluorescent lamp bulbs shall, in addition to the awareness training described above, have a minimum of 2-hours of hands on training that includes PCB cleanup practices, waste accumulation, decon construction, safe handling of cleaning solutions and chemicals and waste storage container management (drums).

1.6 PERSONNEL PROTECTION

- A. Personnel protective equipment for PCB ballast removal and fixture inspection.
  1. Worker personal protective equipment (PPE) shall consist of PCB-resistant clothing including gloves and eye protection. Hearing, head and fall protection as required by job site conditions.
  2. Half-face mask, negative-pressure respirator with disposable chemical vapor cartridge. Provide protection factor of 10. Additional HEPA filter cartridges for particulates including asbestos and lead shall be available for use in areas where these materials are present.
  3. Additional respiratory protection shall be as required by governing regulations.
- B. Personnel protective equipment for mercury-containing lamp removal caution should be taken by the Contractor to minimize lamp breakage as escaping vapors from a broken lamp may expose workers to unsafe levels of mercury. Increased personal protective equipment is not required for handling unbroken lamps. If breakage occurs, the Contractor shall not attempt to clean up the resulting debris without wearing the following personal protective equipment:
  1. Chemical resistant gloves and clothing (compatible with mercury) to minimize dermal contact with debris, and eye protection.

**HANDLING OF LIGHTING BALLASTS AND LAMPS CONTAINING PCB's AND MERCURY**

2. Chemical cartridge or canister respirator providing protection against mercury vapor and equipped with an end of service life indicator.
  3. Additional respiratory protection shall be as required by governing regulations.
- C. Personnel protective equipment for PCB spill cleanup.
4. Worker personal protective equipment (PPE) shall consist of PCB-resistant clothing including gloves and eye protection. Hearing, head and fall protection as required by job site conditions.
  5. Half-face mask, negative-pressure respirator with disposable chemical vapor cartridge. Provide protection factor of 10. Additional HEPA filter cartridges for particulates including asbestos and lead shall be available for use in areas where these materials are present.
  6. Additional respiratory protection shall be as required by governing regulations.

1.7 SAFETY

- A. With regard to the work of this contract, the safety of the Contractor's employees, the Owner's employees, and the public is the sole responsibility of the Contractor.

1.8 LIABILITY

- A. The Contractor is an independent contractor and not an employee of the Owner or Environmental Consultant. The Owner and the Environmental Consultant shall have no liability to the Contractor or any third persons for Contractor's failure to faithfully perform and follow the provisions of these Specifications and the requirements of the governing agencies. Notwithstanding the failure of the Owner or the Environmental Consultant to discover a violation by the Contractor of any of the provisions of these Specifications, or to require the Contractor to fully perform and follow any of them, such failure shall not constitute a waiver of any of the requirements of these Specifications which shall remain fully binding upon the Contractor.

1.9 QUALITY ASSURANCE

- A. Environmental Consultant shall perform periodic inspections to observe work, handling and packaging procedures.
- B. Environmental Consultant shall notify the Contractor in writing to stop work if the Environmental Consultant determines that work practices are in violation of the Specifications or work is endangering workers and occupants of the building. The Contractor shall continue work when conditions and actions are corrected and when written authorization is received from the Environmental Consultant.

1.10 LIMITS

- A. The Contractor shall limit PCB levels as follows:
1. Airborne concentrations below 1 µg/M3 (microgram per cubic meter) or pre-abatement background levels, where available.
  2. Final, post cleanup concentrations of PCBs on non-porous surfaces and intact painted metal surfaces shall not exceed 10 ug/100 cm<sup>2</sup> (microgram per square centimeter) on building surfaces as measured using the standard wipe test.
- B. The Contractor shall limit mercury levels to airborne concentration below 0.05 mg/M3 (milligram per cubic meter) or pre-abatement background levels, where available.

**HANDLING OF LIGHTING BALLASTS AND LAMPS CONTAINING PCB's AND MERCURY**

**PART 2 - PRODUCTS**

**2.1 PCB ABATEMENT**

- A. Plastic Sheet: Plastic sheeting shall be flame-retardant polyethylene material. It shall not dissolve on contact with PCB compounds or any chemicals used by the contractor for abatement/decontamination. The minimum thickness shall be 6-mil.
- B. Storage Containers: Storage containers shall be suitable to receive and retain any PCB-containing or contaminated materials until disposal or incineration at an approved site. They shall comply with container specifications set forth in 49 CFR 178.80, 178.82, 178.102 or 178.116. Containers shall be labeled with waterproof print and permanent adhesive in accordance with WAC, OSHA, DOT and EPA regulations.
- C. Warning labels on all disposal containers/drums shall include the following information:

**DANGER  
CONTAINS POLYCHLORINATED BIPHENYLS  
CANCER HAZARD**

- D. Warning Signs: Unless other signage or security access is provided, warning signs shall be provided and displayed at each regulated area to warn of the presence of PCBs. If PCB containing wastes are to be stored on-site, all provisions of 40 CFR 761.65 shall be followed. These rules include but are not limited to establishing a designated and secure storage area and proper signage and documentation.

**2.2 MERCURY-CONTAINING LAMP ABATEMENT**

- A. Storage Containers: A container for lamps must be closed, structurally sound, compatible with the contents of the lamp, and must lack evidence of leakage, spillage or damage that could cause leakage under reasonably foreseeable conditions.
- B. Labeling/markings for mercury-containing lamps. In addition to the requirements in 40 CFR 273.14 and 40 CFR 273.34, universal waste mercury containing lamps (i.e. each lamp) or a container in which the lamps are contained must be labeled or marked clearly with any one of the following phrases:

**UNIVERSAL WASTE - MERCURY-CONTAINING LAMP(S), or  
WASTE MERCURY CONTAINING LAMP(S), or  
USED MERCURY CONTAINING LAMP(S).**

**PART 3 - EXECUTION**

**3.1 WORK AREA PREPARATION**

- A. Where the work area containment requirements are determined by abatement of other hazardous materials, the Contractor may not need to provide any additional isolation procedures.
- B. PCB Cleanup: Where no other hazardous materials abatement is performed in conjunction with the PCB cleanup, prepare the work area as follows:

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1. Contractor shall isolate the work area from unauthorized, untrained, unqualified and unprotected persons. At a minimum, warning signage indicating the presence of PCBs and danger tape shall be used. Whenever possible doors should be closed to further reduce unauthorized access.
  2. An approved disposable floor covering (i.e. plastic sheeting) shall be kept beneath the work and in areas of dismantling, consolidation or packaging.
  3. An approved worker decontamination area.
- C. Mercury-Containing Lamp Abatement: If no lamps are broken, then no special precautions are necessary other than items listed below:
1. Provide mercury cleanup equipment to immediately transfer any material recovered from a spill or leak to a container that meets the requirements of 40 CFR 262.34.
  2. Ensure that the area is well-ventilated and monitored in the event of breakage, to ensure compliance with applicable OSHA exposure levels for mercury.
- D. Broken Mercury-Containing Lamp Cleanup: In the event that a lamp is broken, the following work area preparation steps shall be taken:
1. Secure the impacted area with barricades such as hazard tape, danger signs, etc.
  2. Notify workers in affected area and notify owner and/or owner's environmental consultant.
- 3.2 REMOVAL OF MERCURY-CONTAINING LAMPS
- A. Contractor shall isolate work area and perform work at times and in a manner that will not result in the release or discharge of mercury vapor or the exposure to employees or other building occupants.
  - B. Contractor shall carefully handle lamps and shall not break, drop, throw or otherwise damage them.
  - C. Should lamp breakage occur, the Contractor shall determine if resulting released material is hazardous waste and if so, the Contractor shall manage it as a hazardous waste.
  - D. Lamps shall be transferred directly into a container, such as a lamp box, that is suitable for shipping to the disposal or recycling facility. Filled containers shall be handled and stored in a manner that protects lamps from breakage.
- 3.3 INSPECTION OF FLUORESCENT LIGHT FIXTURES
- A. Contractor shall isolate work area and perform work at times and in a manner that will not result in the release or discharge of PCBs or the exposure to employees or other building occupants.
  - B. Contractor shall disassemble fluorescent light fixtures to the extent that the ballast and surrounding fixture surfaces can be visually inspected. If there is visual evidence or suspicion of a PCB leak or spill, Contractor shall secure the immediate area with barricades such as hazard tape, danger signs, etc., shall notify workers in the area, and shall notify owner and/or owner's environmental consultant.
- 3.4 REMOVAL OF NON-LEAKING PCB LIGHT BALLASTS
- A. Contractor shall isolate work area and perform work at times and in a manner that will not result in the release or discharge of PCBs or the exposure to employees or other building occupants.

**HANDLING OF LIGHTING BALLASTS AND LAMPS CONTAINING PCB's AND MERCURY**

- B. Contractor shall carefully handle light ballasts and shall not break, drop, throw or otherwise damage the ballasts.
- C. Contractor shall remove non-leaking ballast from the fixture and place it directly into an awaiting container (55-gallon drum typical) that will be used to transport the ballasts to an approved disposal site. Ballasts should be stacked in the drum in an orderly fashion, in order to maximize the capacity of the drum and to minimize the potential for damage to the ballasts. Container shall be labeled per 40 CFR 761.65. While filling the drum with ballasts, the void between ballasts shall be filled with a suitable absorbent material (kitty litter typical).
- D. Filled containers shall be handled and stored in a manner that protects lamps from breakage.
- E. Areas used for the temporary storage of PCB ballasts shall be secured and demarcated as per 40 CFR 761.65.

**3.5 CLEANUP OF PCB SPILLS FROM NON-POROUS AND PAINTED METAL SURFACES**

- A. Contractor shall isolate work area and perform work at times and in a manner that will not result in the release or discharge of PCBs or mercury vapor or the exposure to employees or other building occupants.
- B. The contractor shall record the location of all leaking PCB ballasts and all visible or suspected PCB leaks and spills on floor plans that clearly indicate the location of light fixtures, leaking and non-leaking ballasts, the room number, the direction north, and a list of all surfaces and materials that appear to have been impacted by the PCB leaks and spills and a description of the area that was impacted. If PCBs appear to have spilled or leaked onto a porous surface, immediately notify the owner and/or the owner's environmental consultant.
- C. PCBs on non-porous surfaces and intact painted metal surfaces shall be cleaned up to a concentration of 10 micrograms per 100 square centimeters ( $10\mu\text{g}/100\text{cm}^2$ ). Generation of liquid wastes during the cleanup of PCBs is not allowed.
- D. When PCB cleanup is complete, owner's environmental consultant will collect wipe samples from cleaned surfaces to verify if cleanup is complete. Samples will be collected from every surface that is cleaned. If sample analysis indicates PCB concentrations in excess of  $10\mu\text{g}/100\text{cm}^2$ , contractor will re-clean fixture at no expense to owner and shall pay lab fees associated with re-testing the re-cleaned surface (assume \$100.00 per sample).
- E. All waste materials generated during the cleaning of PCBs shall be placed directly into an awaiting container (55-gallon drum typical) that will be used to transport the wastes to an approved disposal site. Container shall be labeled per 40 CFR 761.65.
- F. Filled containers shall be handled and stored in a manner that prevents leakage and possible exposure to PCB.
- G. Areas used for the temporary storage of PCB cleanup related wastes shall be secured and demarcated as per 40 CFR 761.65.

**HANDLING OF LIGHTING BALLASTS AND LAMPS CONTAINING PCB's AND MERCURY**

**3.6 DISPOSAL**

- A. The Contractor shall determine current waste handling, transportation, and disposal regulations for each waste stream generated. The Contractor must comply with these regulations and U.S. Department of Transportation and EPA requirements.
- B. Unless permitted by the Owner, Contractor shall remove containers from site within ten calendar days after collection for disposal or incineration at a site operated in accordance with the provisions of 40 CFR 761 (PCB waste) and OAR 340-113 and 40 CFR 273 (mercury-containing lamps handled as a universal waste). Notify disposal site in advance of delivery to ensure immediate disposal.

**END OF SECTION**



**CONCRETE**

**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Provide concrete where indicated on the Drawings and as specified herein.

**1.2 REFERENCES**

- A. ASTM International (ASTM):
1. ASTM A185: Standard Specification for Steel Welded Wire Reinforcing, Plain, for Concrete.
  2. ASTM A615: Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
  3. ASTM C31: Standard Practice for Making and Curing Concrete Test Specimens in the Field.
  4. ASTM C33: Standard Specification for Concrete Aggregates.
  5. ASTM C39: Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
  6. ASTM C94: Standard Specification for Ready-Mixed Concrete.
  7. ASTM C143: Standard Test Method for Slump of Hydraulic Cement Concrete.
  8. ASTM C150: Standard Specification for Portland Cement.
  9. ASTM C172: Standard Practice for Sampling Freshly Mixed Concrete.
  10. ASTM C260: Standard Specification for Air-Entraining Admixtures for Concrete.
  11. ASTM C494: Standard Specification for Chemical Admixtures for Concrete.
- B. American Concrete Institute (ACI):
1. ACI 304R: Guide for Measuring, Mixing, Transporting, and Placing Concrete.
  2. ACI 305R: Hot Weather Concreting.
  3. ACI 306R: Cold Weather Concreting.
  4. ACI 347R: Guide to Formwork for Concrete.

**1.3 QUALITY ASSURANCE**

- A. Workmanship: Set and maintain screeds, lines, and forms within the following tolerance limits:
1. Variations from Plumb:  $\pm 1/8"$  per foot not cumulative; not to exceed  $1/4"$  in 10 feet.
  2. Variations from Grade:  $\pm 1/8"$  per foot not cumulative; not to exceed  $1/4"$  in 10 feet.
  3. Finish Floor Slabs:  $1/8"$  in 10 feet and  $1/16"$  per foot.
- B. The Owner may employ a separate testing laboratory to evaluate concrete delivered to and placed at the site.

**PART 2 – PRODUCTS**

**2.1 MATERIALS**

- A. Materials for Concrete:
1. Portland Cement: ASTM C150, type as required.
  2. Aggregates: ASTM C33.
  3. Water: Clean, free of oils, acids, and organic matter.
  4. Air-Entraining Admixture: ASTM C260.
  5. Water-Reducing Admixture: ASTM C494, Type A.
  6. Unexposed Concrete Surfaces: Suitable material dressed on at least 2 edges and 1 side for tight fit.

**CONCRETE**

- 7. Exposed Concrete Surfaces: Provide 3/4" PS 1, Type I, concrete form grade plywood with grade and type stamped.
- 8. Form Coating Manufacturers: Nox-crete, Edcoc Burke-Release, or accepted substitute non-staining pine oil derivative type.
- B. Reinforcing Bars and Dowels: ASTM A615, Grade 40.
- C. Welded Wire Fabric: ASTM A185, 6" x 6" - W1.4/W1.4, in flat sheets.

**2.2 MIXES**

- A. Ready-Mixed Concrete: ASTM C94, Mix Design Alternate No. 3; and in addition:
  - 1. Minimum Cement Content per Cubic Yard: 470-pounds.
  - 2. Slump for Flat Work: 4" maximum (plus 0, minus 2-1/2").
  - 3. Use air-entraining admixture in concrete exposed to freezing and thawing, providing not less than 4% or more than 8% entrained air.
- B. Minimum 28-Day Compressive Strength:  $f'_c = 3,000$ -psi per ACI 301, unless otherwise noted, with minimum cementitious material content and maximum water/cement ratio as noted in the General Structural Notes. As required by SEOR and verified by Special Inspector.
  - 1. 2,000 psi @ non structural interior elements
  - 2. 3,500 psi @ exterior concrete paving, retaining walls and concrete exposed to weather.
  - 3. 4,00 psi @ all structural concrete elements.

**PART 3 - EXECUTION**

**3.1 FORMING AND PLACING CONCRETE**

- A. Formwork: Construct so concrete members and structures are of correct size, shape, alignment, elevation, and position complying with ACI 347.
- B. Provide openings in formwork to accommodate work of other trades. Accurately place and securely support items built into forms.
- C. Surface Preparation: Remove loose material from the compacted sub-base surface immediately before placing concrete.
- D. Clean and adjust forms prior to concrete placement. Apply form release agents or moisten forms, as required. Re-tighten forms after concrete placement to eliminate mortar leaks as required.
- E. Reinforcement: Position, support, and secure reinforcement against displacement. Locate and support with metal chairs, runners, bolsters, spacers and hangers, and cinder blocks as required. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
- F. Installation of Embedded Items: Set and build into the Work, anchorage devices and other embedded items required for other work that is attached to or supported by cast-in-place concrete. Use setting diagrams, templates, and instructions provided by others for locating and setting.
- G. Concrete Placement:
  - 1. Comply with ACI 304R. Do not begin placement until work of other trades affecting concrete has been completed.
  - 2. Consolidate placed concrete using mechanical vibrating equipment with hand rodding and tamping, so that concrete is worked around reinforcement and other embedded items and into all parts of forms.

**CONCRETE**

3. Protect concrete from physical damage or reduced strength due to weather extremes. In cold weather, comply with ACI 306R. In hot weather, comply with ACI 305R.

**3.2 CONCRETE FINISHES**

- A. Slab Trowel Finish: Apply trowel finish to monolithic slab surfaces that are exposed-to-view or are to be covered with resilient or other thin film coating. Consolidate concrete surface by finish troweling, free of trowel marks and uniform in texture and appearance.

**3.3 CURING**

- A. Begin initial curing as soon as free water has disappeared from exposed surfaces. Where possible, keep continuously moist for not less than 72-hours. Continue curing by use of moisture-retaining cover or membrane-forming curing compound.
- B. Provide protection to prevent damage to exposed concrete surfaces.

**3.4 CONCRETE TESTING**

- A. When required by Chapter 17, Structural Tests and Inspections, of the 2014 Oregon Structural Specialty Code, the Owner will employ a separate testing laboratory to evaluate concrete delivered to and placed at the Site. Concrete strength tests for quantities less than 50 cubic yards will not be required when waived by the Building Official and the Architect.
- B. Comply with the 2014 Oregon Structural Specialty Code, Section 1903, Specifications for Tests and Materials, and Section 1904, Durability Requirements, for evaluation and acceptance of concrete.
- C. When required, perform tests as follows:
  1. Sampling: ASTM C172.2.
  2. Slump: ASTM C143, one test for each truck load at point of discharge for ready mixed concrete and each batch of Site mixed concrete.
  3. Air Content: ASTM C31, one for each set of compressive strength specimens.
  4. Compressive Strength: ASTM C39, one set for each day of structural concrete pour or each 50-cubic yards, or fraction thereof of each class of concrete. Two specimens tested at 7 days, two specimens tested at 28 days, and one retained for later testing if required.

**END OF SECTION**



**ARCHITECTURAL METALS**

**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Provide all custom stainless steel work for stainless steel wall panels, accessory trims, flashings, corner guards, as indicated on the Drawings and as herein specified.

**1.2 SUBMITTALS**

- A. Shop Drawings: Show complete details and instructions for fabrication, assembly, and installation of all custom fabricated items.
- B. Clearly indicate materials, components, fasteners, hardware, equipment, finishes, methods of installation and assembly, supplementary support, or bracing.
- C. Submit 5 copies of the manufacturer's Material Safety Data Sheets on all materials prior to delivery to site.

**1.3 QUALITY ASSURANCE**

- A. Fabricator and installer are to maintain personnel and facilities totally engaged in design, fabrication, and provision of custom architectural metal work of type and size specified for this project.
- B. Installation performed only by personnel thoroughly familiar and trained to the manufacturer's recommended methods of installation.
- C. Provide at least one person who shall be thoroughly trained and experienced in the skills required, who shall be completely familiar with the requirements of this work, and who shall personally direct all installation performed under this Section of these Specifications.

**1.4 DELIVERY, STORAGE, AND HANDLING**

- A. Do not deliver materials or assemblies to the site until spaces are ready to receive the installation.
- B. Wrap and crate finished components and assemblies to prevent damage or marring of the assemblies or surfaces during shipping and handling.
- C. Deliver all materials in one piece. When impractical, deliver in largest sections and field assemble as continuous unit without obvious joints, by butt-welding.
- D. Deliver all items with protective covering and protect work of other trades.
- E. Cover and protect work from damage through times of construction until Final Acceptance by the Owner.

ARCHITECTURAL METALS

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Stainless Steel Wall Panels: 16-gage at wall panels. Type 304 stainless steel in #4 finish ((horizontal grain). Panel sizes as indicated on Drawings. Provide with hemmed edges as detailed on Drawings..
- B. Stainless Steel Flashings and Accessory Pieces: Type 304 stainless steel in #4 finish. Profiles and shapes as detailed on Drawings. Includes:
  - 1. Pocket Hem Strips and Ends: 22-gage.
  - 2. Inside Corners: 22-gage.
  - 3. Corner Guards: 16-gage. Size and shape as shown on Detail 11 on Drawing Sheet A5.1.
  - 4. Fasteners and Toggles: As indicated on Drawings.
    - a. Toggles: 3/16 – 24 “SnapToggle”, or accepted substitute.
- C. “Z” Brackets at Top of Cove Base: 16 gage stainless steel “Z” brackets as indicated on Drawings.
  - 1. Fasteners
    - a. Fasten through new stainless steel wall panels to existing wall construction using button head tamperproof machine screws with stainless steel bonded sealing washers.
      - 1) Toggles: 3/16 – 24 “SnapToggle”, or accepted substitute.
  - 2. Fasteners: Stainless steel drywall TEK screws as indicated on Drawings.
  - 3. Toggles: 3/16 – 24 “SnapToggle”, or accepted substitute.
- D. Accessories: Provide stainless steel angles, screws, bolts, and brackets required for support and attachments. Specified fasteners and washers to be used to attach stainless steel sheets to the wall. Fasten to studs or use specified toggles where a stud is not available.
- E. Adhesive: Any formulated for the permanent bondage of stainless steel to existing wall substrate.
- F. Sealant: As specified in Section 07 92 00 JOINT SEANANTS..

2.2 CUSTOM FABRICATION

- A. Items to be constructed in a strong manner with bracing, reinforcing, and welding for rigidity.
- B. Welding by AWS standard heliarc method with welding rod of the same composition as parts welded. Exposed joints continuously welded to appear as one-piece construction.
- C. Directionally grind and polish all welds to match factory finish that is smooth and without depressions or metal discoloration.
- D. Brake bends and sheared edges will not mar uniform appearance of the material, texture at bend, or edge burrs polished to smooth uniform condition.

**ARCHITECTURAL METALS**

- E. Fasten with concealed fasteners to framework or adjacent items. Surface depressions from any weld studs are unacceptable.
- F. General Appearance and Correction:
  - 1. All custom fabricated items must retain a uniformity of overall appearance consistent with the quality level specified.
  - 2. All work to be corrected to the highest quality level if visual appearance indicates inconsistency in the skill level of fabrication.
  - 3. The repair of defective work at no additional cost to the Owner.

**PART 3 - EXECUTION**

**3.1 PREPARATION**

- A. Verify all dimensions with measurements in the field before fabrication.
- B. Confirm passage of equipment to installation locations. Advise the Architect of anticipated difficulties prior to fabrication and site delivery.

**3.2 INSTALLATION**

- A. Install, assemble, level, and complete work of this Section in accordance with the manufacturer's printed instructions and reviewed shop drawings.
- B. Over bend pocket hem strips for tight fit.
- C. Mount stainless steel flashing to wall over existing gypsum board and screw for water tight fit.
- D. The continuous vertical pocket hem strip must be mounted to wall in straight line then install sheets by sliding into hem strips.
- E. Existing FRP wall panel to be trimmed as shown on drawings and captured underneath pocket hem strip.
- F. Glue the screws into wall for security purposes.
- G. Slide the stainless steel "Z" bracket over the top of the cove base, up to bottom edge of the existing FRP wall panel. Fasten with button head tamperproof machine screws with stainless steel bonded sealing washers as indicated on Drawings.
- H. Slide the stainless steel "Z" bracket over the top of the cove base and under bottom edge of new stainless steel wall panels. Fasten with button head tamperproof machine screws with stainless steel bonded sealing washers as indicated on Drawings.
- I. Sealant: Apply sealant where indicated on Drawings as recommended by sealant manufacturer. See Section 07 92 00 JOINT SEALANTS.

**ARCHITECTURAL METALS**

**3.3 CLEANING AND ADJUSTING**

- A. Remove masking protection from stainless steel and other finished surfaces.
- B. Polish out, remove, or replace damaged finished surfaces.
- C. Leave the entire installation clean and free from defects at time of Substantial Completion. Remove surplus materials, debris, and tools from the site.

**END OF SECTION**



**WOOD FRAMING**

**PART 1 - GENERAL**

1.1 WORK INCLUDED

- A. Provide lumber framing and accessories for floor, wall, ceiling, and roof framing systems as indicated on the Drawings and as specified herein.
- B. Provide the sill sealer between the foundation wall and sill plate of wood frame construction.

1.2 REFERENCES

- A. U.S. Department of Commerce: PS 20, American Softwood Lumber Standard.
- B. ASTM International (ASTM):
  - 1. ASTM A307: Standard Specification for Carbon Steel Bolts and Studs, 60,000-psi Tensile Strength.
  - 2. ASTM D226: Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
- C. 2009 International Building Code (IBC) and the Oregon 2010 Structural Specialty Code Amendments.
- D. Federal Specification/Standard; General Services Administration Specifications Branch (FS).
- E. West Coast Lumber Inspection Bureau (WCLIB): No. 17 Standard Grading Rules.
- F. Western Wood Products Association (WWPA).

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Wrap, cover, and protect lumber products and trusses in shipment and while stored on the site to prevent weather exposure and damage. Maintain stacks neat and in good order; level and off ground or floors; raised on pallets or dunnage to prevent contact with water or earth.

**PART 2 - PRODUCTS**

2.1 CONCEALED FRAMING LUMBER

- A. Lumber Standard: American Softwood, PS 20.
- A. Wood framing: Douglas Fir, Standard or Better per WWPA.
- B. Species and Dressing: Douglas Fir or Douglas Fir-Larch, standard or better quality, smooth four sides (S4S).
- C. Minimum Grades and Bending Stress Rating: (WCLB and WWPA).
  - 1. Post and Beams: (5x5 and larger) No. 1 grade.
  - 2. Beams and Stringers: (5x9 and larger) No. 1 grade.
  - 3. Structural Framing: (2x6 to 4x14) No. 2 grade.
  - 4. Studs: (2x2 to 4x6) Stud grade.
  - 5. Light Framing for Blocking and Bridging: (2x2 to 4x4) Utility grade or No. 3 grade and Standard grade or No. 2 grade.

**WOOD FRAMING**

- 6. Boards For Furring: (1x2 to 1x4) Standard grade of No. 3 common.
- D. Moisture Content: Kiln dry lumber 4x or less to 19% moisture content at time of dressing.
- E. Pressure Treated Lumber: Treat all lumber in contact with concrete or used for insulation stops with Chemonite, Wolmanized, Osmose K-33, or accepted substitute.
- F. Sillbor Boron Preservative Treatment: Treat cants, nailers, blocking, stripping, and similar items in conjunction with roofing and flashing in accordance with AWWA P5. Retention rate minimum, 0.28 pcf boric oxide. Sodium octaborate is listed in AWWA preservative standard P5 and is referred to as SBX. SillBor® wood meets the requirements of AWWA standard U1 and past standards C9 and C31. It is suitable for Use Category 2.

**2.2 ACCESSORIES**

- A. Steel Connectors: Simpson, Bowman, Silver, KC Metals, or accepted substitute. (Numbers indicated on the Drawings are from Simpson Company.)
- B. Bolts, Nuts, and Screws:
  - 1. Expansion Shields, Lag Screws, Lag Bolts: FS FF-B-561.
  - 2. Wood screws: FS FF-S-111.
  - 3. Bolts: FS FF-B-575.
  - 4. Nuts: FS FF-N-836.
- C. Nails and Staples: FS FF-N-105.
  - 1. Exterior: Galvanized Common Nails.
  - 2. Interior: Common Nails.
- D. Powder Driven Fasteners: Ramset, Hilti, or accepted substitute.
- E. Concrete Anchors: Hilti, ITT Phillips, Ramset, USM Corporation, or accepted substitute.
- F. Foundation Anchor Bolts: ASTM A307.
  - 1. 1/2" diameter.
- G. Sill Insulation: Provide in width to match sill plate. AMOFOAM Sill Sealer or accepted substitute.
- H. Epoxy Grout: Five Star Epoxy Grout by U.S. Grout; Sikadur Grout-Pack, Hi-Mod Systems by Sika; or accepted substitute.
- I. Waterproof Anchoring Cement: Pourable, cement base, non-shrinking quick setting hydraulic compound. Fast Setting Cement by Burke; Anchor Tite by Concrete Products; Embecco 153 by Master Builders; Thorogrip by Standard Dry Wall; or accepted substitute.
- J. Felt Building Paper: ASTM D226, Unperforated, asphalt saturated, 15 pound.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Steel Framing Connectors: Install with nails or bolts of sizes and type specified by manufacturer of connector. Provide "U" type hangers where joists and beams frame into side of beams or headers.

**WOOD FRAMING**

- B. Fasteners: Minimum fasteners per the 2009 International Building Code (IBC) and the Oregon 2010 Structural Specialty Code Amendments Table 2304.9.1, Fastening Schedule, or as indicated on the Drawings.
- C. Bolting: Provide standard plate washers under heads and nuts of bolts bearing on wood. Soap threads of lag bolts prior to installing.
- D. Bridging: Provide code-required bridging between structural joists, rafters, and trusses.
- E. Wood Furring: Install vertical 1x3 preservative treated furring at 16" on center on interior face of concrete or masonry walls indicated to receive gypsum wallboard finish.
- F. Sill Insulation: Install between the concrete foundation wall and the exterior wall sill plate. Impale over the anchor bolts and flush with the face of the foundation wall with all end joints butted together, not overlapped.
- G. Framing: Install framing members at not more than 16" on center unless approved by BSD representative and at spacing indicated on the Drawings. Double floor joists under parallel partitions. Use standard moisture content framing except where indicated kiln dried. Interior doors must be framed in wood with two king studs and a trimmer on each side or have a continuous welded hollow metal frame grouted in place. See Section 08 11 00 Metal Doors and Frames.
- H. Install pressure treated framing at locations where wood framing is in contact with concrete or ground. The end cuts of all pressure treated wood shall have a preservative applied. Hot dipped galvanized nails shall be used with preservative applied wood per the Oregon Structural Specialty Code (2304.9.5).
- I. Temporary Support: Adequately brace structure for wind and earthquake forces until roof and wall panels have been secured. Interior gypsum wallboard panels are used for bracing. Continue bracing until interior gypsum wallboard is fully nailed.

**END OF SECTION**



**SHEATHING**

**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Provide plywood wall sheathing, as indicated on the Drawings and as specified herein.

**1.2 REFERENCES**

- A. ASTM International (ASTM): ASTM C1396, Standard Specification for Gypsum Board.
- B. American Plywood Association: PS 1, Construction and Industrial Softwood Plywood, latest edition.
- C. APA PRP-108: Performance Standards and Policies for Structural Use Panels, latest edition.

**2 - PRODUCTS**

**2.1 MATERIALS**

- A. Plywood Wall Sheathing: 1/2" thick, APA rated sheathing, Exposure 1, 24/0 span rating.
- B. Nail Fasteners: Common nails conforming to FS FF-N-105.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Plywood Wall Sheathing: Install plywood either horizontal or vertical.

**3.2 MINIMUM FASTENING SCHEDULE**

- A. Wall Sheathing: 8d Common nails, 6" on center at panel edges with 12" on center at panel interior.

**END OF SECTION**



**CUSTOM WINDOW SILLS**

**PART 1 - GENERAL**

1.1 WORK INCLUDED

- A. Provide custom plastic laminate finished window sills as indicated on the Drawings and as specified herein.

1.2 REFERENCED STANDARDS

- A. Quality Standards: Except as herein modified, materials and workmanship grades shall be as defined in Architectural Woodwork Quality Standards, published by the Architectural Woodwork Institute.

1.3 SUBMITTALS

- A. Shop Drawings:
  - 1. Show layout, dimensions, profiles, joint details, and other pertinent items.
  - 2. Identify each item as to location, material grade, workmanship grade, wood species, finish, plastic laminate color, and location of casework.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver products to jobsite until notified by the Contractor that the project is conditioned and prepared to handle and store casework products without damage. Coordinate delivery to comply with job requirements.
- B. Protect all window sills from damage during shipment, handling, and storage.

1.5 JOB CONDITIONS

- A. Coordinate with other trades affecting or affected by the work of this Section.
- B. Protect other surfaces against damage or discoloration caused by the work of this Section.

**PART 2 - PRODUCTS**

2.1 MATERIALS

- A. Particleboard: 48-pounds per cubic foot minimum density, with 8% maximum moisture content; provide in thicknesses indicated on the Drawings; Medex by Roseburg or accepted substitute.
- B. High Pressure Laminate: 0.05" thickness and GP-50 NEMA Type. Color to match Nevamar, ARP textured surface, #S-2-86T, Jute.
- C. Fasteners: Nails, staples, and screws to comply with Section 11 in AWS Quality Standards.
- E. Adhesive: Provide low emitting adhesives. All adhesives and sealant installed inside of the weatherproofing system shall meet testing and product requirements of CDPH Standard Method c1.1-2010. Examples include greenguard gold, collaborative for high performance schools and SCS Indoor Advantage Gold. VOC contents wet applied on site must meet applicable chemical content requirements of SCAQMD Rule 1168.

**CUSTOM WINDOW SILLS**

**2.2 FABRICATION**

- A. Window Sills: 3/4" particleboard with 0.050" thick horizontal, general purpose, standard high pressure laminate with 0.020" thick backing sheet. Fabricate for concealed fastening.

**PART 3 - EXECUTION**

**3.1 EXISTING CONDITIONS**

- A. Verify that surfaces to receive window sills are straight, plumb, true, rigid, and otherwise properly prepared. Notify Contractor of any defects requiring correction prior to starting work. Do not start work until conditions have been made and are satisfactory.
- B. Verify that solid blocking has been properly installed to support window sills.

**3.2 FIELD MEASUREMENTS**

- A. Verify field measurements prior to fabrication. If field measurements differ slightly from drawing dimensions, modify work as required for accurate fit. If any measurement differs substantially, notify the Architect prior to fabrication.

**3.3 INSTALLATION**

- A. Secure window sills in place plumb, square, true, level, and without distortion. Level where necessary with concealed shims.
- B. Ease sharp external corners prior to finishing.

**3.4 ADJUSTMENTS, CLEANING, AND REPAIRING**

- A. Damage Adjustments: Repair damaged or defective work as directed. Remove and refinish damaged areas of finish.
- B. Cleaning: Clean exposed and semi-exposed surfaces. Remove labels from exposed plastic laminate finish.
- C. Remove debris from project site upon work completion or sooner, if directed.

**END OF SECTION**



## THERMAL INSULATION

### PART 1 - GENERAL

#### 1.1 WORK INCLUDED

- A. Thermal blanket insulation in wall framing spaces.
- B. Fiberglass sill sealer between foundation wall and sill plate of wood frame construction.

#### 1.2 REFERENCES

- A. ASTM International (ASTM):
  - 1. ASTM C665: Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
  - 2. ASTM C991: Standard Specification for Flexible Glass Fiber Insulation for Metal Buildings.
  - 3. ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials.
- B. Federal Specification (FS):
  - 1. FS HH-I-524b: Insulation Board, Thermal (Polystyrene).
  - 2. FS HH-I-558B, Amendment 3: Insulation, Blocks, Boards, Blankets, Felts, Sleeving (Pipe and Tube Coating), and Pipe Fitting Covering Thermal (Mineral Fiber, Industrial Type).
- C. Thermal Insulation Manufacturer's Association: TIMA 202, Flexible Glass Fiber Insulation for Pre-Engineered Metal Buildings.
- D. Underwriter's Laboratory: UL 623, Fire Resistance Directory.
- E. Uniform Building Code: Standard No. 8-1, Test Method for Surface-Burning Characteristics of Building Materials.

#### 1.3 SUBMITTALS

- A. Product Data: Submit for materials being used, recommended adhesives, and manufacturer's stick pin placement for insulation installation.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver all materials to the project site in the manufacturer's original packaging, indicating R-value, type of material, and other pertinent data.
- B. Store all materials off the ground and protected from weather and traffic damage.

### PART 2 - PRODUCTS

#### 2.1 THERMAL BLANKET INSULATION

- A. Insulation Data: Mineral Fiber Insulation Blanket, ASTM C665, FS HH-I-521F, 1.5 pound minimum density. CertainTeed, Manville, Owens/Corning, U.S. Gypsum, or accepted substitute.
  - 1. Kraft Face: Type II, Class C, kraft vapor barrier (1.0 perm rating).
  - 2. R-Value: R-19, 5-1/2" thick.

**THERMAL INSULATION**

**2.2 SILL INSULATION**

- A. Provide in width to match sill plate. AMOFOAM Sill Sealer, Dow Styrofoam Sill Seal Foam Gasket, or accepted substitute.

**PART 3 - EXECUTION**

**3.1 INSPECTION**

- A. Examine areas scheduled to receive insulation to insure protection against weather and other hazards.
- B. Inspect space allocated for proper depth to receive specified material.
- C. Coordinate timing of installation with framer, plumbers, electricians, and other whose work may be affected or have effect.

**3.2 INSTALLATION**

- A. Thermal Blanket Insulation:
  - 1. Install blankets snugly between framing members with vapor barrier on the inside (heated space) face.
  - 2. Insulate small areas between closely spaced framing members. Cut and fit around pipes, conduits, and outlet boxes. Where pipes are located in stud spaces, place insulation between exterior wall and pipe, compressing insulation if necessary.
  - 3. Tape joints, ruptures, and terminal edges of vapor barrier faces with 2" wide duct tape to form a completely sealed vapor barrier.
  - 4. Staple flanges to sides wood framing members at 8" on center or closer as necessary to keep flanges tight to the framing members over entire length of blanket.
- B. Sill Insulation: Install between the concrete foundation wall and the exterior wall sill plate. Impale over the anchor bolts and flush with the face of the foundation wall with all end joints butted together, not overlapped.

**3.3 CLEANING**

- A. Remove litter and debris leaving areas in a clean, uncluttered condition.

**END OF SECTION**

**VAPOR RETARDER**

**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Provide vapor retarder under the cast-in-place concrete slabs as indicated on the Drawings and as herein specified.

**1.2 REFERENCES**

- A. ASTM International (ASTM):
  - 1. ASTM E1643: Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs
  - 2. ASTM E1745: Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.

**1.3 SUBMITTALS**

- A. Product Data: Submit material sample, specifications, installation instructions and details, and all accessories that will be used in the installation.
- B. Manufacturer's certification of testing on a single roll of production material per paragraph 8.1 of ASTM E1745

**1.4 QUALITY ASSURANCE**

- A. Pre-Application Meeting for Vapor Retarder: Notify Owner, Architect, vapor retarder manufacturer's representative, reinforcing steel workers, and concrete application workers at least 48 hours prior to starting vapor retarder installation. Arrange a mutually acceptable time for meeting at the job with all notified parties to review the vapor retarder specifications and job conditions. Obtain the acceptance, approval and understanding of all parties on materials, details, methods of installation and protection of the vapor retarder materials prior to beginning slab on grade work where a retarder is required.
- B. Vapor Retarder Manufacturer's Qualifications: Vapor retarder system manufacturer shall maintain a full time factory employee with an invested interest to make periodic reviews, in person or through digital photos, during the installation of the vapor retarder system. The technical employee shall be available for such periodic reviews and for consultation whenever requested by the Owner, Architect or the Contractor. The technical employee shall attend the pre-application meeting or conference call and be completely knowledgeable with the installation requirements of the vapor retarder materials.
- C. Warranty: 2 years manufacturer warranty. Manufacturer warrants that its products are in compliance with their published specifications and are free from defects in materials for a period of two years from the date of purchase.

**PART 2 - PRODUCTS**

**2.1 ACCEPTED MANUFACTURERS**

- A. Stego Industries "15-MIL STEGO WRAP"
- B. Raven Industries "Griffolyn 15 mil".
- C. Fortifiber Building Systems Group "Moistop Ultra 15".

**VAPOR RETARDER**

- D. Or accepted substitute.

**2.2 MATERIALS**

- A. Vapor Retarder Sheet: Conform to ASTM E1745, Class A. Maintain permeance of less than 0.01 Perms [grains/(ft<sup>2</sup> · hr · inHg)] as tested after conditioning tests per ASTM E1745, Section 7.1. Extruded minimum 15-mil thickness manufactured with ISO certified virgin resins.
- B. Accessories:
1. Vapor Retarder Seam and Repair Tape: Manufacturer's tape with pressure sensitive adhesive. Nominal width 3.75".
    - a. With Stego Industries Membrane: Stego Tape.
    - b. With other Manufacturer's Membrane: Manufacturer's tape.
  2. Pipe Boot: Construct pipe boots from vapor retarder material and pressure sensitive tape per manufacturer's instructions.
  3. Vapor Retarder Terminating Edge Sealing Tapes: Double-sided tape comprised of polyethylene substrate with polyolefin apertured film and pressure-sensitive adhesion or synthetic rubber/resin blend.
    - a. With Stego Industries Membrane: Stego Crete Claw and StegoTack Tape.
    - b. With Other Manufacturer's Membrane: Manufacturer's standard products.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Proceed with the installation of the vapor retarder only after the substrate construction has been completed and the drains and other projections through the vapor retarder have been installed and the gravel base has been leveled and compacted.
- B. Install the vapor retarder under building slabs-on-ground on top of the gravel base.
- C. Comply with the manufacturer's instructions, except where more stringent requirements are indicated.
1. Install in accordance with ASTM E1643.
  2. Place vapor retarder with the longest dimension parallel with the direction of the pour.
  3. Lap vapor retarder over footings to a distance acceptable to the structural engineer and seal vapor retarder. Turn vapor retarder onto foundation walls, lap up face of wall to a height consistent with the top of slab or impediments and seal.
  4. Lap all joints 6" and seal with the manufacturer's recommended pressure sensitive tape.
  5. Seal pipe and permanent penetrations with pipe boot made of vapor retarder and tape per the manufacturer.
  6. Protect vapor retarder from damage during installation of reinforcing steel and utilities. For interior forming applications and screeding, avoid the use of non-permanent stakes driven through vapor barrier.
  7. Repair damaged areas by cutting patches of vapor retarder, overlapping damaged area 6" and taping all four sides with pressure sensitive tape.

**END OF SECTION**

**METAL ROOF PANELS**

**PART 1 - GENERAL**

**1.1 SECTION INCLUDES**

- A. Provide preformed metal roof panels at the outdoor walk-in cooler as indicated on the Drawings and as herein specified. Include all accessories associated with the roof panels to supply a complete weatherproof roof system.

**1.2 PERFORMANCE REQUIREMENTS**

- A. TESTING AND CERTIFICATION
  - 1. Wind Uplift: UL 580 test, 24 and 22 gauge panels rated Class 90 (Construction #170), when installed over minimum 14 gauge steel purlins spaced 5'0" on center maximum.
  - 2. Structural Performance: The wind uplift resistance of the roof assembly shall be established in accordance with ASTM E-1592 or the previous Corps of Engineers Test Method for Structural Performance SSSMRS by Uniform Static Air Pressure Difference CEGS-07416.
  - 3. Air Infiltration: Panel (without insulation) to meet the following standard when tested in accordance with ASTM 1680-95:
    - a. With Sidelap Sealant: 0.006 CFM/lineal ft. of panel seam at 1.57 psf positive pressure, and;
    - b. 0.02 CFM/lineal ft. of panel seam at 1.57 psf negative pressure.
  - 4. Water Penetration: Panel to meet the following standard when tested in accordance with ASTM E1646- 95:
    - a. With Sidelap Sealant: No leakage at 6.24 psf.

**1.3 SUBMITTALS**

- A. Product Data:
  - 1. Submit Manufacturer's technical product data, installation instructions and recommendations for each type of roofing required. Include data substantiating that materials comply with requirements.
- B. Samples:
  - 1. Prior to ordering products, submit Manufacturer's standard color samples for Architect's/Engineer's selection.
  - 2. Prior to starting work, submit (quantity) 12" long panel samples showing shape and a representative color chip for Architect's/Engineer's acceptance.
- C. Shop Drawings:
  - 1. Submit compete shop drawings detailing all perimeter and joint flashings that comply with Manufacturer's standard recommendations.
  - 2. Describe all proposed details that deviate from what is shown on the plans. Details to allow for expansion and contraction.
- D. Site Conditions:
  - 1. Provide completed site condition form for environmental conditions excluded in the Standard Warranty.

**METAL ROOF PANELS**

- E. Design Criteria:
  - 1. Wind Uplift: The roof system manufacturer shall provide an attachment schedule signed by a professional Engineer licensed in the area where the work will be performed and supporting calculations to resist the following uplift loads:
    - a. Uplift loads as calculated using the 2014 Oregon Structural Specialty Code with a 120 mph basic wind speed, Exposure Factor B, and importance Factor I.E. 1.25.
  - 2. Drag Loading: The roof system manufacturer shall provide an attachment schedule signed by a licensed professional Engineer and supporting calculations to resist drag loads induced by a snow load of (ground snow load 15 psf).

**1.4 QUALITY ASSURANCE**

**A. INSTALLER'S QUALIFICATIONS**

- 1. Installer must be approved by the Panel Manufacturer in writing prior to work commencing.
- 2. Installer shall meet the following:
  - a. Successfully applied five metal roofs of comparable size and complexity which reflects a quality weathertight installation in the region where the work will be performed.
  - b. Have been in business for a minimum period of five (5) years in the region where the work will be performed.

**B. MANUFACTURER'S QUALIFICATIONS**

- 1. Manufacturer shall have a minimum of 10 years experience supplying metal roofing to the region where the work is to be done.
- 2. Comply with current independent testing and certification as specified.
- 3. Manufacturer shall provide proof of \$2,000,000 liability insurance for their metal roof system and comply with current independent testing and certification as specified.
- 4. The roof panel manufacturer must also subscribe to Underwriters Laboratories' "Follow Up Service" assuring continuing product compliance with UL requirements. Shipment packaging of panels and attachment clips must bear UL classification markings.
- 5. Panel Manufacturers without full supporting literature; Flashings & Details Guides, Guide Specifications and Technical Support shall not be considered equal to the specified product.
- 6. Comply with UBC and local Building Code requirements if more restrictive than those specified herein.
- 7. Compliance with certification must be submitted with bid.

**1.5 PRODUCT DELIVER, STORAGE AND HANDLING**

- A. Protect against damage and discoloration.
- B. Handle panels with non-marring slings.
- C. Do not bend panels.
- D. Store panels above ground, with one end elevated for drainage.
- E. Protect panels against standing water and condensation between adjacent surfaces.
- F. If panels become wet, immediately separate sheets, wipe dry with clean cloth, and allow to air dry.

**METAL ROOF PANELS**

- G. Painted panels shall be shipped with a protective plastic sheeting or a strippable film coating between all panels. Remove any strippable film coating prior to installation and in any case, do not allow the strippable film coating to remain on the panels in extreme heat, cold, or in direct sunlight or other UV source.

**1.6 PROJECT CONDITIONS**

- A. Examine the conditions and substrates in which metal roofing work is to be installed. Substrate shall be installed level, flat and true to avoid panel stresses.
- B. Field measurements shall be taken prior to fabrication of panels.
- C. Proceed with roofing installation only after satisfactory conditions are met.

**1.7 WARRANTY**

- A. Manufacturer's Product Warranty:
  - 1. Manufacturer's standard coating performance warranty, as available for specified installation and environmental conditions.
- B. Contractor's Warranty:
  - 1. Warrant panels, flashings, sealants, fasteners and accessories against defective materials and/or workmanship, to remain watertight and weatherproof with normal usage for two (2) years following Project Substantial Completion date.
- C. Manufacturer's Watertightness Warranty:
  - 1. Provide manufacturer's watertightness warranty.

**PART 2 - PRODUCTS**

**2.1 ACCEPTABLE MANUFACTURERS**

- A. AEP Span (Specification Base).
  - 1. Span-Lok hp with integral self-locking standing seam.
- B. Or accepted substitute

**2.2 MATERIALS**

- A. Panels:
  - 1. Base Metal:
    - a. Material: Steel conforming to (choose one)
      - 1) ASTM A792 Zinalume®/ Galvalume®, minimum yield strength of 50,000 psi, thickness 22 gauge.
      - 2) For primers thicker than 0.5 mil] ASTM A653 (formerly ASTM A446). Galvanized, minimum yield 50,000 psi, 22 gauge.
    - b. Protective Coating:
      - 1) Conform to ASTM A792. AZ50 (Zinalume/ Galvalume).
      - 2) For primers thicker than 0.5 mil] Conform to ASTM A924
  - 2. Exterior Finish:
    - a. DuraTech® 5000 (Polyvinylidene Fluoride), full 70% Kynar® 500/Hylar 5000® consisting of a baked on 0.15-0.20 mil corrosion resistant primer and a baked-on 0.70-0.80 mil finish coat with a specular gloss of 10-30% when tested in accordance with ASTM D-523-89 at 60°.

**METAL ROOF PANELS**

3. Interior Finish:
    - a. Primer Coat Material: Corrosion-resistant primer; primer coat dry film thickness: 0.15 mils; finish coat material: polyester paint, finish coat dry film thickness: 0.35 mils.
    - b. Color: Off-White to Light Gray.
  4. Color: Cool Regal White
  5. Configuration: Roof panels shall consist of integral self-locking standing seams with a seam height of 2 inches, nominal panel width 16 inches.
- B. Accessories:
1. Fastener Clip: 22 gauge galvanized steel clip with 16 gauge steel base. Clip hook shall have shop installed hotmelt butyl sealant for continuity of seal at clip locations.
  2. Fasteners
    - a. Per manufacturer's recommendation.
  3. Sealant:
    - a. Gunnable grade caulking: Single component urethane and butyl rubber caulk.
    - b. Tape sealant: Butyl-type mastic.
- C. Flashing:
1. Protective metallic coating, material, gauge and finish to match panels. Do not use lead or copper.
  2. Remove any strippable film prior to installation.
  3. Material, gauge and finish to match panels.
- D. Fabrication:
1. Unless otherwise shown on drawings panels shall be full length. Flashings and accessories shall be fabricated in longest practical lengths.
  2. Roofing panels shall be factory formed. Field formed panels are not acceptable.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Existing Conditions:
1. Verify that members and/or substrate to receive panels are complete, accurately sized and located, in true plane, secure and otherwise properly prepared.
  2. Prior to starting work, notify General Contractor about defects requiring correction.
  3. Do not start work until conditions are satisfactory.

**3.2 PREPARATION**

- A. Field Measurements:
1. Verify prior to installation.
  2. If field measurements differ from drawing dimensions, notify Architect/Engineer prior to fabrication.
- B. Protection:
1. Treat, or isolate with protective material, any contacting surfaces of dissimilar materials to prevent electrolytic corrosion.
  2. Require workmen who will be walking on roofing panels to wear clean, soft-soled shoes that will not pick up stones or other abrasive material that could cause damage and discoloration.
  3. Protect work of other trades against damage and discoloration.
- C. Surface Preparation: Clean and dry surfaces prior to applying sealant.



**METAL ROOF PANELS**

**3.3 PREPARATION**

- A. Field Measurements:
  - 1. Verify prior to fabrication.
  - 2. If field measurements differ from drawing dimensions, notify Architect/Engineer prior to fabrication.
- B. Protection:
  - 1. Treat, or isolate with protective material, and contacting surfaces of dissimilar materials to prevent electrolytic corrosion.
  - 2. Require workmen who will be walking on Roofing panels to wear clean, soft-soled work shoes that will not pick up stones or other abrasive material, which could cause damage or discoloration.
  - 3. Protect Work of other Trades against damage and discoloration.
- C. Surface Preparation:
  - 1. Clean and dry surfaces prior to applying sealant.

**3.4 INSTALLATION**

- A. Panels:
  - 1. Follow roof panel manufacturer's directions.
  - 2. Install panel seams vertically.
  - 3. Lap panels away from prevailing wind direction.
  - 4. Do not stretch or compress panel side-lap interlocks.
  - 5. Secure panels without warp or deflection.
  - 6. Fully engage attachment clips and interlocking seams.
  - 7. Extend roof panels over gutter openings or eave trim 2 inches, but do not restrict opportunity to clean gutters.
  - 8. Remove any strippable protective film preceding panel installation.
  - 9. Erection tolerance: panels shall be installed in a true and straight alignment.
- B. Allowable Erection Tolerance:
  - 1. Maximum alignment variation: 1/4 inch in 40 feet.
- C. Cutting and Fitting:
  - 1. Neat, square and true. Torch cutting is prohibited.
  - 2. Openings 6 inches and larger in any direction: Shop fabricate and reinforce to maintain original load capacity.
  - 3. Where necessary to saw-cut panels, debur and treat with galvanic paint.

**3.5 CLEAN UP AND CLOSE OUT**

- A. Panel Damage And Finish Scratches:
  - 1. Do not apply touch-up paint to damaged paint areas that involve minor scratches.
  - 2. Panels or flashings that have severe paint and/or substrate damage shall be replaced as directed by the Architect's or Owner's representative.
- B. Cleaning and Repairing:
  - 1. At completion of each day's work and at work completion, sweep panels, flashing and gutters clean. Do not allow fasteners, cuttings, filings or scraps to accumulate.

**END OF SECTION**



**METAL WALL PANELS**

**PART 1 – GENERAL**

**1.1 SECTION INCLUDES**

- A. The work includes, but is not necessarily limited to, furnishing and installation of all preformed metal wall panels and accessories at the exterior wall above the walk-in cooler as indicated on the Drawings and as specified herein.

**1.2 SUBMITTALS**

- A. Product Data: Submit Manufacturer's technical product data, installation instructions and recommendations for each type of roofing and wall panel required. Include data substantiating that materials comply with requirements.

**1.3 QUALITY ASSURANCE**

- A. Installer's Qualifications: Installation of panels and accessories by installers with a minimum of 5 years experience on panel projects of this nature.

**1.4 MANUFACTURER'S QUALIFICATIONS**

- A. Manufacturer shall have a minimum of 10 years experience supplying metal roofing/siding to the region where the work is to be done.
- B. Manufacturer shall provide proof of \$2,000,000 liability insurance for their metal roof system and comply with current independent testing and certification as specified. See specific product literature for testing information.
- C. Panel manufacturers without full supporting literature, Flashings & Details Guides, Guide Specifications and Technical Support shall not be considered equal to the specified product.

**1.5 REGULATORY AGENCY REQUIREMENTS**

- A. Comply with 2014 Oregon Structural Specialty Code requirements if more restrictive than those specified herein.

**1.6 PRODUCT DELIVERY, STORAGE AND HANDLING**

- A. Protect against damage and discoloration.
- B. Handle panels with non-marring slings.
- C. Do not bend panels.
- D. Store panels above ground, with one end elevated for drainage.
- E. Protect panels against standing water and condensation between adjacent surfaces.
- F. If panels become wet, immediately separate sheets, wipe dry with clean cloth, and allow to air dry.

**METAL WALL PANELS**

- G. Remove any strippable film coating prior to installation and do not allow it to remain on the panels in extreme cold, heat or in direct sunlight.

**1.8 WARRANTY**

- A. Manufacturer's Product Warranty:
  - 1. Manufacturer's standard coating performance warranty, as available for specified installation and environmental conditions.
- B. Contractor's Warranty:
  - 1. Warrant panels, flashings, sealants, fasteners and accessories against defective materials and/or workmanship, to remain watertight and weatherproof with normal usage for two (2) years following Project Substantial Completion date.

**PART 2 – PRODUCTS**

**2.1 ACCEPTABLE MANUFACTURER**

- A. AEP Span, A Division of ASC Profiles Inc. (Specifications Base)
  - 1. Panel Designation: Nu-Wave.
- B. The Bryer Company.
  - 1. Panel Designation: 7/8 Corrugated.
- C. Metal Sales Manufacturing Corporation.
  - 1. Panel Designation: 7/8" Corrugated-Wall.
- D. Or accepted substitute.

**2.2 MATERIALS**

- A. Panels:
  - 1. Base Metal:
    - a. Material: Steel conforming to ASTM A792 Zincalume®/Galvalume®, minimum yield 50,000 psi, thickness 24 gauge.
    - b. Protective Coating: Conform to ASTM A792, AZ50 (Zincalume/Galvalume).
  - 2. Exterior Finish: DuraTech® 5000 (Polyvinylidene Fluoride), full 70% Kynar® 500/Hylar 5000® consisting of a baked-on 0.15-0.20 mil corrosion resistant primer and a baked-on 0.70-0.80 mil finish coat with a specular gloss of 10-30% when tested in accordance with ASTM D-523- 89 at 60°.
  - 3. Interior Finish:
    - a. Primer Coat Material: Corrosion-resistant primer; primer coat dry film thickness: 0.15 mils; finish coat material: polyester paint, finish coat dry film thickness: 0.35 mils.
    - b. Color: Off-White to Light Gray.
  - 4. Color (Exposed to View): Architect shall select color from manufacturer's standard selection of not less than 22 colors.
- B. Fabrication:
  - 1. Unless otherwise shown on drawings or specified herein, panels shall be full length. Fabricate flashings and accessories in longest practical lengths.
  - 2. Roofing panels shall be factory formed. Field formed panels are not acceptable.

**METAL WALL PANELS**

**PART 3 – EXECUTION**

**3.1 EXAMINATION**

- A. Existing Conditions:
  - 1. Inspect installed work of other trades and verify that such work is complete to a point where this work may continue.
  - 2. Verify that installation may be made in accordance with approved shop drawings and manufacturer's instructions.

**3.2 PREPARATION**

- A. Field Measurements:
  - 1. Verify prior to fabrication.
  - 2. If field measurements differ from drawing dimensions, notify Architect/Engineer prior to fabrication.
- B. Protection:
  - 1. Treat, or isolate with protective material, and contacting surfaces of dissimilar materials to prevent electrolytic corrosion.
  - 2. Require workmen who will be walking on Roofing Panels to wear clean, soft-soled work shoes that will not pick up stones or other abrasive material, which could cause damage or discoloration.
  - 3. Protect work of other trades against damage and discoloration.
- C. Surface Preparation:
  - 1. Clean and dry surfaces prior to applying sealant.

**3.3 INSTALLATION**

- A. Panels:
  - 1. Follow roof panel manufacturer's directions.
  - 2. Install panel seams (choose one) vertically or horizontally.
  - 3. Lap panels away from prevailing wind direction.
  - 4. Do not stretch or compress panel side-laps.
  - 5. Secure panels without warp or deflection.
- B. Allowable Erection Tolerance:
  - 1. Maximum Alignment Variation: 1/4 inch in 40 feet.
- C. Flashing:
  - 1. Follow manufacturer's directions and architect approved Shop Drawings.
  - 2. Overlap roof panels at least 6 inches.
  - 3. Install flashings to allow for thermal movement.
  - 4. Remove strippable protective film, if used, immediately preceding flashing installation.

**METAL WALL PANELS**

- D. Cutting And Fitting:
  - 1. Neat, square and true. Torch cutting is prohibited where cut is exposed to final view.
  - 2. Openings 6 inches and larger in any direction: Shop fabricate and reinforce to maintain original load capacity.
  - 3. Where necessary to saw-cut panels, debur cut edges.

**3.4 CLEAN UP AND CLOSE OUT**

- A. Panel Damage and Finish Scratches:
  - 1. Do not apply touch-up paint to damaged paint areas that involve minor scratches.
  - 2. Panels or flashings that have severe paint and/or substrate damage shall be replaced as directed by the Architect's or Owner's representative.
- B. Cleaning And Repairing:
  - 1. At completion of each day's work and at work completion, sweep panels, flashings and gutters clean. Do not allow fasteners, cuttings, filings or scraps to accumulate.
  - 2. Remove debris from project site upon work completion or sooner, if directed.

**END OF SECTION**

**SHEET METAL FLASHING AND TRIM**

**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Sheet metal flashing, edge flashing, downspouts and all other sheet metal items required to weatherproof the roofing and window as indicated on the Drawings and as specified herein.

**1.2 REFERENCES**

- A. ASTM International (ASTM):
  - 1. ASTM A167: Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
  - 2. ASTM A480: Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip.
  - 3. ASTM A653: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - 4. ASTM B32: Standard Specification for Solder Metal.
  - 5. ASTM B209: Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
  - 6. ASTM B370: Standard Specification for Copper Sheet and Strip for Building Construction.
  - 7. ASTM C920: Standard Specification for Elastomeric Joint Sealants.
  - 8. ASTM D4586: Standard Specification for Asphalt Roof Cement, Asbestos-Free.
- B. Sheet Metal and Air Conditioning National Association, Inc. (SMACNA): Architectural Sheet Metal Manual, latest edition.
- C. ANSI/SPRI ES-1, "Wind Design Standard for Edge Systems".

**1.3 SYSTEM DESCRIPTION**

- A. Moisture Retention Requirements: Finish work free from water leakage under all weather conditions.

**1.4 SUBMITTALS**

- A. Shop Drawings: Submit shop drawings of flashing details showing dimensions, anchorage, and joint construction.
- B. Samples: Submit 3 samples of factory finished metal for color selection.

**1.5 PERFORMANCE REQUIREMENTS**

- A. General: Sheet metal flashing and trim assemblies as indicated shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Design, fabricate, and install flashings at roof edges in accordance with ANSI/SPRI/FM 4435/ES-1, except with basic wind speed of 130 mph.
- C. Water Infiltration: Provide sheet metal flashing and trim that does not allow water infiltration to building interior.

**SHEET METAL FLASHING AND TRIM**

**1.6 QUALITY ASSURANCE**

- A. SMACNA Manual: Comply with latest edition of the "Architectural Sheet Metal Manual" by SMACNA. Conform to details and description in reference standards unless otherwise indicated on the Drawings.

**1.7 SEQUENCING AND SCHEDULING**

- A. Coordinate with the new roofing work specified in Section 07 51 00, Built-up Bituminous Roofing.

**1.8 WARRANTY**

- A. Provide installer's written warranty against defects in materials and workmanship for a period of not less than 2 years.
- B. Provide manufacturer's standard 20 years warranty on coil coated steel sheet.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

- A. Galvanized Steel: 24-gage or 26 gage, hot-dip galvanized steel conforming to ASTM A653, G90 coating class. 20 year warranty on baked enamel finish. Factory applied, prefinished "Kynar 500 Fluorocarbon coating". Minimum thickness 0.70-mil over 0.25-mil prime coat.
- B. Lead: 4 pound per square foot minimum, Grade B.

**2.2 ACCESSORIES**

- A. Clips: Same gage and type as metal covering, 2" wide.
- B. Continuous Clips: Same gage and type as coil coated steel used for metal flashings.
- C. Concealed Fasteners: Hot-dip galvanized steel, or cadmium plated screws of type as appropriate for materials and substrates encountered.
- D. Exposed Fasteners: Hot-dip galvanized steel or stainless steel nails or cadmium plated screws with neoprene grommets washers and head to match sheet metal color. Color matching rivets may be used on exposed flashing. Provide type(s) as appropriate for the substrates encountered.
- E. Sealants: ASTM C920; Type as required for conditions being sealed, compatible with materials encountered. ChemKalk 900, Sonnebourn NP1, or accepted substitute.
- F. Downspouts: Provide new continuous roll formed gutters of prefinished coil coated 24-gage material in manufacturer's standard color selected by the Architect.
- G. Downspout Brackets: 1" wide by 10 gage galvanized steel brackets. Prime painted prior to installation. See Section 09 91 00, Painting.

**2.3 FABRICATION**

- A. Minimum Sheet Thickness: 24-gage.



**SHEET METAL FLASHING AND TRIM**

- B. Shop Forming Requirements:
  - 1. Fabricate sheet metal flashing as detailed and in accordance with reviewed shop drawings. Use the SMACNA Architectural Sheet Metal Manual Specifications and Details as a guide and basis for fabrication wherever applicable.
  - 2. Provide for thermal movement of sheet metal.
  - 3. Angle bottom edges of exposed vertical surfaces to form hemmed drip edge.
  - 4. Fabricate to dimensions indicated on shop drawings.
  - 5. Fabricate sheet metal with lines, brakes and angles sharp and true, and surfaces free from oilcanning, wave, warp, or buckle.
  - 6. Fold exposed edges of sheet metal back to form 1/2" wide hem on side concealed from view.
  - 7. Provide galvanic protection in areas where dissimilar metals are adjacent to each other.
  - 8. Spring Locks: Provide flashing pieces fabricated to spring lock where indicated on the Drawings.
- C. New Gutters, Downspouts: Provide new continuous roll formed gutters of pre-finished coil coated 24-gage material in manufacturer's standard color selected by the Architect. Downspouts are to match existing materials and profiles being tied into.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Do not proceed with Work until construction to receive the Work is completed.
- B. Examine substrates and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected. Surfaces to receive sheet metal shall be clean, even, smooth, dry, and free from defects and projections that might adversely affect the application. Verify slope prior to installation.

**3.2 PREPARATION**

- A. Verify that surfaces to receive sheet metal have been covered with flashing membrane specified in Section 07 52 00, Modified Bituminous Membrane Roofing. Notify the Contractor if this has not been installed.
- B. Verify that flashing membrane material, specified under roofing work, has been installed prior to sheet metal installation. Refer to Drawings for membrane and sheet metal application.

**3.3 INSTALLATION**

- A. Cleating at Seams: For size and spacing, refer to Drawings and SMACNA Manual. Secure one end with two fasteners and fold the cleat over the fastener heads. Unless otherwise indicated, use 2" x 3" long cleats of the same material and thickness of metal being installed.
- B. Seams: Comply with SMACNA Manual details (Figures 3-2 and 3-3 and other Figures as applicable to specific installations). Orient seams properly for direction of water flow.
  - 1. Flat Lock Seams: Provide four-ply flat lock horizontal seams at cap flashing on top of parapet and crickets. Solder lap seams around roof scuppers. Solder exposed gutter and downspouts seams. Finish not less than 1" wide.

**SHEET METAL FLASHING AND TRIM**

2. Cap is to extend a minimum of 3" over edge, with felts tucked underneath or single ply to extend over top of curb or parapet wall. Use fastening clip at parapet and curb flashing. No screws through top of parapet. Seal at corners with Dow Corning 795.
  - C. Soil Stacks:
    1. Install new 4 pound lead soil stacks set in mastic per the roofing manufacturer's recommendations.
    2. Five course to new roof membrane in accordance with the roofing manufacturer's recommendations.
- 3.4 SCHEDULE
- A. Fabricate sheet metal flashing and trim from the following materials of the minimum thicknesses indicated, unless otherwise required on the Drawings or to meet performance requirements.
  - B. Counter Flashing:
    1. Galvanized Steel: 0.028 inch (24 gage) thick.
  - C. Drip Edge Flashing:
    1. Pre-finished Galvanized Steel: 0.028 inch (24 gauge) thick.
    2. Joint Style: Lapped and sealed.
  - D. Rake Edge Flashing:
    1. Pre-finished Galvanized Steel: 0.028 inch (24 gauge) thick.
    2. Joint Style: Lapped and sealed.
  - E. Fascia Panels: Fabricated with profiles as shown on Drawings.
    1. Pre-Finished Galvanized Steel: 0.028 inch (24 gauge) thick.
    2. Pre-Finished Galvanized Steel: 0.028 inch (24 gauge) thick.
    3. Provide horizontal ribs as indicated on Drawings.
  - F. One or Two Piece Storm Collar Flashings with Hose Clamp:
    1. Stainless Steel: 0.018 inch (26 gauge) thick
    2. Joint Style: Soldered.
    3. Basis of Design:
      - a. SBC Industries: Model UMB or UMB-BELL.
      - b. Or approved.
  - G. Cleats: Fabricate to profiles shown on Drawings.
    1. Galvanized Steel: 0.034 inch (22) gauge thick.
    2. Joint Style: Lapped and sealed.
  - H. Roof-Penetration Flashing:
    1. Galvanized Steel: 0.028 inch (24 gage) thick.
  - I. Opening Flashings in Frame Construction: Fabricate head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings. Form head and sill flashing with 2-inch-high, end dams.
    1. Galvanized Steel: 0.028 inch (24 gage) thick.
  - J. Storefront Sill Pans: Fabricate storefront sill pan flashings with end and back dams and all corners sealed watertight.
    1. Pre-Finished Galvanized Steel: 0.028 inch (24 gage) thick at raised openings.

**SHEET METAL FLASHING AND TRIM**

- K. Equipment Support Flashing:
  - 1. Galvanized Steel: 0.028 inch (24 gage) thick.
- L. Equipment Support Flashing:
  - 1. Galvanized Steel: 0.028 inch (24 gage) thick.
- M. Miscellaneous Flashings: Fabricate with profiles as shown on Drawings and from sheet metal materials as indicated.

**END OF SECTION**



**FLEXIBLE FLASHING**

**PART 1 - GENERAL**

1.1 WORK INCLUDED

- A. Provide flexible membrane flashing for window waterproofing as indicated on the Drawings and as specified herein.

1.2 PERFORMANCE REQUIREMENTS

- A. It is required that membrane be watertight and not deteriorate in excess of limitations published by the manufacturer. Membrane shall be fully adhered to the surface it is applied.

1.3 SUBMITTALS

- A. Product Data: Submit product data and the general recommendations from the membrane manufacturer. Include data substantiating that material complies with requirements.
- B. Field Sample: Install 10-lineal feet of membrane product for review by the Architect to demonstrate the application and installation of the finished product.

1.4 STORAGE, DELIVERY AND HANDLING

- A. Protect all rolls from rain and physical damage. Store where temperatures will not exceed 90°F for extended periods. Store in a dry area away from high heat, flames or sparks. Store only as much

1.5 PROJECT/SITE CONDITIONS

- A. Substrate: Proceed with the Work after substrate construction, openings, and penetrating work has been completed.
- B. Temperature and Moisture Requirements: Do not install during wet weather or when ambient temperature is less than 40°F. Do not install on wet, damp, or frost covered surfaces.

**PART 2 - PRODUCTS**

2.1 ACCEPTED MANUFACTURERS

- A. Perm-A-Barrier Detail Membrane by W.R. Grace & Co. (Specification Base)
- B. "FortiFlash 40" by Forifiber Building Systems Group.
- C. Or accepted substitute.

2.2 MATERIALS

- A. Wall Membrane: Factory made, self-adhering, cold-applied sheet composites with a thickness of 0.040" consisting of a 0.004" high density, cross-laminated polyethylene film coated on one side with a 0.036" layer of rubberized asphalt adhesive interwound with a disposable silicone-coated release sheet.

**FLEXIBLE FLASHING**

**PART 3 - EXECUTION**

**3.1 INSPECTION**

- A. Examine surface specified to receive membrane to assure that surface is in condition acceptable to the manufacturer's requirements.
  - 1. Surface shall be dry and clean of oil, grease, dust, loose debris, or other contaminants.
  - 2. Surface shall be free of voids, spalled areas, and sharp protrusions.

**3.2 INSTALLATION**

- A. Apply primers to substrate surfaces as recommended for full adhesion. Prime only areas that will be covered by the membrane in the same working day; reprime areas not covered by the membrane within 24-hours. Priming is not required where membrane will properly fully adhere to substrate and remain fully adhered.
- B. Comply with the manufacturer's instructions for handling and installation of the membrane material.
- C. Coordinate the installation of the membrane material and associated work to provide complete system complying with combined recommendations of the manufacturer and installer involved in work. Schedule the installation to minimize period of exposure of the membrane material.
- D. Apply membrane flashing to vertical surfaces as shown on the Drawings and as required to provide complete membrane flashing system. Seal projections through membrane and seal seams.
- E. Firmly press the membrane into place with a hand roller or the back of a utility knife as soon as possible, ensuring continuous and intimate contact with the substrate to prevent water from migrating under the membrane. Continue the membrane into all openings in the wall area, such as windows, doors, etc., and terminate at points that will prevent interior visibility. The installation must be made continuous at all framed opening.

**3.3 MEMBRANE REPAIRS**

- A. Repairs must be made using Perm-A-Barrier wall membrane sized to extend 6" in all dimensions from the perimeter of the affected area. If repairs are required, carefully cut out affected areas and replace in similar procedure as outlined above. The repair piece must be pressed into place with a hand roller as soon as possible to ensure continuous and intimate contact with the substrate.

**3.4 PROTECTION**

- A. Institute required procedures for protection of completed membrane during installation of work against the membrane and throughout remainder of construction period.

**END OF SECTION**

## FIRESTOPPING

### PART 1 - GENERAL

#### 1.1 WORK INCLUDED

- A. Provide firestopping materials designed to retain the integrity of time rated construction maintaining a barrier against the spread of flame, smoke, and gasses as herein specified. All penetrations in separation walls shall be sealed with an approved firestopping material.
- B. Application to include, but not limited to, penetrations through time rated, floors, partitions, or fire walls.

#### 1.2 REFERENCE STANDARDS

- A. ASTM International (ASTM):
  - 1. ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials.
  - 2. ASTM E814: Standard Test Method for Fire Tests of Through-Penetration Fire Stops.
- B. UL Building Materials Directory.
- C. Uniform Building Code (ICBO).
- D. National Fire Protection Association (NFPA):
  - 1. NFPA 101 - Life Safety Code.
  - 2. NFPA 70 - National Electric Code.

#### 1.3 SUBMITTALS

- A. Submit the manufacturer's product data with certification that materials meet the requirements of applicable codes. Include description of materials, prefabricated devices, reinforcement, anchorage, and method of installation.

#### 1.4 DESIGN CRITERIA

- A. Firestopping material shall be asbestos-free and capable of maintaining an effective barrier against flame, smoke and gasses, and suitable for firestopping of penetrations made by steel, glass, plastic, and insulated pipe. The fire rating classification shall not require removal of insulation on insulated pipe.
- B. The rating of the firestopping materials shall not be less than the rating of the time rated floor or wall assembly.
- C. All firestopping to be of a single type from the same manufacturer. In existing facilities identify and match the existing firestopping material.

#### 1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in unopened containers bearing the manufacturer's name and product description.
- B. Store under cover and protected from damage. Remove damaged material from the job site.

**FIRESTOPPING**

**PART 2 - PRODUCTS**

**2.1 ACCEPTABLE MANUFACTURERS**

- A. United States Gypsum Thermafiber "Safeing" mineral fiber insulation.
- B. 3M Brand CP-25, Caulk; 303 Putty; FS-195 Wrap/Strip; CS-195 Composite sheet; 7900 Series Penetrating Sealing System.
- C. Dow Corning 3-6548 Silicone RTV Fire Stop Foam.
- D. General Electric Company RTV 850 Silicone Foam.
- E. Grace Construction Products "FlameSafe" Systems.
- F. Bio Fire Shield Firestopping systems.
- G. Metacaulk Brand, 800 series and 900 series.
- H. SpecSeal by Specified Technologies Inc.
- I. Or accepted substitute.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Clean surfaces to be in contact with the firestopping materials of dirt, grease, oil, or other substance that may affect proper installation or fire resistance.
- B. Install materials as indicated in accordance with the manufacturer's instructions. Seal all holes or voids to provide an effective barrier.
- C. Examine firestopped areas to ensure proper installation prior to closing or covering. Area to remain accessible until inspection by applicable authority as may be required.
- D. 4-Hour Tilt Panel Joints: Provide tested assembly conforming to ASTM E814 and ASTM E119. System designed after SpecSeal Firestop Products and shall consist of nominal 4 pounds density Mineral Wool placed in the center of joint then covered with 1/2" minimum thickness of Pensil 300 silicone sealant on each side. The system is to be inspected prior to the installation of urethane sealant.

**END OF SECTION**



**JOINT SEALANTS (DOW CORNING)**

**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Provide complete sealant systems as indicated on Drawings and specified herein.
- B. Section includes building sealants for weatherproofing, including but not limited to, perimeter joints of jambs, sills and trim; perimeter of door and window frames; penetrations of mechanical, electrical, and roof drainage equipment and parts through exterior wall, soffit and trim; expansion joints. Miscellaneous sealant products used throughout job. Include interior sealing of joints prior to painting.

**1.2 QUALITY ASSURANCE**

- A. Guarantee: Furnish written guarantee at completion of work. Guarantee period shall be 2 years from date of substantial completion. Include repair and replacement of defective work, such as leaks, failure of sealants.
- B. Provide manufacturer's standard warranties as follows:
  - 1. 20 year Structural Adhesion Warranty.
  - 2. 20 year Weatherseal Warranty.
  - 3. 20 year Non-Staining Warranty.
- C. Installer must have 5 years of experience in the installation of sealants specified herein.
- D. Laboratory Adhesion Tests: Contractor shall furnish samples of surface materials being sealed to the Sealant manufacturer for laboratory testing. Sealant Manufacturer shall perform laboratory tests of staining, weatherseal, and structural adhesion of sealant on each type of material being sealed. Sealant Manufacturer shall furnish written report of results and recommendations.

**1.3 SUBMITTALS**

- A. Product Data: Submit product data and MSDS sheets for all sealants to be used at interior locations indicating compliance with VOC limits of the Bay Area Air Resources Board Reg. 8, Rule 51.

**PART 2 - PRODUCTS**

**2.1 ACCEPTABLE MANUFACTURERS**

- A. Silicone:
  - 1. Dow Corning Corporation. (Specification Base)
  - 2. General Electric Company.
  - 3. Tremco, Inc.
  - 4. Or accepted substitute.
- B. Organic (at Interior Locations Only):
  - 1. Pecora Corporation.
  - 2. Sika Corporation.
  - 3. Sonneborn Building Products Division, Contech, Inc.
  - 4. Tremco, Inc. / Mameco Vulkem
  - 5. Bostik.
  - 6. Or accepted substitute.

**JOINT SEALANTS (DOW CORNING)**

**2.2 MATERIALS**

- A. Silicone Sealant: General exterior weather resistant applications. Ultra-low modulus, one-part, silicone sealant. Color(s) are to be selected by the Architect. Dow Corning 790 Silicone Building Sealant, Tremco Spectrum 1, or accepted substitute.
- B. Primer for Silicone Sealant: Dow Corning No. 1200, or accepted substitute. Use at surfaces as required by manufacturer and as indicated by laboratory and field adhesion tests.
- C. Acrylic Latex Sealant: General interior application for finishing gaps between various materials where painting of sealant is specified. Use single or multi-component products as appropriate.
- D. Sealant Color: Color as selected by the Architect to match adjacent surfaces at exposed joints. At concealed joints, manufacturer's highest performance color.
- E. Joint Cleaner and Primer/Sealers: As recommended by sealant manufacturer for the joint surface to be cleaned, primed, or sealed.
- F. Bond Breaker Tape: Polyethylene or other plastic self-adhesive tape, compatible with sealant, which will not bond to sealant.
- G. Sealant Backer Rod: Nonabsorptive closed cell compressible rod stock, compatible with sealant, which will not bond to sealant as recommended by the sealant manufacturer.

**PART 3 - EXECUTION**

**3.1 JOINT SURFACE PREPARATION**

- A. Clean, prime, and seal joint surfaces as recommended by the sealant manufacturer.
- B. Support sealant from back with construction indicated or with joint filler or backer rod where recommended by the sealant manufacturer.

**3.2 INSTALLATION**

- A. Comply with the manufacturer's printed instructions. Verify that the Architect has selected the sealant color during the submittal process or at the first pre-installation meeting.
- B. Skilled workmen shall install each type of material in locations as called for. All material struck neat to line and cleaned from adjacent surfaces.
- C. Apply sealants only to clean and dry surfaces at correct temperatures, and with approved protection from adverse weather conditions and dust.
- D. Thoroughly clean and remove any non-compatible substances remaining on surfaces such as lacquers, curing compounds, form coatings, bond breakers and silicone water repellents. Clean out any dust and loose material by brushing, scraping and blowing with air jet as necessary. Clean metal and glass with solvents.
- E. Run full, continuous and uniform beads of sealant in joints to be sealed keeping faces of work clean. Dry tool joint to concave profile.

**JOINT SEALANTS (DOW CORNING)**

- F. 1/2" maximum joint depth and 3/4" maximum width. Use backing rod to make approximately 1:2 joint section depth to width ratio. Use polyethylene bond breaker tape as required to prevent adhesion to back of joints where backer rod cannot be used or would not allow for proper depth to width ratio.
- G. Install elastomeric sealants in non-traffic joints to size and shape indicated or with slightly concave surface and depth equal to 50% of normal joint width, but not more than 1/2" and not less than 1/4".
- H. Install elastomeric sealants in concrete traffic joints to size and shape indicated or with slightly concave surface and depth equal to 75% of normal joint width, but not more than 5/8" and not less than 3/8" deep.
- I. Install non-elastomeric sealants to size and shape indicated or with slightly concave surface and depth from 75% to 125% of normal joint width.

**3.3 ADJUSTING AND CLEANING**

- A. Remove excess and spillage promptly.
- B. Replace materials improperly installed as directed by the Architect.
- C. Protect all horizontal sealants from dust and dirt until sealant is no longer tacky by covering the joint.

**END OF SECTION**



**METAL DOORS AND FRAMES**

**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Provide hollow metal door frames at locations indicated on the Drawings and as specified herein.

**1.2 REFERENCES**

- A. American National Standards Institute, Inc.: ANSI A115, Frames.
- B. ASTM International (ASTM):
  - 1. 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.
  - 2. ASTM A653: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - 3. ASTM A1011: Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
- C. Factory Mutual.
- D. Hollow Metal Manufacturers Association (HMMA), a Division of the National Association of Architectural Metal Manufacturers (NAAMM): HMMA 861, Guide Specifications for Commercial Hollow Metal Doors and Frames.
- E. International Conference of Building Officials (ICBO).
- F. National Fire Protection Association (NFPA): NFPA 80, Standard For Fire Doors and Windows (ANSI A2.7).
- G. Steel Door Institute (SDI): SDI 100-91, Recommended Specification, Standard Steel Doors and Frames.
- H. Underwriter's Laboratories, Inc. (UL).

**1.3 SUBMITTALS**

- A. Shop Drawings: Submit shop drawings of all hollow metal louvers, frames and doors. Include details showing the construction of the door vision frames.
- B. Product Data:
  - 1. Submit product information on door, relites, and frames. Show door frame fabrication and details of glazing of relite frames. Provide product information on factory finish and hardware preparation.

**1.4 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver to job in time for building into walls and partitions and protect from weather and construction damage. Replace dented and bent hollow metal work with new undamaged work as directed. Filled dents and straightened work are not acceptable.

**METAL DOORS AND FRAMES**

1.5 WARRANTY

- A. Provide 10 year warranty on door frames.

**PART 2 – PRODUCTS**

2.1 ACCEPTABLE MANUFACTURERS

- A. The American Welding and Manufacturing Co. (Amweld).
- B. The Ceco Corporation.
- C. Curries.
- D. Mesker Door, Inc.
- E. NCS Manufacturing.
- F. Republic Builders Products Corporation.
- G. Stiles Custom Metal, Inc.
- H. Steelcraft, American-Standard.
- I. Or accepted substitute.

2.2 MATERIALS

- A. Frame Steel: Commercial quality, cold-rolled steel conforming to ASTM A1008 or hot rolled, pickled, and oiled steel conforming to ASTM A1011. Provide steel free of scale, pitting, coil breaks, or other surface defects.
  - 1. Interior Frames: Provide zinc coating applied by the hot-dip process conforming to ASTM A653 (A60 or G60) with a coating weight of not less than 0.60 ounces per square foot (0.30 ounces per square foot per side).
  - 2. Exterior Frames: 14-gage minimum thickness. Provide zinc coating applied by the hot-dip process conforming to ASTM A653 (A60 or G60) with a coating weight of not less than 0.60 ounces per square foot (0.30 ounces per square foot per side).
  - 3. Interior frames at Openings 3'-6" Feet or Less: 16-gage minimum thickness.
  - 4. Interior frames at Openings Greater Than 3'-6" Feet: 14-gage minimum thickness.

2.3 FRAME FABRICATION

- A. Standard Interior Door Frames:
  - 1. 2" face, height and width as indicated on the Drawings with 5/8" high integral stop. (Provide 4" face where indicated on the Drawings.) Continuously weld faces and soffits with the faces finished smooth and free of any visible seam. Continuously weld and finish smooth all other face joints. Provide surface applied glass stops with surface fasteners as detailed at relites.
- B. Anchors: Types as required for wall construction at frame opening.

**METAL DOORS AND FRAMES**

**2.4 HARDWARE PREPARATION**

- A. General:
  - 1. Prepare frames to receive finish hardware, including cutouts, reinforcing, drilling, and tapping for mortised hardware, complying with ANSI A115.
  - 2. Provide manufacturer's standard reinforcing complying with these Specifications at hinge pockets, lockset, latchset openings, and closers.
  - 3. Prepare single door frames to receive 3 silencers on strike jambs.
- B. Frames:
  - 1. Mortise, reinforce, drill, and tap frames at the factory for completely templated mortised hardware in accordance with final accepted hardware schedule and templates provided by the hardware supplier.
  - 2. Reinforce frames where surface mounted, anchor hinges, or non-templated mortise hardware are to be applied.
  - 3. Minimum Gages for Door Hardware Reinforcement:
    - a. Full Mortise Hinges and Pivots: 7-gage.
    - b. Reinforcement for Lock Fronts, Concealed Holders, Surface Mounted Closers: 12-gage.
    - c. Internal Reinforcements for All Other Surface Applied Hardware: 14-gage.
  - 4. Minimum Gages for Frame Hardware Reinforcing Plates:
    - a. Hinge and Pivot Reinforcements: 7-gage x 1-1/4" x 10" in length.
    - b. Strike Reinforcements: 12-gage.
    - c. Closer Reinforcements: 12-gage.
    - d. Flush Bolt Reinforcements: 12-gage.
    - e. Reinforcements for Surface Applied Hardware: 12-gage.
    - f. Reinforcements for Hold Open Arms: 12-gage.
    - g. Reinforcements for Surface Panic Devices: 12-gage.

**2.5 FINISHING**

- A. Shop prime door and frame surfaces, using manufacturer's standard rust-inhibitive primer.
- B. Coat inside faces of door frames with approved sound deadening material.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Install steel door frames in accordance with the manufacturer's instructions and HMMA 861. Anchor frames to wall as recommended by the manufacturer. Secure door frames to floor with 2 fasteners at each jamb.
- B. Seal opening between door frames and exterior walls with sealants as indicated on the Drawings and as specified in Section 07 92 00, Joint Sealants.
- C. Frames must be installed plumb, level and square. Assist as necessary to insure that the door operates without binding, tightness, or stickiness from finish hardware installation.
- D. Fit doors to frame providing clearances as specified in HMMA 861.

**METAL DOORS AND FRAMES**

**3.2 ADJUSTING AND CLEANING**

- A. Adjust door clearances and hardware placement to allow for smooth operation.
- B. Clean frame surfaces and touch up scratched prime and factory finished paint.
- C. Seal openings between frame and wall as directed.

**END OF SECTION**



**WOOD DOORS**

**PART 1 - GENERAL**

1.1 WORK INCLUDED

- A. Provide interior wood flush face doors in number, rating, type, and size scheduled on the Drawings and as specified herein.

1.2 REFERENCES

- A. National Wood Window and Door Association, Inc. (NWWDA):
  - 1. NWWDA I.S.1-87: How to Store, Handle, Finish, Install, and Maintain Wood Doors.
  - 2. ANSI/NWWDA I.S.1-A SERIES (Latest Edition) Industry Standard for Flush Wood Doors.
- B. Architectural Woodwork Standards: AWS Section 9, Doors.
- C. National Fire Protection Association (NFPA):
  - 1. NFPA 80: Fire Doors and Windows.
  - 2. NFPA 252: Standard Test Methods for Fire Door Assemblies.
- D. Warnock-Hersey International (WHI), or Underwriter's Laboratories (UL), only, for fire labels.

1.3 SUBMITTALS

- A. Submit product data indicating construction, profiles, and veneers proposed. Submit manufacturer's information indicating the location where doors were manufactured.
- B. Provide certification letter from the manufacturer that the doors have been fabricated with the styles and rails bonded to the core and the panel sanded prior to the installation of the veneer.

1.4 QUALITY ASSURANCE

- A. The following programs are accredited by the Forest Stewardship Council:
  - 1. Green Cross Certification Program as administered by Scientific Certification Systems (SCS).
  - 2. SmartWood Certification Program as administered by Rainforest Alliance.
  - 3. Silva Forest Foundation as administered by Silva Forest Foundation.

1.5 GUARANTEE

- A. Provide written standard life-time of building guarantee. Include reasonable refinishing and rehanging costs. Replace any door not meeting these standards without cost to the Owner.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect during transportation handling and storage from surface damage, moisture, and soiling. Hang and protect doors soon as possible after delivery.

**PART 2 - PRODUCTS**

2.1 ACCEPTED MANUFACTURERS

- A. Algoma Hardwoods, Inc.
- B. Eggers, Inc.

**WOOD DOORS**

- C. Lynden Door, Inc.
- D. Marshfield Door Systems
- E. Oregon Door, Inc.
- F. Vancouver Door Company
- G. Or accepted substitute.

**2.2 DOOR CONSTRUCTION**

- A. Provide premium grade interior doors complying with NWWDA I.S.-1 and AWI, Type 1 with waterproof glue, hot press 5-ply construction.
- B. Non-Fire Rated Core: Premium Grade Architectural Doors to have solid particleboard, structural composite lumber (SCL), or stave lumber with stiles and rails bonded to the core and factory sanded prior to assembly of face veneers. Top and bottom rails shall be a minimum of 2-1/4" before trimming. All hardware is to be attached without through bolting.
- C. Edge Banding:
  - 1. Transparent Finished Doors: Construct of high quality hardwood matching/compatible in color and grain with face veneer. Wood materials shall originate in "certified well-managed" forests.
- D. Core Bonding: Bond all stiles and rails to the core using hot glue and pressure construction.
- E. Blocking for Hardware Mounting: All doors to have adequate blocking for mounting of hardware. Provide minimum 1" vertical stiles and 5" blocking at the top and bottom rails. Provide blocks for locks at 5" x 12" with blocking provided on both sides.
- F. Door Veneer For Transparent Door Finish: AWS Premium Grade Plain Sliced, White Maple with closed-grain hardwood edges. Veneer thickness is to be 1/50" minimum at 12% MC after factory sanding. Provide hot press glue construction. Finishing: See Section 09 91 00, Painting, for field transparent finishing.
- G. Wood Framed Door Lites: See door patterns as scheduled, provide square style wood stop beads for all openings of material to match the finish of the doors. Verify the door lite size with the hardware placement and notify the Architect if conflicts occur. Provide fire rated construction as required.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Condition doors to average prevailing humidity in the installation area prior to hanging.
- B. Door Hardware: Accurately locate hardware on doors by dimension, jig, and template. Carefully rout or bore all mortises to recess hardware. Predrill all screw fastening device holes. In addition, cut hinge mortises with not over 1/32" clearance in height and width. Install hardware perfectly fitted and in proper operation and adjustment. No through bolting will be allowed for hardware attachment.
- C. Seal jobsite cut surfaces under Section 09 91 00, Painting, before the final hanging of doors.
- D. Install wood doors in accordance with the manufacturer's instructions.
  - 1. Fit doors to frame for proper fit and uniform clearance at each edge, and machine for hardware per SDI-100 recommendations.

**WOOD DOORS**

2. Fit doors for width by planing and for height by sawing.
3. Clearances:
  - a. Allow maximum of 1/8" at jamb and head.
  - b. Allow maximum of 3/16" over threshold or saddle.
  - c. Allow 3/8" over decorative floor coverings, openings without saddles and thresholds, or as indicated.
  - d. Bevel lock and hinge stile edges 1/8" in 2" to operate without binding.
  - e. Undercut when specially noted on the Drawings or on the Schedule.
  - f. Fit for other clearances when required by special details, hardware, or floorcoverings as reviewed by the Architect.

**3.2 ADJUSTING AND CLEANING**

- A. Replace or rehang doors that do not swing or operate freely.
- B. Refinish or replace doors damaged during installation.
- C. Wipe all doors clean just prior to Substantial Completion.

**END OF SECTION**



**ACCESS DOORS AND PANELS**

**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Provide access door panels for access to walls and ceilings to access valves, controls, filters, fire dampers, electrical junction boxes and equipment as required for ongoing lubrication and servicing and replacement of smaller equipment items without demolition. Door size is to be as required for servicing or replacing the item but not smaller than 12" x 12".

**1.2 SUBMITTALS**

- A. Submit shop drawings and manufacturer's detail sheets for review before ordering. Show installation details, list all required parts and accessories. Indicate required modifications to standard products required for this installation.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Acudor Products Inc.
- B. J.L. Industries.
- C. KARP Associates.
- D. Larsen's Manufacturing Company.
- E. Milcor Limited Partnership.
- F. Or accepted substitute.

**2.2 MATERIALS**

- A. Style and model as applicable to ceiling and wall finish.
- B. Provide sizes as required for suitable maintenance access to concealed equipment and devices.
- C. Furnish screwdriver function latching on all non-rated doors. Door panels fastened to frames with continuous hinge. Supply with factory applied white rust inhibitive prime coat ready for painting.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Install all panels in accordance with the manufacturer's standard specifications and recommendations.
- B. Verify that reinforcing, backing and blocking required for solid anchorage is in place. Furnish with screw type fasteners long enough to anchor into supports.
- C. Furnish and install all units free from damage and to be in perfect operating condition.

**END OF SECTION**



**ALUMINUM-FRAMED STOREFRONTS**

**1.1 WORK INCLUDED**

- A. Section Includes: Storefront system, complete with reinforcing, fasteners, anchors, and attachment devices, and accessories necessary to complete work.
- B. The aluminum storefront and the aluminum window system manufacturer as specified in Section 08 51 13, Aluminum windows must be the same.

**1.2 REFERENCES**

- A. Aluminum Association (AA):
  - 1. DAF-45 Designation System for Aluminum Finishes.
- B. American Architectural Manufacturers Association (AAMA):
  - 1. AAMA 501 Methods of Test for Exterior Walls.
  - 2. AAMA 501.2 Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems.
  - 3. AAMA 503: Voluntary Specification for Field Testing for Metal Storefronts, Curtain Wall and Sloped Glazing Systems.
  - 4. AAMA 611 Voluntary Specification for Anodized Architectural Aluminum.
  - 5. AAMA 701 Voluntary Specifications for Pile Weatherstripping and Replaceable Fenestration Weatherseals.
  - 6. AAMA 1503 Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors, and Glazed Wall Sections.
  - 7. AAMA CW-10 Care and Handling of Architectural Aluminum From Shop to Site.
  - 8. AAMA SFM1 Aluminum Storefront and Entrance Manual.
- C. American Society for Testing and Materials (ASTM):
  - 1. ASTM A36 Structural Steel.
  - 2. ASTM A123 Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - 3. ASTM B209 Aluminum and Aluminum - Alloy Sheet and Plate.
  - 4. ASTM B221 Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.
  - 5. ASTM E283 Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors.
  - 6. ASTM E330 Test Method for Structural Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.
  - 7. ASTM E331 Test Method for Water Penetration of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.
- D. Glass Association of North America (GANA):
  - 1. Glazing Manual

**1.3 PERFORMANCE REQUIREMENTS FOR CURTAIN WALL**

- A. Air Infiltration: Tested in accordance with ASTM E283. Infiltration shall not exceed 0.06-cfm per square foot at a static air pressure differential of 6.24-psf.
- B. Water Infiltration: Tested in accordance with ASTM E331. No water leakage at a static air pressure differential of 15-psf as defined in AAMA 501.

**ALUMINUM-FRAMED STOREFRONTS**

- C. Uniform Load (CCCD Phase 2 - Wind Design Performance Requirements): A static air design load of 25-psf shall be applied to the positive and negative direction in accordance with ASTM E330. There shall be no deflection in excess of  $L/175$  of the span of any framing member at design load. At structural test load equal to 1.65 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2% of their clear spans shall occur.
- D. Thermal Transmittance (U-value): When tested to AAMA Specification 1503, the thermal transmittance (U-value) shall not be more than 0.45 BTU per hour per square foot per degree F.
- E. Condensation Resistance (CRF): When tested to AAMA Specification 1503, the condensation resistance factor shall not be less than 72 (frame) and 66 (glass).

**1.4 PERFORMANCE REQUIREMENTS FOR OPERABLE UNITS**

- A. Air Infiltration: Tested in accordance with ASTM E283. Infiltration shall not exceed 0.10-cfm per square foot of perimeter crack length at a static air pressure differential of 6.24-psf.
- B. Water Infiltration: Tested in accordance with ASTM E331. No water leakage at a static air pressure differential of 15-psf as defined in AAMA 501. No uncontrolled water leakage.
- C. Uniform Load: A static air design load of 50-psf shall be applied to the positive and negative direction in accordance with ASTM E330. There shall be no deflection in excess of  $L/240$  of the span of any framing member at design load. At structural test load equal to 1.65 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2% of their clear spans shall occur.
- D. Thermal Transmittance (U-value): When tested to AAMA Specification 1503, the thermal transmittance (U-value) shall not be more than 0.45 BTU per hour per square foot per degree F.
- E. Condensation Resistance (CRF): When tested to AAMA Specification 1503, the condensation resistance factor shall not be less than 56.

**1.5 SUBMITTALS**

- A. Product Data: Submit copies of manufacturer's published specifications and installation instructions.
- B. Shop Drawings: Submit shop drawings showing elevations and details of framing and doors. Indicate field dimensions, finish, hardware, glazing, thickness, flashing, and sealants.
- C. Office Samples: Submit samples of anodized aluminum factory finish for the Architect's review prior to fabrication.
- D. Test Reports: Submit certified test reports showing compliance with specified performance characteristics.

**1.6 QUALITY ASSURANCE**

- A. Installer Qualifications: Installer experienced to perform the work of this Section who has specialized in the installation of work similar to that required for this Project and who is acceptable to product manufacturer.



**ALUMINUM-FRAMED STOREFRONTS**

- B. Manufacturer's Qualifications: Manufacturer capable of providing field service representation during construction, approving acceptable installer and approving application method.
- C. Pre-Installation Meetings: Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions, and manufacturer's warranty requirements. The meeting shall be attended by the manufacturer's field service representative, the installer, the General Contractor, the Architect, and the Owner's Representative(s).
- D. On-Site Testing: The Owner will provide on-site testing of the water penetration and air infiltration to prove that the installed window units meet the design criteria specified above.

**1.7 SECURITY CORRINATION**

- A. Failure to review the entire construction document package should not relieve the respective contractor of the work required.
- B. If discrepancies or conflicts between the different areas of drawings or specifications are noted, immediately bring it to the attention of the Architect.
- C. Provide the coordination of the installation of the storefront systems with the Security Contractor so that the low voltage wiring can be routed within the system prior to its completion.

**1.8 DELIVERY, STORAGE, AND HANDLING**

- A. Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- B. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Deliver frame materials with slip sheets to protect the metal finish.
- D. Store materials in dry areas protected from exposure to harmful weather conditions and above the floor and away from construction activity.
- E. Handle curtain wall materials and components to avoid damage.
- F. Protect curtain wall materials against damage from elements, construction activities, and other hazards before, during and after storefront installation.

**1.9 WARRANTY**

- A. Manufacturer's Product Warranty Period: Submit manufacturer's warranty for 2-years from Date of Substantial Completion of the Project.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURER**

- A. Series 3000 Thermal Storefront System by OldCastleBuilding Envleope, 2" x 4 1/2"; center glazed.
- B. Series 403(T) Storefront System by EFCO, 2" x 4 1/2" center glazed.

**ALUMINUM-FRAMED STOREFRONTS**

- C. Trifab 451(T) Storefront System by Kawneer, 2" x 4 ½" center glazed.
- D. Or accepted substitute.

**2.2 MATERIALS**

- A. Material Standard: Extruded aluminum, ASTM B221, 6063-T54 alloy and temper.
- B. Member Wall Thickness: Each framing member shall provide structural strength to meet specified performance requirements.
- C. Tolerances: Reference to tolerances for wall thickness and other cross-sectional dimensions of curtain wall members are nominal and in compliance with AA Aluminum Standards and Data.
- D. Aluminum Finish: Permanodic AA-M12C22A44, AAMA 611, Architectural Class 1 color anodic coating in clear anodized aluminum finish.

**2.3 ACCESSORIES**

- A. Fasteners: Where exposed, stainless steel.
- B. Glazing Gaskets: Extruded EPDM rubber.
- C. Perimeter Anchors: Aluminum or steel. When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.
- D. Trim and Other Finish Closures: Special shapes and sizes as indicated on the Drawings and as otherwise required in the same thickness, finish and color as the curtain wall system. No module gap between filler panel and frame. Filler panel is to have insulation to control condensation.

**2.4 FABRICATION**

- A. Fabricate components per manufacturer's installation instructions and with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- C. Prepare components to receive anchor devices. Fabricate anchors.
- D. Arrange fasteners and attachments to conceal from view.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Site Verification of Conditions: Verify substrate conditions (which have been previously installed under other Sections) are acceptable for product installation in accordance with manufacturer's instructions. Verify openings are sized to receive curtain wall system and sill plate is level in accordance with manufacturer's acceptable tolerances.

**ALUMINUM-FRAMED STOREFRONTS**

- B. Field Measurements: Verify actual measurements/ openings by field measurements before fabrication. Show recorded measurements on shop drawings. Coordinate field measurements, fabrication schedule with construction progress to avoid construction delays.

**3.2 INSTALLATION**

- A. Storefront: Install storefront systems plumb, level and true to line, without warp or rack of frames with manufacturer's prescribed tolerances and installation instructions. Provide support and anchor in place.
- B. Dissimilar Materials: Provide separation of aluminum materials from sources of corrosion or electrolytic action contact points.
- C. Construction: Install sill members and other members in a bed of sealant or with joint filler or gaskets, to provide weathertight construction. Coordinate installation with wall flashings and other components of construction. Refer to Section 07 92 00, Joint Sealants.

**3.3 FIELD QUALITY CONTROL**

- A. Site Tests (Post Installation Testing): Conduct project site tests for air and water infiltration in the presence of the manufacturer's representative and the Architect. Architect will select storefront units to be tested. Tests not meeting specified performance requirements and units having deficiencies shall be corrected.
  - 1. Testing shall be performed by a qualified independent testing agency employed by the Owner.
  - 2. Per AAMA 503, including reference to ASTM E783 for Air Infiltration Test and ASTM E1105 Water Infiltration Test.
    - a. Air Infiltration Tests: Conduct tests in accordance with ASTM E783. Allowable air infiltration shall not exceed 1.5 times the amount indicated in the performance requirements or 0.09-cfm per square foot, whichever is greater.
    - b. Water Infiltration Tests: Conduct tests in accordance with ASTM E1105. No uncontrolled water leakage is permitted when tested at a static test pressure of two-thirds the specified water penetration pressure but not less than 10-psf.
- B. Manufacturer's Field Services: Provide manufacturer's field service consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions. Make corrections as recommended by manufacturer's field inspector.

**3.4 CLEANING AND PROTECTION**

- A. After installation, clean all metal surfaces to remove mortar, plaster, paint or other contaminants. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance. Remove construction debris from project Site and legally dispose of debris.
- B. Protect all work against damage until Substantial Completion of Project. Protect aluminum curtain wall system from damage from grinding and polishing compounds, plaster, lime, acid, cement, or other harmful contaminants.

**END OF SECTION**



ALUMINUM WINDOWS

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Provide projected windows at the storefront systems as indicated on the Drawings and as specified herein.
- B. The aluminum window and aluminum storefront entrance system manufacturer must be the same.
- C. At least 1% of windows (include at least one of each installation) shall be subjected to a pressurized test for moisture intrusion of at least four cycles of five minutes each in compliance with ASTM E1105 Procedure B.

1.2 REFERENCES

- A. ASTM International (ASTM):
  - 1. ASTM C1363: Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus.
  - 2. ASTM C509: Standard Specification for Elastomeric Cellular Performed Gasket and Sealing Material.
  - 3. ASTM E283: Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
  - 4. ASTM E330: Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls by Uniform Static Air Pressure Difference.
  - 5. ASTM E331: Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.

1.3 SYSTEM DESCRIPTION

- A. Minimum Thickness: 0.10" nominal for fixed frame and operating ventilator members.
- B. Air Infiltration Requirements: ASTM E283, maximum of 0.5-cfm per lineal foot of vent at 1.56 or 6.24-psf pressure, 25 or 50-mph wind. A-2 or A-3 Rating.
- C. Water Penetration Requirements: ASTM E331, no water during 15 minute test with 5 gallons/hour/square foot under pressure of 3.33, 6.24, or 10-psf to stimulate 37, 50, or 60-mph wind. A-2 or A-3 Rating.
- D. Structural Requirements: ASTM E330, under test pressure of +40-psf and -20-psf for 10 seconds each, no permanent deformation of structural members, glazing members, fasteners, or hardware.
- E. Thermal Requirements: AAMA 1502.6 minimum condensation resistance factor (CRF) of 38 or 47, ASTM C1363 maximum U value of 0.46.

1.4 SUBMITTALS

- A. Shop Drawings: Submit detailed drawings showing field dimensions, profiles, flashing, attachment, and sealants.
- B. Office Samples: Submit sample of aluminum finish for the Architect's review prior to fabrication.

**ALUMINUM WINDOWS**

- C. Test Reports: Submit independent laboratory test reports to indicate that the proposed window system meets the Air Infiltration, Water Retention, Structural, and Thermal requirements of this Section.

**1.5 WARRANTY**

- A. Provide 10 year warranty on window frames and 3 year warranty on window glass.

**PART 2 - PRODUCTS**

**2.1 WINDOW SYSTEM MANUFACTURERS**

- A. Oldcastle Glass ZS2750 Thermally broken storefront vent system.
- B. EFCO Corporation WV410 Thermally broken storefront vent system.
- C. Kawneer Glassvent UT Thermally broken storefront vent system.
- D. Or accepted substitute.

**2.2 MATERIALS**

- A. Aluminum Extrusions: 6063-T5 aluminum alloy.
- B. Anodized Aluminum Finish: Class II, Aluminum Association Standard, AAM 12C22A31. Color to match the storefront system: Clear Anodized.
- C. Hardware: Standard manufacturer's hardware of stainless steel or any other material that is completely corrosive resistance. Provide with lock and hinges as required. Provide 4-bar stainless steel arms for operating arm of the projected vent units.
- D. Weatherstripping: Extruded closed cell neoprene, ASTM C509 for fixed and operating ventilators.
- E. Glass: See Section 08 81 00, Glass Glazing.
- F. Screen Frame: 0.020", manufacturer's standard tubular roll-formed aluminum with pull tab.
- G. Screen Cloth: 18 x 14 fiberglass mesh secured by vinyl screen spline.
- H. Provide trim pieces and compensating channel mounting at the head as indicated.

**2.3 FABRICATION**

- A. Glazing Channel:
  - 1. Type: Outside glazed
  - 2. Drainage: Exterior weep holes in glazing pockets.
  - 3. Reglazing: Permitted without disassembly of ventilator or removal of ventilator from frame.
- B. Corner Joints:
  - 1. Ventilators: Mitered, angle reinforced, and epoxy bonded.
  - 2. Frames: Mitered, angle reinforced, and epoxy bonded, gas/metal arc welded, flash-welded, or mortised and tenoned.
  - 3. Sealed: Corners filled with elastomeric sealant.

**ALUMINUM WINDOWS**

- C. Weatherstripping: Continuous at perimeter, keyed to aluminum sections and replaceable after installation of windows.
- D. Glass: Install glass and apply glazing sealants as recommended by window frame and glass manufacturer.
- E. Assembly U-value: Maximum 0.46.
- F. Assembly SHGC: Maximum 0.40.

**PART 3 - EXECUTION**

**3.1 PREPARATION**

- A. Check window operation and close and lock operating sash prior to installing windows.

**3.2 INSTALLATION**

- A. Install windows in accordance with manufacturer's printed instructions. Set shims on 4 sides.
- B. Install screens at all ventilator openings.
- C. Set window frame in opening with sealant at perimeter as detailed.
- D. Apply silicone sealant to frame corners and window frame perimeter.
- E. Flash over window frame with concealed wall flashing at head, jamb, and sill as indicated.

**3.3 ADJUSTING AND CLEANING**

- A. Replace broken or defective glass prior to final completion of the Project.
- B. Adjust operating hardware for smooth operation.
- C. Clean window frames and glass prior to Substantial Completion. Clean weep holes.
- D. Check sash operation and correct units where sash does not operate smooth and with little effort from building occupants.

**END OF SECTION**





**DOOR HARDWARE**

**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Provide finish hardware for doors as scheduled on the Drawings and as specified herein.

**1.2 REFERENCES**

- A. National Fire Protection Association: NFPA 80, Fire Doors and Fire Windows.
- B. Americans with Disabilities Act (ADA): ADA Accessibility Guidelines for Buildings and Facilities (ADAAG).
- C. The National Fire Protection Association: NFPA 101, Life Safety Code.

**1.3 SUBMITTALS**

- A. Hardware Schedule: Submit 5 copies of the final hardware schedule. Comply with construction progress schedule requirements.
- B. Samples:
  - 1. Furnish only upon request and prior to submittal of the last draft of the hardware schedule and prior to delivery of hardware.
  - 2. Submit 1 sample of each exposed hardware unit, finished as required, and tagged with full description for coordination with the schedule.
  - 3. Samples will be returned to the supplier. Units that are acceptable and remain undamaged through submittal, review and field comparison procedures may, after final check of operation, be used in the work.
- C. Templates: Furnish hardware templates and copy of approved hardware schedule to each fabricator of doors and frames within 2 weeks after approval of hardware schedule.

**1.4 QUALITY ASSURANCE**

- A. Manufacturer: To the greatest extent possible, obtain each type of hardware from only 1 manufacturer.
- B. Supplier: Provide hardware supplier who has furnished hardware in the same market area as the project for a period of not less than 2 years, and who has in his employment an experienced hardware consultant who is available for project hardware consultation to the Owner, Architect, and Contractor.
- C. Labels:
  - 1. Provide hardware for fire-rated openings in compliance with NFPA Standard No. 80.
  - 2. Provide hardware that has been tested and listed by UL for the types and sizes of doors required, and complies with the requirements for the door and door frame labels.
  - 3. Where panic exit devices are required for fire-rated doors, provide UL label on exit device indicating "Fire Exit Hardware."
- D. ADA Compliance:
  - 1. Interior Doors: All interior doors are required to meet ADAAG requirement that the force for pushing or pulling open interior swinging egress doors, other than fire doors, shall not exceed 5-pounds. Any interior swinging egress door not meeting this requirement will not be allowed.
  - 2. Exterior Doors: The maximum opening force allowed is to not exceed 8-1/2-pounds.

**DOOR HARDWARE**

3. Interior Fire Doors: Conform to NFPA 101 for the opening forces for interior side-hinged or pivoted-swinging door leaves without closers. These forces shall not exceed 5-pounds while the forces required to fully open any door leaf manually in a means of egress shall not exceed 15-pounds to release the latch, 30-pounds to set the leaf in motion, and 15-pounds to open the leaf to the minimum required width.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Provide secure lock up for hardware delivered to the project, but not yet installed.
- B. Control the handling and installation of hardware items that are not immediately replaceable, so that the completion of the work will not be delayed by hardware losses, both before and after installation.
- C. Coordinate the delivery of hardware with the scheduled installation and fabrication of doors and frames.
- D. Tag each item or package separately, with identification related to the final hardware schedule. Include basic installation instructions in the package.
- E. Deliver individually packaged hardware items at the times and to the shop or field for installation, as directed by the Contractor.
- F. Key Delivery:
  1. Place sets of change keys in suitable individual envelopes tagged and plainly marked with the change number or symbol, door designation and all other identifying information as required. Assemble change key envelopes into 1 package and deliver to the Owner.
  2. Forward masterkeys by registered mail. See Section 01 70 00, Execution and Closeout Requirements.
  3. Place construction masterkeys in 1 envelope, clearly identified and deliver with the hardware.

**PART 2 - PRODUCTS**

2.1 ACCEPTABLE MANUFACTURERS

- A. Finish Hardware Manufacturers:

<u>Items</u>	<u>Specified</u>	<u>Approved</u>
Butts	Stanley	McKinley, Hager
Locks/Latchsets	Schlage	(No Substitution)
Door Closers	LCN	(No Substitution)
Stops & Holders	Glynn Johnson	Ives
Thresholds	Reese	Pemko
Kickplates	Quality	Tice, Builders Brass

**DOOR HARDWARE**

**MATERIALS**

- B. Fasteners:
  - 1. Furnish screws for installation, with each hardware item. Provide Phillips flat-head screws to match the hardware finish, or if exposed in surfaces of other work, to match the finish of such other work.
  - 2. Provide concealed fasteners for hardware units which are exposed when the door is closed whenever possible.
  - 4. Do not use through bolts where the bolt head or nut on the opposite face is exposed. Where it is not possible to adequately reinforce the work, use machine screws or concealed fasteners with flush heads.
  - 5. Provide fasteners that are compatible with both the unit fastened and the substrate.
- C. Hand of Door: The drawings show the swing or hand of each door leaf (left, right and reverse bevel). Furnish each item of hardware for proper installation and operation of the door swing as indicated.
- D. Hardware Finishes: Provide finish as scheduled at the end of this Section in the Hardware Schedule.
- E. Butts:
  - 1. Provide full mortise butts in exact width required to clear projection of trim.
  - 2. Provide butts with flat tips and retainer device to prevent rising during use.
  - 3. Provide butts for exterior out-swinging doors and where noted with non-removable pins.
  - 4. 4 ½" X 4 ½" sized butts at interior.
  - 5. Standard size doors shall have three hinges. Doors larger than 36" x 84" shall be installed with four hinges.
- F. Latch and Lock Sets:
  - 1. Design: Schlage D Series x Rhodes style Lever. No substitutions.
  - 2. Strikes: Provide locks and latches with curved lip wrought box strikes in matching metal and finish.
  - 3. Furnish with anti-friction latchbolts.
  - 4. 6 pin with interchangeable core.
  - 5. Keyways vary with each facility. Consult with Owner.
- G. Surface Door Closers:
  - 1. Type: Liquid-controlled, all weather fluid.
  - 3. 10 year factory guarantee of satisfactory performance on all hydraulic closers. 2 year warranty on all electrified closers.
  - 4. Provide closers that permit the door to open as far as construction conditions permit and do not limit the door swing.
  - 5. Provide closers with key-type regulating screws.
  - 6. Closers to have independent closing, latch and backcheck valves and adjustable spring power.
- H. Kickplates: Provide 10" high (unless scheduled otherwise) kickplates at all designated doors. Finish as scheduled. Provide with all edges beveled.
  - 1. Provide half height kick plate at high use areas. At all other areas use 12" high kickplate.
- I. Door Silencers: Provide 3 silencers for single acting single doors and 4 silencers for single acting pairs of doors in steel frames.

**2.2 KEYING AND KEY CONTROL SYSTEM**

**DOOR HARDWARE**

- A. Provide locks and cylinders with masterkeying, grand masterkeying, and construction masterkeying, using a 6 pin system, removable core cylinders. Key to existing master key system.
- B. Upon receipt of approved hardware schedules, hardware supplier shall request Architect to arrange a keying meeting between hardware supplier and the Owner. Submit a detailed keying schedule in triplicate for final approval prior to ordering locks and cylinders.
- C. Keys: Provide nickel silver keys in the following quantities:
  - 1. Change Keys: 3 keys each lock or cylinder.
  - 2. Key Blanks: 20 for each different keyway.
- D. Locksets to be provided with keying capability to accommodate great grand master key, grand master key and master key. Provide locksets with removable cores for construction period. Installation of final post construction keying to be done by Owner. Constructor to provide Door Schedule submittal referencing room numbers with associated key numbers to be used for final keying.

**PART 3 - EXECUTION**

**3.1 HARDWARE MOUNTING HEIGHTS**

- A. Where hardware mounting heights are not indicated in other Sections of this specification, use the following heights as a guide:
  - 1. Top Hinges: 5" header rabbet to top of hinge.
  - 2. Bottom Hinge: 10" finish floor to bottom of hinge.
  - 3. Center Hinge: Equal distance between top and bottom hinges.
  - 4. Locksets/Latchsets: 40" finish floor to center of knob.
  - 5. Deadlocks/Deadlatches: 60" finish floor to center of cylinder.
  - 6. Push Plates: 45" finish floor to center of plate.
  - 7. Door Pulls: 42" finish floor to center of pull.
  - 8. Other Hardware: Install in heights recommended by the manufacturers.

**3.2 INSTALLATION**

- A. Installation on Field Finished Surfaces:
  - 1. Wherever cutting and fitting is required to install hardware on field finished surfaces, install hardware and then remove and store hardware in a secure place during application of field finish.
  - 3. After completion of the field finish, reinstall hardware.
  - 4. Do not install surface-mounted items until field finishes have been completed.
- B. Install kickplates with oval-head full-thread screws spaced uniformly at a maximum of 5" on center along kickplate perimeter.
- C. Provide backing and blocking in walls where door stops or door holds are attached.

**3.3 ADJUSTING AND CLEANING**

- A. Check and adjust operating hardware and each door operation to ensure proper operation. Lubricate moving parts with type of lubrication recommended by the manufacturer. Use silicone type if no other recommended.

**DOOR HARDWARE**

- B. Verify that the doors have been installed plumb, level, and square, without binding, tightness, or stickiness from gaskets. The door must have smoothly operating door bottom seals and hinges. Door latching including fire and security hardware must operate smoothly without sticking. Adjust, repair, or replace any hardware that does not meet all of these requirements.
- C. Replace hardware that cannot be adjusted and lubricated to operate freely and smoothly as intended.

3.4 **HARDWARE SCHEDULE**

- A. Furnish the following hardware groups for each door as indicated on the Door Schedule, and as required for a complete project:

*Hardware Groups will be issued by addendum.*

**END OF SECTION**



**GLASS GLAZING**

**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Provide glass and glazing sealant systems for Storefront and operable aluminum windows as indicated on the Drawings and as specified herein.
- B. Provide all clips, glazier's points, blocks, felt, and other items required to set all glass throughout the building.

**1.2 REFERENCES**

- A. Federal Specifications (FS):
  - 1. FS DD-G-1403B: Float, Plate, and Sheet Glass.
  - 2. FS DD-G-1403B: Heat Strengthened and Tempered Glass.
- B. U.S. Consumer Product Safety Commission Standard: 16 CFR 1201, Safety Standard.
- C. American National Standards Institute: ANSI Z 97.1, Safety Glazing.
- D. National Fire Protection Association (NFPA).

**1.3 SUBMITTALS**

- A. Product Data: Submit product information on insulated glass systems and glazing accessories for review
- B. Samples: Submit two 12" x 12" samples of the insulated glass units for verification of appearance.

**1.4 QUALITY ASSURANCE**

- A. Do not perform glazing when temperature is below 40°F or when dust and wind conditions are detrimental to glazing work. Do not do any exterior glazing in wet weather except under cover.
- B. Comply with Glazing Manual by Flat Glass Marketing Association. Install safety glass to comply with United States Consumer Product Safety Commission Standard 16 CFR 1201, and ANSI Z 97.1.

**1.5 WARRANTY**

- A. Provide 3 year warranty on window glass.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Pittsburgh Plate Glass Co. (PPG) (Specification basis).
- B. Oldcastle Glass.
- C. AFG Glass.
- D. American St. Gobain Glass Co.
- E. Pilkington.

**GLASS GLAZING**

- F. Mississippi Glass Co.
- G. General Electric Co.
- H. Or accepted substitute.

**2.2 MATERIALS**

- A. Clear Insulated Glass: 1" thick, clear, thermal insulated glass. 1/4" thick float glass on outside face and 3/16" clear float glass on inside face with 9/16" air space hermetically sealed. Low E coating on inside pane. Provide manufacturer's 10 year guarantee.
- B. Clear Insulated Safety Glass: 1" thick, clear, thermal insulated safety glass. 1/4" thick clear tempered glass on outside face with 3/16" clear tempered glass on inside face with 9/16" air space hermetically sealed. Low E coating on inside pane. Provide manufacturer's 10 year guarantee.
- C. Tinted Insulated Safety Unit: 1" thick, tinted, thermal insulated unit. Provide with 10 year guarantee. Low E coating on the No. 2 surface.
  - 1. Outside Glass: 1/4" thick float glass of bronze tint, PPG Solarban 60 "Solarbronze"
  - 2. Inside Glass: 3/16" thickness, clear tempered safety glass, PPG "Herculite".
  - 3. Air Space: 9/16" air space hermetically sealed.
  - 4. Glass U-Value: 0.29
  - 5. Glass SHGC: 0.27

**2.3 GLAZING ACCESSORIES**

- A. Glazing Tape and Sealants:
  - 1. Glazing Tape: "3M" E.C. 1202 or accepted substitute. Color as selected by the Architect.
  - 2. Silicone Type Sealants: "Pecora BC-158", PTI "606", "Presstite No. 432", Tremco "Poly-Wej", or accepted substitute. Color as selected by the Architect.
- B. Setting Blocks: Solid Neoprene, 85-95 Shore A hardness.
- C. Spacers: Foam neoprene 40-50 Shore A hardness.
- D. Structural Sealants: Dow Corning #795 Silicon Sealant, Black, or General Electric SCS 1200 Series Silicone Structural Construction Sealant, high modulus. Black or Gray color as selected by the Architect. Use Dow Corning #790 Silicon Sealant for adhering glass to plastic laminate or plywood.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Cut glass to size required for measured opening. Provide adequate edge clearance and glass bit all around. Cut prior to tempering.
- B. Set glass with equal bearing along edges. Do not install sheets that have significant edge damage or other defects.
- C. Clean and dry surrounds and glazing rabbets. Remove and correct any defects, screw heads, nails, etc., in glazing rabbets that interfere with proper setting of glass. Wipe frame and glass with Xylol soaked, oil-free rag.



**GLASS GLAZING**

- D. Maintain original labels on each piece of glass, naming the manufacturer, quality, and thickness, except where cutting makes this impossible. Deliver other glazing materials in original containers, the manufacturer's labels thereon. Remove labels as soon as possible after their installation.

**3.2 EXTERIOR GLAZING**

- A. See the details on the Drawings, including all exterior windows and doors. Take special care to create strong edges and avoid edge damage. Place glass units with tinted or patterned glass to the exterior side.
- B. Provide glass with "Tinted Clean-Cut Edges". Do not install glass with flared edges at bottom. Do not seam or nip edges, scarf corners, bump or brush edges on metal or other hard surfaces.
- C. Use glazing tape between glass and stationary glazing stop. Cut tape with scissors from premeasured mark and handle with care to prevent deformation. Set horizontal tapes first then vertical, butting. Do not overlap. Tape set level with sight line. Compress at least 25% of thickness. Minimum finished thickness to be 3/32".
- D. Set glass on neoprene setting blocks, two per sill, spaced at quarter points, by not closer than 6" to the corner. Set glass unit firmly against the tape to assure good seal, then place another strip of tape continuous on the face of glass with top edge below sight line. Apply the stops and a bead of sealant in the void beveling off at the sight line to assure proper water runoff. Do not bed sash. Verify that weep holes are provided, three per sill.

**3.3 ADJUSTING AND CLEANING**

- A. Replace glass that is broken, damaged, or not weathertight prior to acceptance.
- B. Clean glass prior to Substantial Completion.
- C. Protect all glass from breakage. Reglaze wherever work or material are defective. Replace all glazing damaged prior to final acceptance of the work. Clean and remove all stains and excess glazing compound and sealants from glass, sash, and adjoining surfaces.

**END OF SECTION**



**GYPSUM PLASTERING**

**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Provide gypsum plaster systems for interior surfaces to match existing where patching existing walls as indicated on the Drawings and as specified herein.

**1.2 REFERENCES**

- A. American National Standards Institute: ANSI A42.1, Gypsum Plastering.
- B. ASTM International (ASTM):
  - 1. ASTM A641: Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
  - 2. ASTM A653: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - 3. ASTM C28: Standard Specification for Gypsum Plasters.
  - 4. ASTM C35: Standard Specification for Inorganic Aggregates for Use in Gypsum Plaster.
  - 5. ASTM C61: Standard Specification for Gypsum Keenes Cement.
  - 6. ASTM C206: Standard Specification for Finishing Hydrated Lime.
  - 7. ASTM C645: Standard Specification for Nonstructural Steel Framing Members.
  - 8. ASTM C754: Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel.
  - 9. ASTM C842: Standard Specification for Application Interior Gypsum Plaster.
  - 10. ASTM C1396: Standard Specification for Gypsum Board.

**1.3 SYSTEM DESCRIPTION**

- A. Surface Tolerances: For flat surfaces, do not exceed 1/4" in 8'-0" from plumb or level surfaces.

**1.4 SUBMITTALS**

- A. Submit product preparation instructions and recommendations, storage and handling requirements and installation methods.

**1.5 QUALITY ASSURANCE**

- A. Regulatory Agency Requirements:
  - 1. Comply with local building code and governing authorities requirements for fire rated walls, ceilings and soffits. When requested, provide UL design numbers for fire rated assemblies.
  - 2. Comply with requirements for seismic movement of the structure without structural failure of the wall, ceiling and soffit system.
- B. Field Samples: Provide 4 SF minimum sample of plaster finishes for the Architect's review prior to starting work. Acceptable samples may be incorporated in the Work.

**1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Packaging: Except for water and sand, deliver plaster materials in sealed containers or waterproof bags, fully identified with product information.
- B. Coordinate the delivery of materials with the installation to minimize storage periods.

**GYPSUM PLASTERING**

- C. Storage: Store plaster and steel materials in dry, ventilated space, under cover and 3" minimum above the floor.
- D. Handling: Protect steel framing members from excessive stress during the delivery and erection. Protect metal corner beads and trim from being bent or damaged.

1.7 SITE CONDITIONS

- A. Temperature Requirements: Do not begin plastering until building is enclosed or ambient temperature remains above 55°F.
- B. Ventilation: Provide exhaust ventilation for plaster during the curing period.

**PART 2 - PRODUCTS**

2.1 ACCEPTABLE MANUFACTURERS

- A. Obtain all components and materials of the gypsum plaster system from a single manufacturer, or from producers recommended by the manufacturer, unless otherwise indicated.
- B. Fasteners: Screws and powder actuated fasteners as recommended by manufacturer and ASTM C754 for application required. Type "G" and Type "S", bugle head, in required length and to suit requirement of application to wood studs. Nails will not be allowed for attachment to wood studs.
- C. Lath: Provide lath to match existing systems.
  - 1. Metal Lath: Deformed expanded, self-furring, galvanized, 3.4 pounds per square yard. USG 3/8" Riblath or accepted substitute.
  - 2. Gypsum Plaster Base Panel: ASTM C1396, 3/8" or 1/2" thickness. Use fire resistant base materials where required.

2.2 PLASTER MATERIALS

- A. Base Coat Plaster: ASTM C28.
- B. Finish Coat Plaster: Gauging Plaster, ASTM C28 or Keenes Cement, ASTM C61.
- C. Hydrated Finishing Lime: ASTM C206, Type S with maximum of 8% unhydrated oxides.
- D. Base Coat Aggregates: Sand conforming to ASTM C28 for ready mixed base coats or ASTM C35 for site mixed base coats.
- E. Finish Coat Aggregates: Clean white silica sand sized to match office sample or existing plaster surfaces.

2.3 ACCESSORIES

- A. Acoustical Sealants: Non-setting, non-staining, acoustically tested sealant. USG Acoustical Sealant, Tremco Acoustical Sealant, A.C. Horn Vulcatex Thriftube, or accepted substitute.
- B. Plaster Metal Trim: Manufacturer's standard 26-gage galvanized steel. All trim to have expanded metal flanges. USG #66 square edge casing beads with expanded flange, #1-A expanded corner bead, #75 or #100 control joint, and others as detailed, or accepted substitute.

**GYPSUM PLASTERING**

**2.4 MIXING**

- A. Quantity: Limit batch quantity to amount used before plaster starts to set.
- B. Retempering: Do not retemper plaster. Remove any plaster from the site that starts to set prior to placing.
- C. Mixing Equipment: Conform to ANSI A42.1. Clean tools and equipment before mixing. Use mechanical mixing equipment, except when mixing less than 1 bag of plaster material, plaster may be hand mixed.
- D. Proportioning: Proportion finish coat for a medium hard finish.

**PART 3 - EXECUTION**

**3.1 PREPARATION**

- A. Protection: Provide temporary covering on adjacent surfaces to eliminate splattering of plaster.
- B. Cleaning: Clean and remove loose material and other substances that will interfere with plaster bond to substrate.

**3.2 INSTALLATION OF VERTICAL FRAMING**

- A. Install framing members in accordance with manufacturer's printed instructions.
- B. Space framing and fasteners as required to meet allowable deflection and fire rating requirements, give proper support for the covering material. Comply with UL design requirements for fire rated assemblies. Space studs as indicated on the Drawings.
- C. Coordinate opening requirements for pipes, conduit, ducts and other items concealed within framing space.

**3.3 LATHING**

- A. Gypsum Base:
  - 1. In areas where gypsum base is scheduled for both walls and ceilings, install the ceiling first then the wall. Use base panels of maximum practical length to minimize end joints. Attach to framing with all edges over framing members using proper fasteners. Space fasteners at 12" on center in the field and 8" on center staggered on abutting edges. Drive flush with the surface of the panel for proper finishing. Fastener application below the surface of the panel, breaking of the surface of the paper, or too close to the edge of the board will not be acceptable.
  - 2. Cut panel neatly and fit around pipes, electrical outlets, mechanical work, etc. Remove any loose face paper at cuts and fill holes or openings with quick-setting plaster. Where panel appears loose from framing, install second fastener within 1-1/2" of the first.
  - 3. Finish in every location with metal edge and corner bead unless other finishing details are given and edge is covered with molding or trim. Install crack control joints to match existing wall.
- B. Metal Lath:

**GYPSUM PLASTERING**

1. Install metal lath with its long dimension across the supports and attach to framing at 6" on center. Wire tie lath at side laps not exceeding 9" on center. All fastenings, laps and installation shall conform to the Metal Lath Association Specifications and the recommendations of the Northwest Plaster Bureau.
2. Use expanded flange type corner bead, complete with clips and accessories. Provide control joints as applicable and as approved by Architect. Provide casing beads at perimeters of plaster surfaces, exposed and not concealed by molding or other finish. Install crack control joints to match existing wall. Cut lath at all expansion control joints.

3.4 INSTALLATION OF PLASTER OVER LATH MATERIALS

- A. Use skilled plasterers throughout the work. All surfaces rodged true to an even plane and free from humps and declivities, presenting a smooth and true surface. Protect all adjoining surfaces by covering as required. Neatness of the plasterer is of paramount importance.
- B. Patch of Existing Surfaces: Check the Drawings and the building site to determine areas requiring patching. Wherever patching is necessary or called for, perform this work using materials as specified. Trim areas to be patched to a straight line, vertical or horizontal line. The same materials are to be used as the material of the adjoining surfaces and finished the same. Exercise care in the finishing of the patched area, to feather and blend to the adjoining surface producing as invisible a joint as possible.
- C. Minimum Thickness: Apply gypsum plaster with minimum thickness when measured from face of plaster base to face of finished plaster surface, as established by ASTM C842 for the types of bases occurring in the work unless otherwise required for fire resistance ratings.
  1. Application of Base Coat on Metal Lath: Apply first (scratch) coat and second (brown) coat in accordance with ASTM C842. Level without application of water. Finish thickness of approximately 1" including the lath (scratch, brown with finish coat of Keenes Cement over metal lath).
  2. Application of Base Coat on Masonry and Concrete: Apply the base coat to masonry and concrete and double back to bring the plaster out to the grounds in accordance with ASTM C842. Level without application of water. Finish thickness of approximately 1/2" (3/8" brown coating with 1/8" finish).
  3. Application of Base Coat on Gypsum Base: Apply base coat in accordance with ASTM C842. Level without application of water. Finish thickness of approximately 1/2" (3/8" brown coating with 1/8" finish).
- D. Apply base coats with sufficient materials and pressure to form good bond on the base or substrate material. Scratch the first coat to rough surface then the brown coat brought out to the ground, rodged to a true surface and left rough to receive the finish coat.
- E. When brown coat has set hard and firm and is partially dry, or a thoroughly dry base coat has been evenly wetted, apply finish coat to a 1/16" to 1/8" thickness. Allow the finish coat to draw a few minutes, then trowel or float to a true, even surface free from blemishes.
  1. Scratch Coat or Brown Coat: Composed of a minimum of 1 sack of gypsum plaster to 3 cubic feet of sand.
  2. Sand Finish Coat: Composed of 2 parts lime putty, 3 parts 30 mesh white sand, and 1-1/2 parts Keenes Cement.
  3. Smooth Trowel Coat: Composed of 50 pounds lime putty to 100 pounds Keenes Cement.
  4. Finish Coat to Match Existing Finish: Composed of parts of lime putty, sand, and Keenes Cement to match the existing finish.

**GYPSUM PLASTERING**

**3.5 PATCHING EXISTING SURFACES**

- A. This subcontractor shall check the Drawings and building site to determine areas requiring patching in the area of the Work described on the Drawings. Wherever patching is necessary or indicated, perform this work using materials as specified. The same materials are to be used as the material of the adjoining surfaces and finished the same. Exercise care in the finishing of the patched area. Feather and blend to the adjoining surface to produce as invisible a joint as possible.

**3.6 ADJUSTING AND CLEANING**

- A. Defective Plaster: Plaster which is excessively cracked or crazed due to improper timing and curing will not be accepted. Remove and replace defective plaster, including plaster base materials, if damaged during removal of defective plaster.
- B. Cutting and Patching: Cut, patch, repair, and point-up plaster as required. Repair cracks and indented surfaces by moistening plaster and filling with new material, troweled or tamped flush with adjoining surfaces.
- C. Clean Up: Promptly remove plaster from floors and other surfaces which have been stained, marred or otherwise damaged during the plastering work. Restore damaged floors and surfaces as directed.

**END OF SECTION**





**GYPSUM BOARD**

**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Provide gypsum drywall partitions and ceilings on wood framing and wood furring or metal framing as indicated on the drawings. Include backing for applied finishes as scheduled on the Drawings.

**1.2 REFERENCES**

- A. ASTM International (ASTM):
  - 1. ASTM C473: Standard Test Methods for Physical Testing of Gypsum Panel Products.
  - 2. ASTM C475: Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
  - 3. ASTM C557: Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing.
  - 4. ASTM C754: Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel.
  - 5. ASTM C919: Standard Practice For Use of Sealants in Acoustical Applications.
  - 6. ASTM C1002: Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
  - 7. ASTM C1396: Standard Specification for Gypsum Board.
  - 8. ASTM D3273: Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
  - 9. ASTM E119: Standard Test Methods for Fire Tests of Building Construction and Materials.
- B. Gypsum Association:
  - 1. GA-214: Recommended Levels of Gypsum Board Finish.
  - 2. GA-216: Application and Finishing of Gypsum Panel Products.

**1.3 SYSTEM DESCRIPTION**

- A. Structural Requirements:
  - 1. Steel Framing Systems: Maximum deflection of L/240 for design loads.
  - 2. Steel Ceiling Suspension Systems: Maximum deflection of L/360 for design loads.
  - 3. Seismic Loads: Provide steel bracing members to carry loads created by seismic movement of the ceiling systems.
- B. System Tolerances: Do not exceed 1/4" variation in 8'-0" from plumb, level and true lines.

**1.4 SUBMITTALS**

- A. Product Data: Submit the manufacturer's specifications and installation instructions for each gypsum drywall product component, including other data as may be required to show compliance with these specifications.
- B. Submit product preparation instructions and recommendations, storage and handling requirements and installation methods.

**1.5 QUALITY ASSURANCE**

- A. Regulatory Agency Requirements:

**GYPSUM BOARD**

1. Comply with building code and governing authorities' requirements for fire-rated partitions and ceilings.
  2. Provide materials, accessories and use application procedures that have been listed and approved by UL, ICC, and tested in accordance with ASTM E119 for the type of construction scheduled. When requested, provide UL design numbers for fire-rated wall and ceiling assemblies.
- B. Field Samples: Provide 100 square foot minimum of in-place wall and ceiling joint and fastener treatment for the Architect's review prior to the joint finishing of gypsum board surfaces. The Architect will review smoothness and hiding of board joints and fasteners only. Acceptable samples may be incorporated in the work.
- 1.6 DELIVERY, STORAGE, AND HANDLING
- A. Coordinate the delivery of materials with the installation to minimize storage periods. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.
  - B. Store gypsum and steel materials in dry, ventilated space, under cover protected from weather, direct sunlight, and above grade floor slabs. Neatly stack gypsum boards flat to prevent sagging.
  - C. Protect structural members from excessive stress during delivery and erection.
  - D. Handle gypsum boards to prevent damage to edges, ends or surfaces. Protect metal corner beads and trim from being bent or damaged.
- 1.7 SITE CONDITIONS
- A. Temperature Requirements: Do not begin installing gypsum board until building is enclosed or ambient temperature remains above 55°F.
  - B. Cold Weather Protection: When ambient outdoor temperatures are below 55°F, maintain continuous, uniform, comfortable building working temperatures of not less than 55°F for a minimum period of 48 hours prior to, during, and following application of gypsum board and joint treatment materials or bonding of adhesives.
  - C. Ventilation: Ventilate building spaces as required to remove water in excess of that required for drying of joint treatment material immediately after its application. Avoid drafts during dry, hot weather to prevent too rapid drying.

**PART 2 - PRODUCTS**

**2.1 ACCEPTABLE MANUFACTURERS**

- A. Obtain all components and materials of the gypsum drywall system from a single manufacturer, or from producers recommended by the manufacturer, unless otherwise indicated.

**2.2 WALL FRAMING MATERIALS**

- A. Wood Framing: Existing or new indicated on Drawings and as specified in Section 06 11 00 WOOD FRAMING.

**GYPSUM BOARD**

- B. Fasteners: Screws and powder actuated fasteners as recommended by manufacturer and ASTM C754 for application required. Type "G" and Type "S", bugle head, in required length and to suit requirement of application to wood studs. Nails will not be allowed for attachment to wood studs.

**2.3 METAL FRAMING MATERIALS**

- A. Metal Studs: Provide studs in widths and dimensions as indicated on the Drawings, fabricated from 33,000-psi hot dipped (G60) galvanized steel, listed by ICBO for structural design properties.
  - 1. Stud gage is determinate on the length of the unsupported portion of the stud to meet the International Building Code Section 1607.13, Interior Walls and Partitions, requirements for 5 pounds per square foot minimum lateral force and a deflection ratio of 1/240.
  - 2. Heavy Gage C-Studs and Track: Drywall C-stud and track, ASTM A653, Grade A (33-ksi) for 18-gage and 20-gage and Grade D (50-ksi) for 14-gage and 16-gage. Provide with 1-1/4" flanges with return leg bent at a 90° angle 3/8" long. Runner track with 1-1/4" minimum legs.
  - 3. Light Gage Screw C-Studs and Track: ASTM C645, roll-formed, 25-gage zinc-coated steel with knurled flanges. Provide extended leg top runners where required to prevent structural loading of studs. Provide openings in webs for services at 24" on center maximum.
- B. Screw Furring Channels: ASTM C645, roll-formed, hat shaped, 25-gage hot dipped galvanized steel, knurled face, 1-3/8" wide by 7/8" deep with hemmed legs.
- C. Fasteners: Screws and powder actuated fasteners as recommended by manufacturer and ASTM C754 for application required. Type "G" and Type "S", bugle head, in required length and to suit requirement of application to 25-gage metal studs or wood studs. Type "S-12" in required length for attachment to heavier gage metal framing. Nails will not be allowed for attachment to wood studs.

**2.4 FACE AND BACKING BOARDS**

- A. Gypsum Face Panels: ASTM C1396. Long edges tapered. 5/8" thick, 48" wide, Type "X" gypsum core, UL classified.
  - 1. Use moisture and mold resistant type for walls and ceilings in the kitchen. Conform to ASTM C473, ASTM C1396 and ASTM D3273.
- B. Gypsum Base Panels: ASTM C1396, Type "X" fire retardant type, UL classified, with long edges tapered.

**2.5 GYPSUM ACCESSORIES**

- A. Acoustical Sealants: U.S. Gypsum Acoustical sealant, Tremco Drywall Sealant, A.C. Horn Vulcatex Thriftube, non-setting, non-staining, acoustically tested caulking, or accepted substitute.
- B. Acoustical Insulation: U.S. Gypsum Thermafiber sound attenuation fire blankets, 3" thick, 15-25 flame spread, smoke developed 0; Certainteed Acoustitherm Batts, Owens/Corning Fiberglas Sonobatts, unfaced, 3-1/2" thick, Type II, smoke developed 10; or accepted substitute.
- C. Screw Fasteners: ASTM C1002. No nailing of gypsum materials will be allowed.
- D. Fastening Adhesive for Wood Framing: ASTM C557. Supplement adhesive with permanent or temporary fasteners as recommended by the manufacturer.
- E. Laminating Adhesives: Product recommended by gypsum board manufacturer.

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- F. Gypsum Board Metal Trim: Manufacturer's standard 26-gage galvanized steel. All trim to have fine mesh expanded metal flanges. Fine mesh corner beads: Mini-Bead 800/900 by ClarkDietrich Building Systems, Niles Mini-Bead 800/900, Mini Veneer Bead by Phillips Manufacturing Co., or accepted substitute. Certainteed No-Coat Corner System.
- G. Interior Joint Reinforcing Tape: Fiber tape not less than 2-1/4" wide, ASTM C475.
- H. Interior Joint Treatment Materials: ASTM C475, ready-mixed type as recommended by gypsum wallboard manufacturer. Provide 2 separate grades, 1 specifically for bedding tapes and filling depressions and 1 for topping and sanding. Use chemical-hardening type for bedding and filling where required.
- I. Skim Coat: "First Coat" by U.S. Gypsum, Georgia-Pacific "Ready-Mix All-Purpose Joint Compound", or accepted substitute. Certainteed All Purpose Joint Compound. Certainteed Extreme All Purpose (for MMR or exterior soffits).

**PART 3 - EXECUTION**

**3.1 PREPARATION**

- A. Protection: Provide temporary covering to eliminate splattering of joint compound and spray texture on adjacent finished surfaces.
- B. Adjusting Location of Steel Framing: Coordinate ceiling suspension wire locations with plumbing, heating, ventilating, fire protection piping and electrical work. Adjust framing locations to align new finish flush with existing finish, where required.
- C. Suspension wires must be supported from structure above unless approved otherwise by the Architect.
- D. Do not bridge building expansion joints with support systems, frame both sides of joints with furring and other supports as indicated.

**3.2 INSTALLATION OF METAL FRAMING SYSTEMS**

- A. Comply with ASTM C754 for installation of studs, runners, and furring channels.
- B. Isolate system from building structure to prevent transfer of loading and deflections into metal support system, both vertically and horizontally. Provide slip or cushioned type joints to attain lateral support and avoid axial loading.
- C. Install runner tracks to floor and ceiling with approved fasteners located 2" from each end and spaced at not over 24" on center. Position metal stud framing and furring of size and spacing as detailed, but in any case not over 24" on center. Install additional studs as required at all partition intersections, corners and openings.
- D. Place studs against walls of dissimilar materials and anchor in place at not over 36" on center. Where a possibility of water penetration exists, install asphalt felt strips between studs and adjacent surface.
- E. Space framing and fasteners as required to meet allowable deflection and fire rating requirements, give proper support for covering material and as indicated on the Drawings. Comply with UL design requirements for fire rated assemblies.

**GYPSUM BOARD**

- F. Provide doubled 25-gage or single 20-gage drywall C-studs to support electrical equipment, fixtures, furnishings, fire extinguisher cabinets mounted on stud partitions and similar work to comply with applicable published recommendations of the gypsum board manufacturer.
- G. Coordinate opening requirements for pipes, conduits, ducts and other items concealed within framing space.
- H. Provide framed openings around items shown to be recessed within framing space. Install steel cold-rolled channels above and below wall openings to transfer loads to adjacent studs.
- I. Use 20-gage first stud on all frames supporting solid core doors and frames 36" to 48" in width. Frames over 48" in width, supporting double doors, shall have two 20-gage studs at each jamb. All stud assemblies supporting door jambs are to be securely anchored at the floor and run full height and secured to the structure above.
- J. Fill boxed studs or header beams with insulation equal to adjacent wall insulation where wall is indicated with thermal or noise control insulation.
- K. Acoustical Sealant: Seal sound insulating partitions by setting floor runners in a 1/4" diameter continuous bead of acoustical sealant. Apply acoustical sealant at all board to floor joints. Apply sealant at the perimeter of all objects penetration the wall system. Continue acoustical sealant vertically between studs and concrete or masonry walls. See the Drawings for locations of sound insulating partitions.
- L. Where studs are surfaced on one side only, or surfacing does not run full height of studs, the stud flanges must be laterally braced and braced to adjacent structure as recommended by the manufacturer to meet lateral design loads.
- M. Install 16-gage sheet metal backing plates not less than 6" wide and one or more stud spacing long at location of wall mounted hardware equipment or devices. Refer to accessory fixture list for location, type, size and installation.

3.3 INSTALLATION OF WALL, SOFFIT, AND CEILING PANELS

- A. General and Fire Rating Requirements:
  - 1. Comply with Gypsum Association Specifications GA-216.
  - 2. Install acoustical insulation where indicated, without gaps and with snug fit against studs and support where necessary to prevent movement or dislocation. Install full height of partition, unless otherwise indicated. Fit carefully behind electrical outlets and other work that penetrates partition or face of wall.
  - 3. Install panels of thickness indicated and as required meeting structural and fire rating requirements.
  - 4. Glue and screw wallboard to wood framing members as recommended by the manufacturer. Nailing of gypsum panels will no be allowed.
  - 5. For vertical partition wallboard installation, offset panel joints on opposite sides of stud framing.
  - 6. In areas where gypsum wallboard is scheduled for wall and ceilings, install the ceiling first then the wallboard.
  - 7. Verify that acoustical insulation is in place, where scheduled, prior to completing panel installation.

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8. Where partitions are sound or fire rated construction, acoustical sealant shall be applied to all cutouts and intersections with adjoining structure as described herein. This will require that the gypsum board be cut for loose fit around the partition perimeter leaving a space approximately 1/8" wide.
9. Cut board neatly and fit around pipes, electrical outlets, mechanical work, etc. Remove any loose face paper at cuts and fill holes or openings with quick setting plaster.
10. Use panels of maximum practical length to minimize end joints. Arrange joints on opposite sides of partition walls to occur on different studs and stagger butt joints on the same surface. Where partitions intersect exterior walls, start installation at exterior end to position butt joints as far away from exterior wall as possible. Board shall be brought into contact but not forced into place with all ends and edges neatly fitted. Bottom edge of gypsum board on walls shall be a maximum of 1/4" above floor.
11. Attach to framing with all edges over framing members using screw fasteners. Space screws at 12" on center on ceiling and 16" on center on walls, staggered on abutting edges. Power drive screws at least 1/32" deep. Space screws at not less than 3/8" from edge and ends of board. Where board may appear loose from framing, install second fastener within 1-1/2" for the first fastener.
12. While fasteners are being driven, hold the gypsum board in firm contact with underlying supports, fastening from the center of the board toward ends and edges. Drive fasteners home with heads slightly below surface, taking care to avoid breaking the paper face.
13. Install gypsum base panels as a substrate for face panels where 2 layers are required. Fasten both the base layer and face layer separately to framing members with screws.
14. Finish in every location with metal edge and corner bead unless other finishing details are given and edge is covered with molding or trim. Install control joints vertically at a maximum of 30 feet apart on unbroken wall surfaces whether shown on the Drawings or not. Extend control joint from head to ceiling and from window sill to floor. Verify all expansion joint locations with the Architect prior to installation of gypsum board.
15. Use water resistant type board on all wet and high moisture areas. Seal all cut ends and openings with recommended sealant.

3.4 SEALANT APPLICATIONS

- A. Partition Perimeter: Apply a 1/4" minimum bead of sealant on each side of plates, including those used at intersections with dissimilar wall construction. Immediately install gypsum board, squeezing sealant to form contact with adjacent surfaces. Fasten board as specified. Conform to ASTM C919 for sealant application.
- B. Partition Intersections: Seal edges of face layer of wallboard abutting intersection partitions, before taping and finishing.
- C. Openings: Apply a 1/4" bead of acoustical sealant around all cut outs to seal openings of electrical boxes, ducts, pipes and similar penetrations. Seal sides and backs of all electrical boxes.
- D. Control Joints: Before installing control joints, apply sealant in back of joint to reduce flanking sound path.
- E. Install acrylic latex sealant where required to fill exposed openings.

**GYPSUM BOARD**

**3.5 PATCHING EXISTING SURFACES**

- A. This subcontractor shall check the Drawings and building site to determine areas requiring patching in the area of the Work described on the Drawings. Wherever patching is necessary or indicated, perform this work using materials as specified. The same materials are to be used as the material of the adjoining surfaces and finished the same. Exercise care in the finishing of the patched area. Feather and blend to the adjoining surface to produce as invisible a joint as possible.
- B. Patched materials and surfaces must be finished so that existing and new materials match one another, not only in color but also in patterns and surface texture. The intent is to not have a patched appearance. In areas where partitions must be removed to create new areas, careful planning is required to ensure that finishes of the existing and the newly created surfaces are homogenous. The existing materials should blend into the new so that the transitions form one material to the other cannot be readily observed. IF the desired level of finish cannot be achieved, arrange contrasting materials in a pleasing design.

**3.6 FINISHING**

- A. Levels of Finish:
  - 1. Level 1: All joints and interior angles shall have tape set in joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable.
  - 2. Level 2: All joints and interior angles shall have tape embedded in joint compound and wiped with a joint knife leaving a thin coating of joint compound over all joints and interior angles. Fastener heads and accessories shall be covered with a coat of joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable. Mop down all walls after the final mud coat prior to priming. Joint compound applied over the body of the tape at the time of tape embedment shall be considered a separate coat of joint compound and shall satisfy the conditions of this level.
  - 3. Level 4: All joints and interior angles shall have tape embedded in joint compound and two separate coats of joint compound applied over all flat joints and one separate coat of joint compound applied over interior angles. Fastener heads and accessories shall be covered with three separate coats of joint compound. All joint compound shall be smooth and free of tool marks and ridges. Mop down all walls after the final mud coat prior to priming.
- B. Water Resistant Gypsum Board Substrate for Stainless steel and FRP wainscot: Level 2 finish.
- C. Exposed Board in Finished Areas: Level 4 finish.
- D. Water Resistant Cementitious Backing Board: Do not apply tape and compound at joints. Seal edges and joints with water-resistant sealant.

**3.7 CLEAN UP**

- A. Do not dispose of or leave excess drywall materials or debris on the premises. Leave each area "broom clean" after completing drywall work. Clean spots and spills of taping and finishing compounds off of all adjacent surfaces and equipment.

**END OF SECTION**





## ACOUSTICAL CEILING

### PART 1 - GENERAL

#### 1.1 WORK INCLUDED

- A. Provide acoustical ceilings, complete with suspension systems at locations indicated on the Drawings and as herein specified.
- B. Include the installation of a chain suspension system for the seismic attachment or light fixtures and other items that may be associated with the suspended ceiling system.

#### 1.2 REFERENCES

- A. ASTM International (ASTM):
  - 1. ASTM A568: Standard Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for.
  - 2. ASTM C635: Standard Specification for the Manufacturer, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings.
  - 3. ASTM C636: Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.

#### 1.3 SUBMITTALS

- A. Office Samples: Submit sample of ceiling panels and tiles to the Architect prior to ordering materials.
- B. Design Data: Submit diagram of ceiling horizontal and vertical loads on the ceiling suspension components. Indicated loads carried by the hanger wires, main runners, tees, wall angles, and diagonal bracing.

#### 1.4 QUALITY ASSURANCE

- A. Regulatory Agency Requirements: Add concealed structural supporting members to ceiling suspension system to resist seismic loads as required by local building officials.

### PART 2 - PRODUCTS

#### 2.1 SEISMIC RESTRAINT

- A. Suspended acoustical ceiling systems, with or without lighting fixtures or other ceiling mounted items shall comply with the requirements of ASTM C635 and ASTM C636.
- B. Provide three copies of Engineered Design calculations, drawings and documentation prepared by a Structural Engineer registered in the State of Oregon, showing compliance and classification of light, medium or heavy duty system. Include manufacturer's literature of ICBO Reports and identification of connection devices and approved loading capabilities.
- C. When using a standard 24" x 48" grid system in lieu of an Engineered Design, submit three copies of manufacturer's literature or ICBO Report indication as a light, medium or heavy duty system. Include fixture schedule and other ceiling supported equipment and their weight, with connection devices and approved loading capabilities.

ACOUSTICAL CEILING

- D. Ceiling areas of 144 square feet or less surrounded by walls that connect directly to the structure above shall be exempt from these standards.
- E. Heavy Duty classification systems shall be used where suspension system is used to support lighting fixtures or other equipment.

2.2 MATERIALS

- A. All ratings in conformance with the Acoustical and Insulation Materials Association Bulletin, latest edition.
- B. Acoustical Board: Wet-formed mineral fiber with nonperforated vinyl-face membrane. Provide in 24" by 48" by 5/8" thick size, Class A rating with a flame spread rating of 25 or under. Color white with light reflectance of LR-0.83, square edge detail, humidity-resistant HR-90. Armstrong #870, Pattern E, or accepted substitute.
- C. Suspension System:
  - 1. Main and cross tees, 1-1/2" deep, exposed surfaces finished with white baked enamel and with matching wall angles or as required to match existing.
  - 2. Retaining Clips: BERC2 – 2" Beam End Retaining Clip, 0.034" thick, hot-dipped galvanized cold-rolled steel per ASTM A568 – used to join main beam or cross tee to wall molding.
- D. Suspension Wires: Minimum 12-gage galvanized, soft annealed steel hanger wire.
- E. Spare Materials: Furnish 5% overrun in whole uncut tiles. Furnish from the same production run as that used in the installation. Deliver to the Owner for future repairs and maintenance.

PART 3 - EXECUTION

3.1 INSTALLATION OF ACOUSTICAL CEILING SUSPENSION SYSTEMS

- A. General: Grid location as indicated on reflected ceiling plan. Install in accordance with manufacturer's instructions and recommendations of Article 2, "Installation of Components", of ASTM C636.
- B. Main Runners: Install main runners at 48" on center with hanger wire support at not more than 48" on center. Wrap hanger wire at least 3 full turns.
- C. Tees and Moldings:
  - 1. Install cross tees at 24" on center and adjacent to recessed light fixtures not supported by main runners. Install flat splines or tee splines as recommended by manufacturer. Provide moldings where ceilings meet walls, partitions and other vertical elements.

ACOUSTICAL CEILING

2. Secure terminal ends of the runners by attaching the BERC-2 clip to the wall molding and attaching the runners to the BERC-2 clip. The runners shall have zero clearance at the perimeter on two adjacent walls and with 3/8" (9.5 mm) clearance on the opposite walls. The clip is attached to the wall molding by sliding the locking lances over the hem of the vertical leg of the wall molding. BERC-2 clips installed in this manner are an acceptable means of preventing runners from spreading, in lieu of spacer bars required in CISCA 0-2, which is referenced in ASCE 7, Section 9.6.2.6.2.1, which is referenced in IBC Section 1621. Except for the use of the BERC-2 clip as noted above, installation of the ceiling system must be as prescribed by the applicable code. Maximum ceiling weight permitted is 1.20 pounds per square foot (5.86 kg/m<sup>2</sup>). This construction is equivalent to that required by CISCA 0-2, which is referenced in ASCE-7, Section 9.2.6.2.1, and which is referenced in IBC Section 1621.
  - D. Fixture Loads Causing Excess Deflection: Independently support or supplementally support the grid within 6" of each corner. Such loads shall not cause rotation of runners more than 2° from vertical.
  - E. Trapeze Type System: Provide where obstructions preclude direct attachment. Support all runners within 8" of wall or discontinuity.
  - F. Positively attach light fixtures weighing less than 20 pounds to the suspension system. Fixtures weighing more than 20 pounds but less than 56 pounds shall include two 12-gage hangers from the fixture to the system hangers or the structure above. Support fixtures weighing more than 56 pounds directly from the structure. Support pendant hung fixtures independently from the structure above.
  - G. Lateral Loads: Provide channel diagonal bracing of suspended ceiling system as required to meet lateral loads of the ceiling during seismic activity.
- 3.2 INSTALLATION OF ACOUSTICAL CEILING PANELS
- A. Room centerline to match the center of the tile or edge of the tile as indicated on the Drawings.
  - B. Install ceiling panels in suspended grid system per the manufacturer's recommendations using clean hands or gloves.
- 3.3 ADJUSTING AND CLEANING
- A. Adjust grid height as required maintaining ceiling system leveled to within 1/8" in 12 feet. Bending or kinking of hangers not permitted.
  - B. Where required, locate hanger wire around mechanical, plumbing, fire sprinkler and electrical equipment.
  - C. Clean exposed ceiling suspension members prior to installation of ceiling panels of tile.
  - D. Remove and replace panels and tile improperly placed, broken, or damaged prior to Substantial Completion.
  - E. Clean surfaces of panels and tile or remove and replace as directed prior to Substantial Completion.
- 3.4 EXTRA STOCK
- A. Provide a quantity of each unique type or color equal to 5% of amount installed.

END OF SECTION



**RESILIENT BASE AND ACCESSORIES**

**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Provide resilient base in locations indicated on the Drawings and as herein specified:
  - 1. Replace the rubber base in the Dining C158 in the area where the door is infilled.

**1.2 SUBMITTALS**

- A. Samples: Submit 2 samples of each type and color of resilient base and trim accessory. Provide 2-1/2" long samples for each accessory.
- B. Submit product preparation instructions and recommendations, storage and handling requirements and installation methods.

**1.3 QUALITY ASSURANCE**

- A. Manufacturer: Provide each type of resilient base and accessory as produced by a single manufacturer, including recommended adhesives.

**1.4 PROJECT/SITE CONDITIONS**

- A. Maintain materials and areas of work at temperatures between 70°F and 90°F for not less than 48 hours before, during, and 48 hours after the material installation.
- B. Install resilient base and accessories after other finishing operations, including painting and installation of built-in casework have been completed.

**PART 2 - PRODUCTS**

**2.1 ACCESSORY MATERIALS**

- A. Rubber Base: Type I, 1/8" gage, top set with coved toe. Provide continuous roll lengths. Provide color and manufacturer to match existing.

**PART 3 - EXECUTION**

**3.1 INSTALLATION OF ACCESSORIES**

- A. Apply wall base to walls, columns, pilasters, casework and other permanent fixtures in rooms or areas where base is required.
  - 1. Install base in lengths as long as practicable with corners fabricated from base materials, mitered, or coped inside corners.
  - 2. Tightly bond base to substrate throughout length of each piece with continuous contact at horizontal and vertical surfaces.

**3.2 EXTRA STOCK**

- A. Deliver stock of maintenance materials to Bank. Furnish maintenance materials from same manufactured lot as materials installed and enclosed in protective packaging with appropriate identifying labels.

**RESILIENT BASE AND ACCESSORIES**

- B. Base Materials: Salvage left over materials to the Owner.

**END OF SECTION**

**URETHANE RESINOUS FLOORING**

**PART 1 – GENERAL**

**1.1 WORK INCLUDED**

- A. Provide resinous flooring system for the Kitchen flooring as specified herein.

**1.2 REFERENCES**

- A. ASTM International (ASTM):
  - 1. ASTM C579: Standard Test Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes.
  - 2. ASTM D523: Standard Test Method for Specular Gloss.
  - 3. ASTM D638: Standard Test Method for Tensile Properties of Plastics.
  - 4. ASTM D790: Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulation Materials.
  - 5. ASTM D1709: Standard Test Methods for Impact Resistance of Plastic Film by the Free-Falling Dart Method.
  - 6. ASTM D2240: Standard Test Method for Rubber Property – Durometer Hardness.
  - 7. ASTM D4060: Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser.
  - 8. ASTM D4541: Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers.
  - 9. ASTM F2170: Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.

**1.3 SYSTEM DESCRIPTION**

- A. The work shall consist of preparation of the substrate, the furnishing and application of a cementitious urethane based self-leveling seamless flooring system with flintshot quartz aggregate broadcast and urethane topcoat.
- B. The system shall have the color and texture as specified by the Owner with a nominal thickness of 3/16". It shall be applied to the prepared area(s) as defined in the plans strictly in accordance with the Manufacturer's recommendations.
- C. Cove base (if required) to be applied where noted on plans and per manufacturers standard details unless otherwise noted

**1.4 SUBMITTALS**

- A. Product Data: Latest edition of Manufacturer's literature including performance data and installation procedures.
- B. Manufacturer's Material Safety Data Sheet (MSDS) for each product being used.
- C. Samples: A 3" x 3" square sample of the proposed system. Color, texture, and thickness shall be representative of overall appearance of finished system subject to normal tolerances.

**1.5 QUALITY ASSURANCE**

- A. The Manufacturer shall have a minimum of 10 years experience in the production, sales, and technical support of epoxy and urethane industrial flooring and related materials.

**URETHANE RESINOUS FLOORING**

- B. The Applicator shall have a minimum of 5 years experience in installation of the flooring system as confirmed by the manufacturer in all phases of surface preparation and application of the products specified.
- C. No requests for substitutions shall be considered that would change the generic type of the specified System.
- D. System shall be in compliance with requirements of United States Department of Agriculture (USDA), Food, Drug Administration (FDA), and local Health Department.
- E. System shall be in compliance with the Indoor Air Quality requirements of California Section 01350 as verified by a qualified independent testing laboratory.
- F. A pre-installation conference shall be held between Applicator, General Contractor and the Owner to review and clarification of this specification, application procedure, quality control, inspection and acceptance criteria and production schedule.

**1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING**

- A. Packing and Shipping: All components of the system shall be delivered to the site in the Manufacturer's packaging, clearly identified with the product type and batch number.
- B. Storage and Protection:
  - 1. The Applicator shall be provided with a dry storage area for all components. The area shall be between 60°F and 85°F, dry, out of direct sunlight and in accordance with the Manufacturer's recommendations and relevant health and safety regulations.
  - 2. Copies of Material Safety Data Sheets (MSDS) for all components shall be kept on site for review by the Engineer or other personnel.
- C. Waste Disposal: The Applicator shall be provided with adequate disposal facilities for non-hazardous waste generated during installation of the system.

**1.7 PROJECT CONDITIONS**

- A. Site Requirements:
  - 1. Application may proceed while air, material and substrate temperatures are between 55°F and 85°F providing the substrate temperature is above the dew point. Outside of this range, the Manufacturer shall be consulted.
  - 2. The relative humidity in the specific location of the application shall be less than 85% and the surface temperature shall be at least 5°F above the dew point.
  - 3. The Applicator shall be supplied with adequate lighting equal to the final lighting level during the preparation and installation of the system.
- B. Conditions of new concrete to be coated with cementitious urethane material.
  - 1. Concrete shall be moisture cured for a minimum of 7 days and have fully cured a minimum of 14 days in accordance with ACI-308 prior to the application of the coating system pending moisture tests.
  - 2. Concrete shall have a flat rubbed finish, float or light steel trowel finish (a hard steel trowel finish is neither necessary or desirable).
  - 3. Sealers and curing agents should not to be used.
  - 4. Concrete surfaces on grade shall have been constructed with a vapor barrier to protect against the effects of vapor transmission and possible delamination of the system.



**URETHANE RESINOUS FLOORING**

- C. Safety Requirements:
  - 1. The Owner shall be responsible for the removal of foodstuffs from the work area.
  - 2. Non-related personnel in the work area shall be kept to a minimum.

1.8 WARRANTY

- A. Manufacturer warrants that material shipped to buyers at the time of shipment substantially free from material defects and will perform substantially to published literature if used in accordance with the latest prescribed procedures and prior to the expiration date.
- B. Dur-A-Flex, Inc. liability with respect to this warranty is strictly limited to the value of the material purchase.

**PART 2 – PRODUCTS**

2.1 ACCEPTABLE MANUFACTURERS

- A. Dur-A-Flex. (Specification Base)
- B. Or accepted substitute.

2.2 BASIC FLOORING DESIGN

- A. Basis of Design: (Self leveling broadcast quartz), urethane topcoat seamless flooring system.
  - 1. System Materials:
    - a. Topping: Dur-A-Flex, Inc. Poly-Crete SL resin, hardener and SL aggregate.
    - b. Aggregate: Dur-A-Flex, Inc. Flintshot quartz aggregate.
    - c. Topcoat: Dur-A-Flex, Inc. Poly-Crete Color-Fast resin, hardener and powdered aggregate.
  - 2. Patch Materials:
    - a. Shallow Fill and Patching (Up to 1/4" Thickness): Dur-A-Flex, Inc. Poly-Crete MD.
    - b. Deep Fill and Sloping Material (Over 1/4" Thickness): Dur-A-Flex, Inc. Poly-Crete WR.

2.3 PRODUCT REQUIREMENTS

- A. Topping: Poly-Crete SL.
  - 1. Percent Reactive: 100 %
  - 2. VOC: 0 g/L
  - 3. Bond Strength to Concrete ASTM D4541: 400-psi, substrates fails
  - 4. Compressive Strength, ASTM C579: 7,250-psi
  - 5. Tensile Strength, ASTM D638: 750-psi
  - 6. Flexural Strength, ASTM D790: 4,400-psi
  - 7. Impact Resistance @ 125-mils, MIL D-3134, 160 inch lbs: No visible damage or deterioration
- B. Topcoat: Poly-Crete Color-Fast
  - 1. Percent Solids: 100%
  - 2. VOC: 0 g/L
  - 3. Compressive Strength, ASTM C579: 7,800-psi
  - 4. Tensile Strength, ASTM D638: 4,200-psi
  - 5. Flexural Strength, ASTM D790: 1,000-psi
  - 6. Abrasion Resistance, ASTM D4060, CS-17 wheel, 1,000-gm load, 1,000 cycles: 30-mg loss

**URETHANE RESINOUS FLOORING**

7. Impact Resistance, ASTM D1709: 160 in.lbs
8. Shore D Hardness, ASTM D2240: 65
9. Gloss, ASTM D523, 600: Semi-gloss Appearance
10. Color: Dur-a-flex Dark Grey, Match existing color

**PART 3 – EXECUTION**

**3.1 EXAMINATION**

- A. Examine substrates, areas and conditions, with Applicator present, for compliance with requirements for maximum moisture content, installation tolerances and other conditions affecting flooring performance.
- B. Verify that substrates and conditions are satisfactory for flooring installation and comply with requirements specified.

**3.2 PREPARATION**

- A. General:
  1. New and existing concrete surfaces shall be free of oil, grease, curing compounds, loose particles, moss, algae growth, laitance, friable matter, dirt, and bituminous products.
  2. Moisture Testing: Perform tests recommended by manufacturer and as follows.
    - a. Perform relative humidity test using in situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 99% relative humidity level measurement.
    - b. If the relative humidity exceeds 99% then the Owner and/or Engineer shall be notified and advised of additional cost for the possible installation of a vapor mitigation system that has been approved by the manufacturer or other means to lower the value to the acceptable limit.
    - c. If the vapor drive exceeds 99% relative humidity or 20 lbs/1,000 sf/24 hrs then the Owner and/or Engineer shall be notified and advised of additional cost for the possible installation of a vapor mitigation system that has been approved by the manufacturer or other means to lower the value to the acceptable limit.
  3. Mechanical Surface Preparation:
    - a. Shot blast all surfaces to receive flooring system with a mobile steel shot, dust recycling machine (Blastrac or accepted substitute). All surface and embedded accumulations of paint, toppings hardened concrete layers, laitance, power trowel finishes and other similar surface characteristics shall be completely removed leaving a bare concrete surface having a minimum profile of CSP 4-5 as described by the International Concrete Repair Institute.
    - b. Floor areas inaccessible to the mobile blast machines shall be mechanically abraded to the same degree of cleanliness, soundness and profile using diamond grinders, needle guns, bush hammers, or other suitable equipment.
    - c. Where the perimeter of the substrate to be coated is not adjacent to a wall or curb, a minimum 1/4" key cut shall be made to properly seat the system, providing a smooth transition between areas. The detail cut shall also apply to drain perimeters and expansion joint edges.
    - d. Cracks and joints (non-moving) greater than 1/8" wide are to be chiseled or chipped-out and repaired per manufacturer's recommendations.
  4. At spalled or worn areas, mechanically remove loose or delaminated concrete to a sound concrete and patch per manufacturer's recommendations.

URETHANE RESINOUS FLOORING

3.3 APPLICATION

A. General:

1. The system shall be applied in three distinct steps as listed below:
  - a. Substrate preparation.
  - b. Topping/overlay application with quartz aggregate broadcast.
  - c. Topcoat application.
2. Immediately prior to the application of any component of the system, the surface shall be dry and any remaining dust or loose particles shall be removed using a vacuum or clean, dry, oil-free compressed air.
3. The handling, mixing and addition of components shall be performed in a safe manner to achieve the desired results in accordance with the Manufacturer's recommendations.
4. The system shall follow the contour of the substrate unless pitching or other leveling work has been specified by the Architect.
5. A neat finish with well-defined boundaries and straight edges shall be provided by the Applicator.

B. Topping:

1. The topping shall be applied as a self-leveling system as specified by the Architect. The topping shall be applied in one lift with a nominal thickness of 1/8".
2. The topping shall be comprised of three components, a resin, hardener and filler as supplied by the Manufacturer.
3. The hardener shall be added to the resin and thoroughly dispersed by suitably approved mechanical means. SL Aggregate shall then be added to the catalyzed mixture and mixed in a manner to achieve a homogenous blend.
4. The topping shall be applied over horizontal surfaces using 1/2" "V" notched squeegee, trowels or other systems approved by the Manufacturer.
5. Immediately upon placing, the topping shall be degassed with a loop roller.
6. Quartz aggregate shall be broadcast to excess into the wet material at the rate of 1 lbs/sf.
7. Allow material to fully cure. Vacuum, sweep and/or blow to remove all loose aggregate.

C. Topcoat:

1. The topcoat shall be mixed and applied per manufacturer recommended procedure.
2. The topcoat shall be comprised of three components, a resin, hardener and filler as supplied by the manufacturer.
3. The topcoat will be applied at the rate of 100 sf per kit (1.1 gal).
4. Non-Skid if required is broadcast at the rate of 1 lb per 100 sf and back rolled into the coating.
5. The finish floor will have a nominal thickness of 3/16".

3.4 FIELD QUALITY CONTROL

A. Tests and Inspections: The following tests shall be conducted by the Applicator:

1. Temperature: Air, substrate temperatures and, if applicable, dew point.
2. Coverage Rates: Rates for all layers shall be monitored by checking quantity of material used against the area covered.

3.5 CLEANING AND PROTECTION

- A. Cure flooring material in compliance with manufacturer's directions, taking care to prevent their contamination during stages of application and prior to completion of the curing process.
- B. Remove product edge masking.

**URETHANE RESINOUS FLOORING**

- C. Perform detail cleaning at floor termination, to leave cleanable surface for subsequent work of other sections.

**END OF SECTION**

**FIBERGLASS REINFORCED PLASTIC WALL PANELS**

**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Provide sanitary wall finish at locations indicated on the Drawings and as herein specified.

**1.2 REFERENCES**

- A. ASTM International (ASTM) ([www.astm.org](http://www.astm.org)):
  - 1. ASTM D256: Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics.
  - 2. ASTM D570: Standard Test Method for Water Absorption of Plastics.
  - 3. ASTM D 638: Standard Test Method for Tensile Properties of Plastics.
  - 4. ASTM D696: Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between -30°C and 30°C with a Vitreous Silica Dilatometer.
  - 5. ASTM D 790: Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
  - 6. ASTM D 2583 – Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.
  - 7. ASTM D 5319 – Standard Specification for Glass-Fiber Reinforced Polyester Wall and Ceiling Panels.
  - 8. ASTM D 3273: Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
  - 9. ASTM D 3274: Standard Test Method for Evaluating Degree of Surface Disfigurement of Paint Films by Fungal or Algal Growth, or Soil and Dirt Accumulation.
  - 10. ASTM E 84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
- B. UL ([www.ul.com](http://www.ul.com)):
  - 1. UL 2818 – GREENGUARD Certification Program for Chemical Emissions For Building Materials, Finishes And Furnishings.

**1.3 ACTION SUBMITTALS**

- A. Comply with Division 01.
- B. Product Data: Submit manufacturer's product data for each type of product required.
- C. Samples: Submit manufacturer's selection and verification samples for finish, colors, patterns, and textures.
  - 1. Submit 2 samples of each type of panel, trim, and fastener.
- D. Certificates: Submit manufacturer's certification that materials comply with specified requirements and are suitable for intended application.
- E. Test and Evaluation Reports: Submit reports showing compliance with specified performance characteristics and physical properties.

**FIBERGLASS REINFORCED PLASTIC WALL PANELS**

- F. Manufacturer's Instructions: Submit manufacturer's installation and storage instructions.
- G. Environmental Certifications: Submit certificates for GREENGUARD Indoor Air Quality and Children & Schools Certification.
- H. Manufacturer's Project References: Submit manufacturer's list of successfully completed FRP panel projects, including project name and location, name of architect, and type and quantity of FRP panels furnished.
- I. Installer's Project References: Submit installer's list of successfully completed FRP panel projects, including project name and location, name of architect, and type and quantity of FRP panels installed.

**1.4 CLOSEOUT SUBMITTALS**

- A. Comply with Division 01.
- B. Care and Maintenance Instructions: Submit manufacturer's care and maintenance instructions, including cleaning and repairing instructions.
- C. Warranty Documentation: Submit manufacturer's standard warranty.

**1.5 MAINTENANCE MATERIALS SUBMITTALS**

- A. Comply with Division 01.
- B. Extra Stock Materials:
  - 1. Deliver to Owner extra stock materials from same production run as products installed.
  - 2. Quantity: Furnish quantity of FRP panels equal to 15% percent of amount installed.
  - 3. Delivery, Storage, and Protection:
    - a. Comply with Owner's requirements for delivery, storage, and protection of extra stock materials.
    - b. Package extra stock materials with protective covering and include labels clearly identifying product name and manufacturer.

**1.6 QUALITY ASSURANCE**

- A. Manufacturer's Qualifications: Manufacturer regularly engaged, for a minimum of 10 years, in the manufacturing of FRP panels of similar type to that specified.
- B. Installer's Qualifications:
  - 1. Installer regularly engaged, for a minimum of 5 years, in installation of FRP panels of similar type to that specified.
  - 2. Employ persons trained for installation of FRP panels.
- C. Surface-Burning Characteristics: Determined by testing identical products according to ASTM E 84 by a testing agency acceptable to authorities having jurisdiction.
  - 1. Flame-Spread Index: 25 (Class A).

**FIBERGLASS REINFORCED PLASTIC WALL PANELS**

- 2. Smoke-Developed Index: 450 or less.
  - D. Environmental Certification: GREENGUARD Certification UL 2818.
- 1.7 DELIVERY, STORAGE, AND HANDLING
- A. Delivery Requirements: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
  - B. Storage and Handling Requirements:
    - 1. Store and handle materials in accordance with manufacturer's instructions.
    - 2. Keep materials in manufacturer's original, unopened containers and packaging until installation.
    - 3. Store materials in clean, dry area indoors at temperature and humidity conditions in accordance with manufacturer's instructions.
    - 4. Store materials on flat, level surface, raised above floor, with adequate support to prevent sagging.
    - 5. Store materials out of direct sunlight.
    - 6. Protect materials and finish during storage, handling, and installation to prevent damage.
- 1.8 PROJECT CONDITIONS
- A. Installation shall not begin until building is enclosed, permanent heating and cooling equipment is in operation, and residual moisture from drywall has dissipated.
  - B. During installation and for not less than 48 hours before, maintain an ambient temperature and relative humidity within limits required by type of adhesive used.
  - C. Provide ventilation to disperse fumes during application of adhesive.
- 1.9 AMBIENT CONDITIONS
- A. Do Not Begin Installation Until:
    - 1. Building is enclosed.
    - 2. Permanent heating and cooling equipment is in operation.
    - 3. Residual moisture from plaster, concrete, or terrazzo has dissipated.
  - B. During installation and within 48 hours before installation, maintain ambient temperature and relative humidity within limits required by type of FRP panel adhesive used and adhesive manufacturer's instructions.
- 1.10 WARRANTY
- A. Warranty Period: 1 year from date of purchase.
  - B. Limited Warranty Period: Prorated years 2 to 10 from date of purchase.

**PART 2 - PRODUCTS**

FIBERGLASS REINFORCED PLASTIC WALL PANELS

2.1 ACCEPTED MANUFACTURERS

- A. Crane Composites, Inc.
- B. Or accepted substitute.

2.2 FRP PANELS

- A. Fiberglass Reinforced Plastic (FRP) Panels: Verietex Wall Panels IPSA by Crane Composites, Inc.
  - 1. Collection: Classic.
  - 2. Texture: Sandstone.
  - 2. Composition:
    - a. Reinforcement: Random chopped fiberglass.
    - b. Resin Mix: Polyester/styrene copolymer, inorganic fillers, and pigments.
  - 3. Finish Panel Quality:
    - a. Panels shall have a wear side with a consistent finish. Color shall be uniform throughout as specified. The backside shall be smooth. The backside surface may have some variations which do not affect functional properties and are not cause for rejection.
    - b. Physical Properties:
      - 1) Flexural Strength (ASTM D790):  $14 \times 10^3$  psi | 97 MPa.
      - 2) Flexural Modulus (ASTM D790):  $0.4 \times 10^6$  psi | 2758 MPa.
      - 3) Tensile Strength (ASTM D638):  $7 \times 10^3$  psi | 48 MPa.
      - 4) Tensile Modulus (ASTM D638):  $0.7 \times 10^6$  psi | 3546 MPa.
      - 5) Barcol Hardness (ASTM D2583): 40 | 40.
      - 6) Izod Impact (ASTM D256): 4.0 ft-lb/in notched | 0.21 J/mm.
      - 7) Coefficient of Linear Thermal Expansion (ASTM D696):  $2 \times 10^{-5}$  10/10/°F |  $36 \mu\text{m}/\text{m}/^\circ\text{C}$ .
      - 8) Water Absorption (ASTM D570): 0.16%/24hrs@77°F | 25°C.
      - 9) Surface Burning Characteristics (ASTM E84): Class C
      - 10) Taber Abrasion (Taber Test): 0.015%Max Wt. Loss.
    - c. Dimensions shall be as specified on purchase order, subject to the following tolerances:
      - 1) Width:  $\pm 1/8''$  ( $\pm 3.2$  mm).
      - 2) Length:  $\pm 1/8''$  ( $\pm 3.2$  mm) up to 12' (3.7 m).
      - 3) Squareness:  $\pm 1/8''$  (3.2 mm) in 48'' (1.2 m) of width
    - d. Product quality standards and tolerances for panel weight and thickness shall be as set forth in Crane Composites' Quality Control Procedures/Standards.
    - e. Panels shall be installed in accordance with manufacturer's guidelines as set forth in the Crane Composites Installation Guide (Form #6876).
  - 4. Certifications:
    - a. Meets USDA/FSIS requirements.
    - b. Some products have been tested and meet the requirements FMVSS 302. For a list products that have been tested to this requirement, see manufacturer's test reports on manufacturer's website at [www.cranecomposites.com/testreports.html](http://www.cranecomposites.com/testreports.html).
    - c. FRP does not support mold or mildew (per ASTM D3273 and ASTM D3274).



**FIBERGLASS REINFORCED PLASTIC WALL PANELS**

- d. Meets minimum requirements of major model building codes for Class C interior wall and ceiling finishes of flame spread <200, smoke developed ≤450 (per ASTM E-84).
    - e. This panel has earned GREENGUARD® Indoor Air Quality Certification (Certificate #16349-410, 16364-410, 16351-410)) [greenguard.org](http://greenguard.org).
  - E. Panel Color: Morning Mist Gray 636.
  - F. Panel Dimensions:
    - 1. Nominal Thickness: 0.090 inch (2.3 mm).
    - 2. Wall Panel Size: As indicated on the Drawings.
- 2.3 ACCESSORIES
- A. Moldings, Trim, and Caps: Silhouette trims by panel manufacturer.
    - 1. Color: Match FRP panels.
  - B. Panel Adhesive: As recommended by FRP panel manufacturer for required substrates.

**PART 3 - EXECUTION**

3.1 EXAMINATION

- A. Examine areas to receive FRP panels.
- B. Examine Substrate Surfaces to Determine:
  - 1. Corners: Plumb and straight.
  - 2. Surfaces: Smooth, sound, and uniform.
  - 3. Nails or Screw Fasteners: Countersunk.
  - 4. Joints and Cracks: Filled flush and smooth with adjoining surfaces.
- C. Notify Architect of conditions that would adversely affect installation or subsequent use.
- D. Do not begin preparation or installation until unacceptable conditions are corrected.

3.2 PREPARATION

- A. Clean substrates to remove substances that could impair bond of adhesive, including oil, grease, dirt, dust, or other contaminants.
- B. Acclimate FRP panels by unpacking and placing in installation space a minimum of 24 hours before installation.
- C. Lay out FRP panels before beginning installation.
  - 1. Locate panel joints to provide equal panel widths at ends of walls.
  - 2. Locate panel joints to provide trimmed panels at corners a minimum of 12 inches (300 mm) wide.

**FIBERGLASS REINFORCED PLASTIC WALL PANELS**

**3.3 APPLICATION**

- A. Install FRP panels in accordance with manufacturer's instructions at locations indicated on the Drawings.
- B. Install FRP panels plumb, level, square, flat, and in proper alignment.
- C. Install FRP panels to be water resistant and washable.
- D. Install FRP panels with manufacturer's recommended gap for panel field and corner joints.
- E. Fasteners:
  - 1. Use fasteners in accordance with manufacturer's instructions to install FRP panels securely to supports.
  - 2. Pre-drill fastener holes in FRP panels, 1/8 inch (3.2 mm) greater in diameter than fasteners.
- F. Adhesive:
  - 1. Install FRP panels in full spread of adhesive.
  - 2. Follow adhesive manufacturer's instructions for application of adhesive.
- G. Install trim accessories with adhesive and nails or staples.
  - 1. Do not fasten through FRP panels.
- H. Sealant:
  - 1. Fill grooves in trim accessories with sealant before installing FRP panels.
  - 2. Bed inside corner trim in bead of sealant.
  - 3. Remove excess sealant and smears as FRP panels are installed.
  - 4. Clean in accordance with sealant manufacturer's instructions.
- I. Tolerances: Install FRP panels within manufacturer's installation tolerances.

**3.4 FIELD QUALITY CONTROL**

- A. Manufacturer's Field Services: If requested by Owner, provide manufacturer's field service consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
  - 1. Site Visits: 2.

**3.5 ADJUSTING**

- A. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Architect.
- B. Remove and replace with new material, damaged components that cannot be successfully repaired, as determined by Architect.

**3.6 CLEANING**

**FIBERGLASS REINFORCED PLASTIC WALL PANELS**

- A. Clean FRP panels promptly after installation in accordance with manufacturer's instructions.
- B. Do not use harsh cleaning materials or methods that could damage finish.

**3.7 PROTECTION**

- A. Protect installed FRP panels and finish surfaces from damage during construction.

**END OF SECTION**



PAINTING

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Interior Painting:
  - 1. Field finish the following as scheduled for field finishing.
    - a. Exposed plaster and gypsum board walls and ceilings.
    - b. Unfinished wood trim.
    - c. Metal door frames
    - d. Wood doors.
    - e. Exposed ductwork.
    - f. Other items as indicated on Drawings.
  - 2. Field paint all exposed factory finished HVAC wall grilles to match the surrounding paint color and as indicated by the Architect.
- C. Do Not Paint:
  - 1. Prefinished items, such as light fixtures, plumbing fixtures and finished door hardware.
  - 2. Finished metal such as anodized aluminum, stainless steel, finished brass or bronze.
  - 3. Moving parts of operating units, equipment identification, performance rating, name plates or code-required labels.

1.2 REFERENCES

- A. Oregon Administrative Rules (OAR), Department of Human Services, Public Health Division: Chapter 333, Division 70 Renovation, Repair and Painting Activities Involving Lead-Based Paint.
- B. Code of Federal Regulations: 40 CFR: Protection of the Environment.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's literature on each coating proposed for this Project. Obtain approval of coatings prior to ordering. Include the manufacturer's recommended minimum dry film thickness for each coating system. Indicate where the material is to be used.
- B. Office Samples:
  - 1. Submit Samples: For the Architect's review of color and gloss.
  - 2. Resubmit Samples: As requested until required color and gloss is achieved.
  - 3. Opaque Finish: Provide three 8" x 8" minimum size samples of each color and gloss.
  - 4. Transparent Finish: On actual wood surfaces provide three 4" x 8" minimum size samples for natural and stained wood finish.
- C. Submit product preparation instructions and recommendations, storage and handling requirements and installation methods.

1.4 QUALITY ASSURANCE

- A. Painter: Provide local subcontractor experienced in painting commercial buildings. Painting subcontractor must have 5 years' experience in projects of similar size.

**PAINTING**

- B. Field Samples:
  - 1. On actual building components, duplicate finishes on acceptable office samples.
  - 2. Provide wall and ceiling colors and finishes on minimum 50 square feet of in-place surfaces.
  - 3. Provide trim and equipment colors and finishes on minimum 10 lineal feet of in-place-surfaces.
  - 4. The Architect will approve for color, texture and sheen only.
- C. Fire Protection: Provide sufficient fire extinguishers of a type suitable for the control of fire originating in paint materials. Remove and dispose of, or safely store, all waste, empty containers and oily cloths off of the premises daily.

**1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Delivery: Deliver materials to each site in new, original and unopened containers bearing manufacturer's name, trade name, and label analysis.
- B. Storage: Store coatings in ventilated spaces with containers closed.
- C. Handling: Keep dust and open flame from coating materials while mixing and painting.

**1.6 QUALITY ASSURANCE**

- A. Maintain environmental conditions (temperature, humidity and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- B. Coordinate work with other operations and installation of finish materials to avoid damage to installed materials. Do not apply coatings materials until moisture or dust producing work or other appearance or performance impairing construction activities have been completed.

**PART 2 - PRODUCTS**

**2.1 ACCEPTABLE MANUFACTURERS**

- A. Rodda Paint Co. / Cloverdale Paint Co. (Specification Standard)
- B. Or accepted substitute.

**2.3 INTERIOR MATERIALS**

- A. Products listed below are approved for use in the Project. Other products may be used when approved by the Architect in writing.
- B. Painted Wood and Plywood - New and Existing:
  - 1. Primer: Rodda 502001 Unique II Enamel Undercoater.
  - 2. Second and Third Coats (select gloss): Rodda 523601 Master Painter UL VOC Satin or 543601 Master Painter UL VOC Semi-Gloss.
- C. Ferrous Metal:
  - 1. Primer: Rodda 508901 Metal Master Primer.
  - 2. Second and Third Coats: Rodda 548901 Multi Master Enamel
- D. Non Ferrous Metal:

**PAINTING**

1. Primer: Rodda 508901 Metal Master Primer.
  2. Second and Third Coats: Rodda 548901 Multi Master Enamel.
- E. Galvanized Metal:
1. Primer: Rodda 508901 Metal Master Primer.
  2. Second and Third Coats: Rodda 548901 Multi Master Enamel.
- F. Gypsum Board - Walls (Paint):
1. Primer: Rodda 503601 Master Painter UL VOC Drywall Primer.
  2. Second and Third Coats: Rodda 523601 Master Painter UL VOC Satin Latex.
- G. Gypsum Board - Ceilings:
1. Primer: Rodda 503601 Master Painter UL VOC Drywall Primer.
  2. Second and Third Coats: Rodda 523601 Master Painter UL VOC Satin Latex.
- H. Stained and Sealed Wood:
1. Toner Stain: Old Masters Water-Based Wood Stain; color as selected by the Architect to match existing transparent wood surfaces. (Provide color samples for the Architect's selection; install field samples for the Architect's approval.)
  2. Second Coat: Old Masters Water-Based Polyurethane 755xx Satin.
  3. Sanding: Sand lightly with 220 grit between coats.
  4. Third Coats: Old Masters Water-Based Polyurethane 755xx Satin.
  5. Sanding: Sand lightly with 220 grit between coats.
  6. Fourth Coat: Old Masters Water-Based Polyurethane 755xx Satin.

**PART 3 - EXECUTION**

**3.1 INSPECTION**

- A. Examination of Surfaces: Examine areas and conditions under which painting work is to be applied. Correct conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected.
- B. Contaminated Surfaces: Do not paint over dirt, rust, blistered paint, grease, wet substrates, or surface conditions detrimental to the formation of a durable paint film.
- C. Work Start: Start of painting work will be interpreted as the Applicator's acceptance of surfaces and conditions within any particular area.

**3.2 PREPARATION**

- A. Cleaning: Comply with coating the manufacturer's instructions for preparation and cleaning of each substrate.

PAINTING

- B. Protection:
1. Cover and protect adjacent finished surfaces.
  2. Remove hardware, machined surfaces, cover plates, lighting fixtures and prefinished items in place and not scheduled for field finishing, or provide surface applied protection. Reinstall removed items after finishing adjacent surfaces.
  3. Post "WET PAINT" signs during application and curing of all coatings that may be accessed by other trades or the public.
  4. Contractor shall take special safety precautions against hazards from toxic and flammable materials. Keep open flame, electrical and static spark and other ignition sources away from flammable vapors and materials at all times. Place paint and solvent contaminated cloths and materials subject to spontaneous combustion in sealed non flammable containers and remove from site every day.
- C. Priming:
1. Seal wood required to be job painted. Prime edges, ends, face, undersides and backsides of millwork and exterior painted wood.
  2. Provide finish coats that are compatible with prime paints used. Provide barrier coats over incompatible primers where required. Notify the Architect in writing of anticipated problems using specified coatings with substrates primed by others.
  3. Apply prime coat or first coat to material that is scheduled or required to be painted or finished.
  4. Touch up shop primed surfaces scratched or chipped prior to field finishing.
- D. Repair cracks, indentations, surface irregularities and abrasions. Do not start work until surfaces to be finished are in proper condition to produce finished surfaces of uniform satisfactory appearance.
1. Ensure substrates have moisture content within tolerances allowed by coating manufacturer. Where exceeding the following values, promptly notify BSD rep and obtain direction before beginning work.  
Concrete and Masonry: 13 percent. Cure minimum 28 days.  
Exterior Wood: 17 percent.  
Interior Wood: 15 percent.  
Interior Finish Detail Woodwork, including trim and casework: 10 percent.  
Plaster and Gypsum: 15 percent.  
Concrete Slab on grade: Perform calcium chloride test over 24 hour period or other test acceptable to manufacturer. Verify acceptable moisture transmission and ph levels.
  2. Stains & Marks: Remove completely, if possible, using materials and methods recommended by coating manufacturer; cover stains and marks which cannot be completely with isolating primer or sealer recommended by coating manufacturer to prevent bleed through.
  3. Remove mildew, algae and fungus using materials and methods recommended by coating manufacturer.
  4. Remove dust and loose particulate matter from surfaces to receive coatings immediately prior to coating application.
  5. Protect adjacent surfaces not indicated to receive coatings.
- E. Caulk to be installed after the application of primer. Use elastomeric and polyurethane paintable caulk. Use non sagging polyurethane for expansion joints and elastomeric around windows and doors. Use non sagging polyurethane caulk and foam backer rod for expansion joints. The backer rod needs to be slightly thicker than the expansion joint. Backer rod must be ½ to ¾ of an inch below the surface; caulking to fill until level with surface.



**PAINTING**

- F. Paint applied over existing painted finish in good condition. If presence of lead in existing coatings is suspected, cease surface preparation and notify BSD rep immediately.
1. Wall finish: Etch or sand, prime if needed. Fill all holes, caulk gaps between any adjacent painted substrates. Remove surface irregularities to produce uniform substrate for coating application; apply one coat of primer of type recommended by coating manufacturer for maximum coating adhesion.
- G. Surface Preparation of Specific Substrates:
1. Gypsum Board & Plaster: Repair cracks, holes and other surface defects, as required to create smooth surface and maintain proper surface adhesion. Apply joint compound for gypsum board or patching plaster for plaster and sand to produce surface flush with adjacent undamaged surface. Allow a full cure prior to coating application as recommended by the patching compound manufacturer's recommendations.
  2. Metals – Ferrous, Unprimed: Remove rust or scale, if present, by wire brush, power tool or sandblasting. Remove grease, oil and other contaminants which could impair coating performance or appearance by solvent cleaning. Clean welds, bolts and nuts with phosphoric acid solution; spot prime repaired welds with specified primer.
  3. Metals – Ferrous, Shop Primed: Remove loose primer and rust, if present, by scraping and sanding, feathering edges of cleaned areas to produce uniform flat surface; solvent clean surfaces and spot prime bare metal with specified primer, feathering edges to produce uniform flat surface.
  4. Metals – Galvanized Steel: Clean with a water based industrial strength cleaner, apply Glava Prep adhesion promoter followed by a clean water rinse; or wipe down surfaces using clean, lint free cloths saturated with xylene or lacquer thinner; followed by wiping the surface dry using clean lint free cloths. Test adhesion of primer to ensure performance.
  5. Metals – Stainless Steel: Clean surfaces with pressurized steam, pressurized water or waterbased industrial cleaner. Test adhesion of primer to ensure performance.
  6. Wood: Seal knots, pitch streaks and sap areas with sealer recommended by coating manufacturer; fill nail recesses and cracks with filler recommended by coating manufacturer. Sand surfaces smooth. Apply primer coat to back of wood trim and paneling.
  7. Existing Coatings – Repaint: Paint applied over existing painted finish in good condition. If presence of lead in existing coatings is suspected, cease surface preparation and notify Architect immediately.
  8. Wall Finish: Etch or sand, prime if needed, fill all holes, caulk gaps between any adjacent painted substrates.
  9. Remove surface irregularities by scraping or sanding to produce uniform substrate for coating application; apply one coat primer of type recommended by coating manufacturer or maximum coating adhesion.
- H. Existing Lead Base Paint: For renovations, repairs and painting (RRP) in "Child-Occupied Facilities" (where kids under the age of 6 regularly spend time and built before 1978), the General Contractor shall follow all Federal, State and local rules (including OSHA and US EPA rules and Oregon Administrative Rules Chapter 333, Division 70) associated with lead-based paints (LBP).
1. The Contractor is responsible for the identification of LBP hazards and providing engineering controls for trigger activities that disturb LBP.
  2. Any time painted surfaces are disturbed, the work must be performed by a certified firm with a trained and certified "renovator" in accordance with *40 CFR (including Part 745.82 Lead)*.
  3. Post the areas of the building that will be affected with appropriate signage warning of the potential hazard.

PAINTING

3.3 APPLICATION

- A. Methods and Coverage:
1. Apply painting and finishing materials in accordance with the manufacturer's directions. Use techniques best suited for the material and surfaces to which applied.
  2. For opaque finishes, apply additional coats when undercoats, stains or other conditions show through final paint coat, until paint film is of uniform finish, color and appearance.
  3. Where recommended by manufacturer, sand lightly between succeeding enamel or clear coats.
  4. Apply each material at not less than the manufacturer's recommended spreading rate, to provide a total dry film thickness of not less than amount recommended by coating manufacturer.
  5. Match approved office and field samples for color, texture and sheen.
  6. Paint exposed surfaces behind movable equipment and furniture same as adjacent surfaces.
  7. Paint surfaces behind permanently fixed equipment or furniture with prime coat only.
  8. Remove dust and other foreign materials from substrate immediately prior to applying each coat.
  9. Where coating application abuts other materials or other coating color, terminate coating with a clean sharp termination line without coating overlap.
  10. Re-prepare and recoat unsatisfactory finishes; refinish entire area to corners or other natural terminations.
  11. Repair coatings damaged by subsequent construction activities to achieve flat, uniform surface without surface defects visible from 5 feet. Where repairs cannot be made to Architect's acceptance, reapply finish coating to nearest adjacent change of surface plane, in both horizontal and vertical directions.
  12. Notify Owner's Representative prior to applying subsequent coats. Coats will only be considered in determining number of coats applied if BSD representative has been notified.
  13. Sheet: Match existing adjacent surfaces.
- B. Equipment Surfaces:
1. Paint interior surfaces of ducts where visible through registers or grilles, flat black.
  2. Except where accent colors are scheduled, paint mechanical and electrical work in finished areas including exposed ducts, piping, conduit, louvers, and grilles to match adjacent surfaces except when factory finished to color matching adjacent surface.
  3. Paint exterior exposed equipment where noted on the Drawings.
- C. Existing Surfaces: Existing walls to be repainted are to be cleaned, removing all scaled and loose paint. Wall areas that have been patched are to be primed and painted as specified for new work. The existing painted surfaces, after cleaning and spot priming as necessary, are to receive 2 finish coats of paint.
- D. Workmanship: Tint undercoats slightly darker than finish coat to aid Inspector in verifying coverage of each coat. Assume all responsibility for paint coats applied over surfaces and undercoats that have not been inspected and approved by Architect. Apply any additional coats of paint, as directed by Architect where surface preparation and undercoats have not been approved before painting. Make finished work match approved samples.
- E. Drywall and Plaster Surfaces: Paint shall not be applied to any surface until it is thoroughly dry and cured. Prime surfaces that show hot spots or alkali in order to prevent such blemishes from showing through the paint. Brush off all loose particles or crystals that may have formed.
- F. Colors: Refer to the Color Schedule included at the end of this Section. Colors have been selected from color chips in the Architect's office. Match the colors to these chips. Job mixing and tinting will not be allowed.

**PAINTING**

**3.4 ADJUSTING AND CLEANING**

- A. Remove, refinish or repaint work not in compliance with specified requirements. Recoat work not meeting minimum dry film thickness.
- B. Correct any painting related damage by cleaning, repairing or replacing and refinishing as directed.
- C. Repaint lines between accent colors as directed to obtain clean straight lines.
- D. Remove paint splatters from plastic laminate, resilient flooring, anodized aluminum, glass and similar finished surfaced.
- E. Touch up factory finished surfaces damaged during construction.
- F. Reinstall items that have been removed to protect from coating application.
- G. Remove protective materials.
- H. Protect completed coating applications from damage by subsequent construction activities.

**3.5 EXTRA STOCK**

- A. Deliver one gallon of each finish coating material, in sealed unopened original manufacturer's container, clearly marked with color and finish identification. Remove all other opened containers and dispose of in compliance with regulations.
- B. Keep list of stock delivered to Owner and submit with Closeout Manuals.

**3.6 COLOR SCHEDULE**

- A. General Interior Wall Color:
  - 1. Gypsum Board Walls: Match existing adjacent wall color.
- B. General Interior Ceiling Color: Match existing adjacent ceiling color.
- C. Interior Wood Trim: Match existing trim color.
- D. Interior hollow metal door frames: Match existing frame color.
- E. Interior wood doors: Match existing door color.
- D. Exposed Ductwork: Color as selected by Architect.
- E. Other Items: Color as selected by Architect.
- F. Sheen: Match existing adjacent surfaces.

**END OF SECTION**



**FOOD SERVICE EQUIPMENT**

**PART 1 - GENERAL**

1.1 SECTION INCLUDES: FOOD SERVICE EQUIPMENT

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

1.2 RELATED WORK

- A. Rough-ins and Final Connections: Service lines from rough-in to point of final connections are provided by plumbing and electrical contractors.
- B. Electrical: Wiring, conduit, fuses, breakers, final disconnects, junction boxes, and other required electrical apparatus not built-in or mounted on equipment are provided by electrical contractor.
- C. Plumbing: Controls, regulators, valves, stops, traps, strainers, checks, grease traps, and fittings not mounted on/in equipment are provided by plumbing contractor.
- D. Mechanical: Ductwork from above finished ceiling to building exhaust and supply fans, flue pipes, exhaust and supply fans for hoods, room ventilation, and air supply blowers are provided by mechanical contractor.
- E. Miscellaneous
  - 1. Provides backing plates or blocking in wall or ceiling partitions.
  - 2. Provides fittings secured to structural ceiling to accommodate hangers.
  - 3. Provides the forming of architectural enclosures, floor, wall openings or recesses for equipment.
  - 4. Caulks and seals Cold Storage Room floor sections to building floor.
  - 5. Finishes floors (masonry or poured-in-place) in cold storage rooms, concrete curbs and pads.

1.3 SYSTEM DESCRIPTION

- A. Delegated Design: Design canopy hoods with fire protection system, walk-in cold storage rooms, and seismic restraint of equipment using performance requirements and design criteria indicated, including comprehensive engineering analysis by a qualified professional engineer licensed by the State.
- B. Fabricated Equipment: Constructed to configuration, dimension, detail, and design as shown with materials and workmanship as specified.
- C. Manufactured Equipment: Mass produced and referenced by manufacturer's name and model number.
- D. Each model number includes the code \*H011 as a suffix. This code is known as the Specified Identification System. It is not to be removed by the bidders. Its purpose is to identify the Food Service Consultant to the vendors providing equipment in the event it is necessary to communicate questions, clarifications, and comments, from prior to bid award through the final purchase. It is to be used on all correspondence, including fax and e-mail, when communicating with manufacturer representatives and factories.

1.4 DEFINITIONS

- A. Furnish - Supply and deliver to Project Site, ready for unloading, unpacking, assembly, installation, and similar operations.

**FOOD SERVICE EQUIPMENT**

- B. Install (set in place) - Work at Project Site, including actual unloading, unpacking, assembly, erecting, rigging, placing, anchoring, applying, finishing, curing, protecting, cleaning, and similar operations, ready for final utility connections by other Sections as appropriate.
- C. Coordinate – Relay required information requested by other trades to ensure they are able to correctly perform their work related to the food service or laundry equipment installation.
- D. Provide - Furnish and install complete, ready for intended use.
- E. Kitchen Equipment Contractor (KEC) - All references to the Contractor in this Section 114000 shall refer to the Kitchen Equipment Contractor (KEC). Reference to any other Contractor shall be specific, such as General Contractor, Plumbing Contractor, Electrical Contractor, Architect, designated, etc.

1.5 LAWS, ORDINANCES AND STANDARDS

- A. STANDARDS: Except as otherwise indicated, comply with the following standards as applicable to the manufacture, fabrication, and installation of the work of this Section:
  - 1. Air Conditioning and Refrigeration Institute (ARI): Comply with the applicable regulations and references of the latest edition of standards for remote refrigeration system(s), components, and installation.
  - 2. American Gas Association (AGA): Comply with AGA standards for gas heated equipment and provide equipment with the AGA seal. Automatic safety pilots shall be provided on all equipment, where available. (Canadian Gas Association or alternate testing lab's seals may be accepted if acceptable to local code jurisdictions.)
  - 3. American National Standards Institute (ANSI): Comply with ANSI Z21-Series standards for gas-burning equipment and provide labels indicating name of testing agency.
  - 4. American National Standards Institute (ANSI): Comply with ANSI B57.1 for compressed gas cylinder connections and with applicable standards of the Compressed Gas Association for compressed gas piping.
  - 5. American National Standards Institute (ANSI): Comply with ANSI A40.4 and A40.6 for water connection air gaps and vacuum breakers.
  - 6. American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE): Comply with the applicable regulations and the latest edition of standards for remote refrigeration system(s), components, and installation.
  - 7. American Society of Mechanical Engineers (ASME): Comply with ASME Boiler Code requirements for steam generating and steam heated equipment and provide ASME inspection, stamp, and registration with National Board.
  - 8. American Society for Testing and Materials (ASTM): Comply with ASTM C1036 for flat glass.
  - 9. American Society for Testing and Materials (ASTM): Comply with ASTM C1048 for heat-treated flat glass – Kind HS, Kind FT coated and uncoated glass.
  - 10. American Welding Society (AWS): Comply with AWS D1.1 structural welding code.
  - 11. National Electric Code (NEC): Comply with NFPA Volume 5 for electrical wiring and devices included with food service equipment, ANSI C2 and C73, and applicable NEMA and NECA standards.
  - 12. National Electrical Manufacturers Association (NEMA): Comply with NEMA LD3 for high-pressure decorative laminates.
  - 13. National Fire Protection Association (NFPA): Comply with the applicable sections of the NFPA for exhaust hood, ventilators, duct and fan materials, hoods fire suppression systems, construction and installation, as well as local codes and standards.

**FOOD SERVICE EQUIPMENT**

14. National Sanitation Foundation (NSF): Comply with the latest Standards and Revisions established by NSF for equipment and installation. Provide NSF Seal of Approval on each applicable manufactured item and on items of custom fabricated work. (UL Sanitation approval and seal may be accepted if acceptable to local code jurisdictions.)
15. Sheet Metal and Air Conditioning Kitchen Equipment Contractor (KEC)'s National Association (SMACNA): Comply with the latest edition of SMACNA guidelines for seismic restraint of kitchen equipment and applicable local regulatory agencies requirements.
16. Underwriters Laboratories (UL): Provide either UL labeled products for electrical components and assemblies or, where no labeling service is available, "recognized markings" to indicate listing in the UL "Recognized Component Index". (Canadian Standards Association or alternate testing lab's seals may be accepted if acceptable to local code jurisdictions.)
17. UL 300 Standard: Wet chemical fire suppression systems for exhaust hoods/ventilators shall comply with these requirements.
18. American with Disabilities Act (ADA): Comply with requirements as applicable to this Project.
19. Refrigeration Service Engineers Society (RSES): Comply with the applicable regulations, the latest edition of standards for remote refrigeration system(s), components and installation, and the 1995 requirements of the Montreal Protocol Agreement.
20. All refrigerants used for any purpose shall comply with the 1995 requirements of the Montreal Protocol Agreement and subsequent revisions and amendments. No CFC refrigerants shall be allowed on this Project.
21. All refrigeration components installation, repairs, and/or associated work on any refrigeration system, self-contained or remote, shall be performed by a Certified Refrigeration Mechanic.
22. Comply with all applicable local codes, standards and regulations, and any special local conditions (example only: City of Los Angeles Testing Lab requirements or seismic standards compliance).
23. Jails, prisons, and all detention facilities shall comply with Correctional Standards as applicable to the specific Project. Verify the level of security and construction required with the Project Architect and provide all items in compliance. As a minimum, no part or component of any item provided shall be easily removable and used as a weapon.
24. Subway grating installed in floor drain troughs must meet IBC 1104.3.1 standards for maximum opening sizes in grates.
25. Confirm all drawings, specifications, and project documentation meet all federal, state, and local codes and regulations.

**1.6 KITCHEN EQUIPMENT CONTRACTOR (KEC) QUALIFICATIONS**

- A. In addition to requirements of Related Sections 1.02, submit evidence of compliance with the following qualifications and conditions:
  1. Five (5) years minimum continuous operation under the same company name and ownership.
  2. Evidence of Company's financial stability and financial ability to complete this Project without endangering that stability.
  3. List a minimum of comparable size and scope projects completed in the last five (5) years with Owner's contact name and telephone number.
  4. Have manufacturer's authorization to purchase, distribute, and install all items specified with this Project.
  5. Maintain a staff or have access to personnel with a minimum of five (5) years experience in the installation of comparable size and scope projects, and meeting NSF standards and requirements. (UL Sanitation standards and requirements may be accepted if acceptable to local code jurisdictions.)

**FOOD SERVICE EQUIPMENT**

6. Maintain or have access to a fabrication shop meeting NSF standards and labeling requirements. (UL Sanitation approval and seal may be accepted if acceptable to local code jurisdictions.) If other than the Kitchen Equipment Contractor (KEC)'s own fabrication shop, they shall have five (5) years minimum experience in the fabrication of comparable size, scope, and level of quality projects. The Kitchen Equipment Contractor (KEC) shall submit their company name and credentials to the Architect, who shall have the right of approval or disapproval
7. Maintain a staff or have access to personnel experienced in the preparation of professional style shop drawings and submittals.
8. Maintain or have access to manufacturer's authorized service personnel together with readily available stock of repair and replacement parts.
9. Any sub-Kitchen Equipment Contractor (KEC) employed by Kitchen Equipment Contractor (KEC) for this Project shall comply with the same qualification requirements.

1.7 SUBSTITUTIONS

- A. Refer to Division 1 for Substitution Request requirements.

1.8 APPROVED SUBSTITUTIONS AND/OR LISTED ALTERNATES

- A. Substitutions approved as noted in article 1.07 and/or any Listed Alternate Manufacturers listed in these Itemized Specifications or added by Addendum may be utilized in lieu of the primary specified manufacturer with the following conditions and understanding:
  1. The Project Documents are designed and engineered using the primary specified manufacturer and model. The Kitchen Equipment Contractor (KEC) shall assume total responsibility for any deviations required due to the utilization of a substitution/alternate manufacturer or model including, but not limited to, fitting alternates into the available space, providing directions for required changes, and assuming any and all associated costs for utility, building, food service design, architectural, or engineering changes directly or indirectly related to the substitution.
  2. The Kitchen Equipment Contractor (KEC) shall be responsible for supplying the model, which is equal to the primary specified model in regard to general function, features, options, sizes, accessories, utility requirements, finish, operation, and listing approvals. If the Owner or their appointed representative determines at any time during the construction and installation, prior to the final acceptance of the Project, that the substitution/alternate model submitted is not equal to the primary specified model, the Kitchen Equipment Contractor (KEC) shall assume all associated cost and implications required to replace the model submitted with the correct model.
  3. The bid proposal shall clearly state any substitutions/alternates which will be utilized, including the manufacturer and model number. The proposal shall also include a data sheet for each substitution/alternate with any and all deviations between the primary specified manufacturer and the substitution/alternate manufacturer itemized and listed on the data sheet. The manufacturers' cut sheets are not acceptable as a substitute for the data sheet. Complex alternates, such as utility distribution systems, exhaust hoods, ventilators, etc., shall include a shop drawing specific to the Project.
  4. Inclusion of an alternate manufacturer in the Itemized Specifications is not intended to indicate that there is an equal alternate unit to match every primary specified unit. It shall be the responsibility of the Kitchen Equipment Contractor (KEC) to ensure that the alternate unit submitted matches the primary specified unit and meets the other conditions, as stated above.
  5. Manufacturers not approved as substitutions or listed as a Listed Alternate will not be permitted unless submitted for prior approval, as described above and in the General and Supplementary Conditions and applicable Division-1 Specifications Sections.



**FOOD SERVICE EQUIPMENT**

6. Submittal of a substitution/alternate manufacturer or model shall indicate agreement to the above stated conditions. Solely at the Owner's discretion, failure to comply with any of these conditions or to supply complete and correct data information shall result in the Kitchen Equipment Contractor (KEC) being required to provide the primary specified manufacturer at no additional cost to the Owner or to adjust the Contract cost.

**1.9 DISCREPANCIES**

- A. Where discrepancies are discovered between the drawings and the specifications regarding quality or quantity, the higher quality or the greater quantity shall be included in the Bid Proposal. The Kitchen Equipment Contractor (KEC) shall notify the Architect, in writing, of any discrepancies discovered and await clarification prior to proceeding with the items or areas in question.

**1.10 SUBMITTALS**

- A. The Kitchen Equipment Contractor (KEC) shall review all submittals for basic compliance with the Contract Documents and correct as required prior to submitting to the Design Team (Architects/Engineers/ Consultants/Owner) for review. Failure to comply with this requirement, the submission of submittal(s) which are significantly inconsistent with the Contract Documents, or inconsistencies that are discovered during review by a Design Team member shall be justification for reimbursement by the Kitchen Equipment Contractor (KEC) to the Design Team member's company for the "lost" time or for the time required for a second review.
- B. Rough-In Drawings
  1. Submit electronic PDF file for approval. After approval, reproduce and supply the required number of distribution prints for record and construction purposes.
  2. Submit 1/4 inch (1:50) scale rough-in drawings for approval. These drawings shall be dimensioned from grid lines showing location of ducts, stubs, floor and wall sleeves for ventilation, plumbing, steam, electrical, refrigeration lines, beverage lines, concrete base and curb dimensions as required for equipment so supported.
  3. Site-verify mechanical, electrical and ventilating rough-in and sleeve locations.
  4. The Kitchen Equipment Contractor (KEC) shall be responsible for the accuracy of the information on their submittals.
  5. In the event rough-ins have been accomplished before the award of this contract, the Kitchen Equipment Contractor (KEC) shall check the existing facility and make adjustments to their equipment to suit building conditions and utilities, where possible. If not possible, the Kitchen Equipment Contractor (KEC) shall so state in a letter to the Owner and Architect with reasons and an alternate method and pricing.
- C. Shop Drawings
  1. Submit electronic PDF file for approval. After approval, reproduce and supply the required number of distribution prints for record and construction purposes.
  2. Submit shop drawings for items of custom fabrication included in this contract. Shop drawings shall be submitted at 3/4 inch (1:20) and/or 1-1/2 inch (1:10) scale and shall show dimensions, materials, details of construction, features and options, installation and relation of adjoining work requiring cutting or close fitting. Shop drawings shall also indicate reinforcements, anchorage and related work required for the complete installation of fixtures.
  3. Before proceeding with the fabrication of any item, the Kitchen Equipment Contractor (KEC) shall be responsible for verifying and coordinating all dimensions and details with site dimensions and conditions.

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- D. Product Data Submittal Manuals
1. Submit electronic PDF file of Product Data Submittal Manuals with a cover sheet and detailed information on every item included in this Section for approval. Detailed information shall include, but not be limited to, item number, description, quantity, model numbers, options and accessories provided, exact utility requirements, manufacturer's cut-sheets, reference to specific shop drawings, etc. Distribute one additional copy of installation and start-up instructions to the Installer. Mark each data sheet with the applicable project equipment item number. Each data sheet shall include NEMA plug and receptacle configuration for applicable items, where applicable. Every cover sheet and associated detailed submittal shall provide sufficient and complete information to verify that the Kitchen Equipment Contractor (KEC) is providing each item in compliance with the Contract documents.
  2. Architect review of drawings, shop details, product data brochures, and service and parts manuals are for general conformance with the design concept and contract documents. Markings or comments shall not be construed as relieving the Kitchen Equipment Contractor (KEC) from compliance with the contract documents or departures there from. The Kitchen Equipment Contractor (KEC) remains responsible for details and accuracy, for confirming and correlating all quantities and dimensions, for selecting fabrication processes, for techniques of assembly, and for performing their work in a safe, satisfactory, and professional manner.

1.11 OPERATION AND MAINTENANCE DATA MANUALS

- A. Operation and Maintenance Manuals (Service and Parts Manuals): Three (3) bound sets of manuals shall be furnished for items of standard manufacture on/or before the date of the first event to occur of the following: demo/start-up, start-up for intended use by the Owner/Operator, completion of installation of kitchen equipment contract package, or final acceptance of installation by Owner. Manuals shall be in alphabetical order according to manufacturer, including item numbers and utility options provided for the equipment installed.
1. Installing company's name, address, telephone number, and date of completed installation.
  2. Serial numbers of principal pieces of equipment.
  3. Part numbers of all replaceable items.
  4. Lubrication data and belt sizes.
  5. Electrical characteristics including data for motors and heaters.
- B. Service Agency List: Submit a complete list of local service agencies with the service and parts manuals for included manufacturers, complete with telephone numbers for all buy-out equipment installed.
- C. Provide video tapes for maintenance, training, operation, etc. where available from the manufacturer.

1.12 AS-BUILT/ RECORD DOCUMENTS

- A. Maintain one record set of Food service Equipment Plans with any related corrections, revisions, additions, deletions, changes, etc. noted during construction and installation. Provide an "as-built" set in reproducible transparency form and electronic computer disk form.
- B. Provide one (1) final set of Product Data Submittal Manuals with any related corrections, revisions, additions, deletions, changes, etc. noted during construction and installation as a specifications record set.
- C. These documents shall be provided on/or before the date of the first event to occur of the following: demo/start-up, start-up for intended use by the Owner/Operator, completion of installation of kitchen equipment contract package, or final acceptance of installation by Owner.

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- D. Provide two (2) final complete set of Submittals to be retained by Architect as a Record Set.

**1.13 SCHEDULE**

- A. General: Time is of the essence in this agreement. Acceptance constitutes a guarantee that the Kitchen Equipment Contractor (KEC) can and will obtain materials, equipment, and manpower to permit overall completion of the entire building project on schedule upon notice to proceed. The Kitchen Equipment Contractor (KEC) shall coordinate their work with the progress schedule, as prepared and updated periodically by the General Kitchen Equipment Contractor (KEC) or Construction Manager.
- B. The Kitchen Equipment Contractor (KEC) shall notify the Food service Consultant and the Architect in writing of anticipated delays not within the realm of control of the Kitchen Equipment Contractor (KEC) immediately upon the Kitchen Equipment Contractor (KEC)'s realization that delays are imminent.
- C. The Kitchen Equipment Contractor (KEC) will not be granted relief for failure to meet schedules or failure of manufacturers to meet promised delivery dates unless the Kitchen Equipment Contractor (KEC) can establish, in writing, that orders were received by the manufacturer with reasonable lead times.
- D. The Kitchen Equipment Contractor (KEC) shall pay extra charges resulting from special handling or air shipment in order to meet the schedule if insufficient time was allowed in placing factory orders.

**1.14 PRODUCT HANDLING**

- A. Delivery of Materials: Deliver materials (except bulk materials) in manufacturer's containers fully identified with manufacturer's name, trade name, type, class, grade, size, color, power requirement, if any, and item number.
- B. Storage of Materials, Equipment and Fixtures: Kitchen Equipment Contractor (KEC) is responsible for receiving and warehousing of equipment and fixtures until ready for installation. The Kitchen Equipment Contractor (KEC) will store materials, equipment, and fixtures in sealed containers. They shall be stored off the ground and under cover, protected from damage.
- C. Handling Materials and Equipment: The Kitchen Equipment Contractor (KEC) will verify and coordinate conditions at the building site, particularly door and/or wall openings and passages to assure access for all equipment. Pieces too bulky for existing facilities shall be hoisted or otherwise handled with apparatus as required. All special handling equipment charges shall be arranged for and paid for by the Kitchen Equipment Contractor (KEC).

**1.15 PRODUCT PROTECTION**

- A. The Kitchen Equipment Contractor (KEC) is responsible to protect their equipment against theft or damage during the progress of the project until final acceptance by the Owner. Items delivered to the job site at the Owner's or Contract Manager's request before the site is ready for installation should be signed for as approved by the Owner or Contract Manager.
- B. The Kitchen Equipment Contractor (KEC) will use all reasonable means to protect the materials of this Section before, during, and after installation and to protect the associated work and materials of the other trades.

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- C. Pre-fabricated walk-in boxes, on-site and installed in advance of the rest of the equipment are not to be used for general storage by other trades and should be locked before leaving the site. Damage and theft resulting from the failure to secure boxes shall be repaired or replaced at the Kitchen Equipment Contractor (KEC)'s own expense. The Kitchen Equipment Contractor (KEC) shall be available, as needed, to open and secure walk-in boxes for the other trades to perform their work related to these walk-in boxes, within the other trades' schedules as not to delay their work.
- D. Kitchen Equipment Contractor (KEC) will verify if the flooring is to be acid washed. In the event of this type of cleansing, any equipment constructed of stainless steel shall not be delivered until a minimum of 24 hours after the final cleansing is completed.

**1.16 WARRANTY**

- A. Work shall be guaranteed against defects for one (1) year from the date of operation of the equipment. The Kitchen Equipment Contractor (KEC) will provide a written warranty of each component to include work in this Section to cover all testing and re-testing as may become necessary for one year past the Contract final acceptance date. Any equipment, system, or element failing to perform as directed in this Section shall be repaired or replaced at no cost to the Owner (including labor and transportation), excluding replacement cost of damaged components or work caused by misuse of the equipment.
- B. Additional Warranty: Refrigeration systems shall include a start-up and one-year service and maintenance contract in addition to the regular one-year warranty as stated above, plus an additional four-year warranty on sealed portions of condensing units, including refrigerant lost. This shall include all refrigerators, ice cream makers and cabinets, ice makers, freezers, dispensers, walk-in coolers/freezers compressors, and/or any other items with refrigeration system(s).

**PART 2 - PRODUCTS**

**2.1 EQUIPMENT**

- A. Equipment schedule: Refer to schedule on Food service Drawings and Part 2 Itemized Specifications for equipment included in this Section.

**2.2 MATERIALS**

- A. Metals
  - 1. Stainless Steel: AISI Type 302/304, hardest workable temper, and No.4 directional polish. Standard gauges are noted in these specifications under Heading 2.04; Section B.1.
  - 2. Galvanized Steel Sheet: ASTM A526, except ASTM A527 for extensive forming; ASTM A525, G90 zinc coating, chemical treatment.

Note: Where painted finish is indicated, provide mill phosphatized treatment in lieu of chemical treatment.

- 3. Steel Sheet: ASTM A569 hot-rolled carbon steel.
- 4. Galvanized Steel Pipe: ASTM A53 or ASTM A120, welded or seamless, schedule 40, galvanized.
- 5. Steel Structural Members: Hot rolled or cold formed, carbon steel unless stainless steel is indicated.

Note: Galvanized Finish (G.I.): ASTM A123 hot-dipped zinc coating, applied after fabrication.

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6. Aluminum: ASTM B209B221 sheet, plate and extrusions (as indicated), alloy, temper and finish as determined by manufacture / fabricator, except 0.40-mil natural anodized finish on exposed work unless another finish is indicated.
- B. Plastic Laminate: NEMA LD3, Type 2, 0.050" thick, except Type 3, 0.042" for post-forming smooth (non-textured). Color and texture as selected by the Architect/Interior Designer.
1. Comply with NSF Standard No. 35.
  2. Veneered with approved waterproof and heat proof cement. Rubber base adhesives are not acceptable.
  3. Applied directly over close grained plywood, such as solid Mahogany or solid Birch, of selected, smooth, sanded stock to ensure a smooth ripple-free laminated surface; or commercial grade furniture particle board, Cortron or equal.
  4. If specified plywood or particle board is unavailable, submit specifications and sample of alternate material for approval. If specified for a "wet" area, only marine grade wood products will be approved for these areas.
  5. Exposed faces and edges shall be faced with 1/16 inch (1.6mm) thick material. Cover corresponding backs with approved backing and balancing sheet material. No unfinished exposed plywood/particle board will be acceptable.
- C. Hardwood Work Surfaces: Laminated edge grained hard maple (*Acer saccharum*), NHLA First Grade with knots, holes and other blemishes culled out, kiln dried at 8 percent or less moisture, waterproof glue, machined, sanded, and finished with NSF approved oil-sealer.
- D. Solid Surface Material (SSM): Unless otherwise specified, provide 1/2" thick 100% homogeneous filled acrylic material meeting ANSI Z124.6 Type 6, as manufactured by DuPont Company and known as Corian. Color(s) and pattern(s) as selected by the Architect/ Interior Designer.
1. Comply with NSF Standard No. 51.
  2. Acrylic adhesive shall be used for all joints.
  3. Install directly over 3/4" thick (minimum) substrate of close-grained plywood, such as solid Mahogany or solid Birch, of selected, smooth, sanded stock to ensure a smooth ripple-free surface or a commercial grade furniture particle board, Cortron or equal. Provide additional bracing and support as required by the SSM manufacturer.
  4. Fabrication shall be by a fabricator trained by DuPont factory authorized training personnel and Certified as a Commercial Corian Fabricator.
  5. Installation shall be by an installer trained by DuPont factory authorized training personnel and Certified as a Commercial Corian Installer.
  6. All fabrication and installation of Corian and all components attached to or installed in or through Corian shall be in compliance with manufacturer's instructions and the DuPont Corian Food Service Guidelines and Design Manual. Of particular concern are the sections, details, and instructions on the installation of drop-in or built-in hot or cold components.
  7. All other Solid Surface Material (SSM), which may be specified by others to be used in food service areas, must comply with NSF certification and ANSI Standard No. 51.
- E. Insulation
1. For low temperature applications, such as ice bins, cold pans, or fabricated under counter freezers, use urethane, rigid board foam or foamed-in-place, not less than 2 inches (50mm) thick, except that vertical surfaces of cold pans and ice bins may be 1 inch (25mm) thick. Insulation shall be bonded at joints to prevent condensation on exterior.
  2. For refrigerated applications, such as fabricated undercounter refrigerators, use urethane rigid board foam or foamed-in-place, or Styrofoam rigid board foam 2 inches (50mm) thick, bonded at joints.

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3. For heated type applications, such as plate warmers, use block type rock wool, minimum 1 inch (25mm) thick.
4. At counter tops, subject to heat from cooking equipment and refrigeration compressors, use 1 inch (25mm) thick B&Z Products (1-800-999-0890) Marinite I, or equal, to insulate underside of top.
5. Marinite material shall be added between freezer or refrigerator and 14 gauge (2.0) stainless steel top.
6. All insulation shall be fully encased or enclosed.

**F. Joint Materials**

1. Sealants: 1-part or 2-part, polyurethane or silicone based, liquid elastomeric sealant, non-solvent release type, Shore A hardness of 30, except 45 if subject to traffic. Sealants shall be NSF Listed for use in food zones. Installation shall comply with applicable requirements of NSF Standards.
2. Backer Rod: 3/8 inch or larger joints shall be polyurethane rod stock, larger than joint width.
3. Gaskets: Solid or hollow (but not cellular) neoprene or polyvinyl chloride, light grey, minimum of 40 Shore A hardness, self-adhesive or prepared for either adhesive application or mechanical anchorage.

**G. Paint and Coatings**

1. Provide the types of painting and coating materials which, after drying or curing, are suitable for use in conjunction with food service, durable, non-toxic, non-dusting, non-flaking, mildew resistant, and comply with governing regulations for food service.
2. Galvanize Repair Paint: MIL-P-21035.
3. Sound Deadener: NSF listed sound deadener material such as latex sound deadener for internal surfaces of metal work and underside of metal counters and tables between work top and underbracing.
4. Pretreatment: SSPC-PT2 or PT3, of FS TT-C490.
5. Primer Coating for Metal: FS TT-P-86, type suitable for baking, where indicated.
6. Enamel for Metal: Synthetic type, FA TT-P-491, type suitable for baking, where indicated.

**2.3 FABRICATED PRODUCTS**

**A. Hardware**

1. General: Manufacturer's standard, but not less than ANSI 156.9 Type 2 (Institutional), satin finish stainless steel or dull chrome finish on brass, bronze, or steel.
2. Hinged Door Hardware: Hinged doors shall be mounted with heavy duty NSF approved hinges with Component Hardware Group, Model No. P62-1010 pulls, or equal. Catches shall be heavy-duty magnetic type, except as otherwise indicated.
3. Drawer Hardware: Slides to be 200 pounds minimum capacity per pair, 300 series stainless steel, full extension, side-mounting, self-closing type, with stainless steel ball bearings and positive stops, Component Hardware Group Series S52, or equal. Pulls shall be Component Hardware Group, Model No. P62-1 012, or equal.
4. Sliding Door Hardware: Sliding doors shall be mounted on large, quiet ball bearing rollers in 14-gauge (2.0mm) stainless steel overhead tracks and be removable without the use of tools. Bottom of cabinet shall have stainless steel guide-pins and not channel tracks for doors.
5. All hardware shall be identified with manufacturer's name and number so that broken or worn parts may be replaced.

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**B. Casters**

1. Type and size as recommended by caster manufacturer, NSF approved for the type and weight of equipment supported, but not less than 5 inch (127mm) diameter heavy-duty, ball bearing, solid or disc wheel with non-marking grease proof rubber, neoprene or polyurethane tire, unless otherwise specified. Minimum width of tread shall be 1-3/16 inch (30mm). Minimum capacity per caster shall be 250 pounds (113.4kg), unless otherwise noted in itemized specifications.
2. Provide solid material wheels with stainless steel rotating wheel guard.
3. To be sanitary, provide sealed wheel and swivel bearings and polished plated finish per NSF.
4. Unless otherwise indicated, equip each item with two (2) swivel-type casters and two (2) fixed casters. Provide foot brakes on two (2) casters on opposite front corners of equipment.
5. Unless equipment item is equipped with another form of all-around protective bumper, provide circular rotating bumper above each caster, 5 inch (127mm) diameter tire of light grey synthetic rubber (hollow or closed-cell) on cadmium-plated disc.

**C. Plumbing Fittings, Trim and Accessories**

1. General: Where exposed or semi-exposed, provide bright chrome plated brass or polished stainless steel units. Provide copper or brass where not exposed.
2. Vacuum Breakers: Provide with food service equipment as listed in the itemized specifications.
3. Water Outlets: At sinks and at other locations where water is supplied (by manual, automatic or remote control), furnish commercial quality faucets, valves, dispensers or fill devices of the type and size indicated and as required to operate as indicated.
4. Waste Fittings: Except as otherwise indicated, furnish 2 inch (50mm) remote-lever waste valve and 3-1/2 inch (89mm) strainer basket.

**D. Electrical Materials**

1. General: Provide standard materials, devices and components as recommended by the manufacturer or fabricator, selected and installed in accordance with NEMA standards and recommendations and as required for safe and efficient use and operation of the food service equipment without objectionable noise, vibration and sanitation problems.
2. Before ordering equipment, confirm pertinent electrical requirements with the serving electrical utility, such as actual voltages available, number of phases and number of wires in the system.
3. Wire electrical work for fabricated equipment completely to a junction or pull box which is wholly accessible and mounted on the equipment. Wiring shall be labeled for outlet or item served. Verify local requirements for UL Listing on complete assembly and provide if required.
4. Components shall bear the UL label or be approved by the prevailing authority.
5. Provide Custom fabricated refrigerator units with vapor tight light receptacles, shatterproof lamps and automatic switches. Conceal wiring.
6. Controls and Signals: Provide recognized commercial grade signals, on-off push buttons or switches, and other speed and temperature controls as required for operation, complete with pilot lights and permanent signs and graphics to assist the user of each item. Provide stainless steel cover plates at control and signal electrical boxes. Locate controls and switches out of heat zones, in easily accessible locations that preclude accidental contact by employees.
7. Internal Wiring of Fixtures and Equipment
  - a. The Kitchen Equipment Contractor (KEC) shall be responsible for internal wiring of electrical devices built into or forming an integral part of fabricated equipment items. Wiring will be in metal conduit, connected to an accessible pull-box or j-box, and tagged for intended use. Refer to Section 26 Specifications for color coding of wiring.

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- b. Each standard item shipped in sections shall be properly connected internally and verified by the Kitchen Equipment Contractor (KEC).
- c. Furnish dish washers and conveyors internally wired to junction box or distribution panel as specified, including push button switches, motors, immersion heaters, solenoids, etc.
- d. Where light fixtures are specified or detailed as part of counters, furnish and install cases or fixtures, light fixtures, lamps and shields. Provide warm white lamps unless otherwise specified. If fluorescent light fixtures are specified, provide ballasts and include shields. Provide shields for all light fixtures.
- e. Wiring for built-in strip heaters or immersion-type elements shall be provided as follows:
  - 1) In heat zone: shall have UL approved insulation and be not less than 300-volt rated heat resistant insulation with nickel wire.
  - 2) Connection wiring extended in raceway or conduit to junction or pull box shall be not less than 600 volt rated heat resistant insulation covered wire, UL approved, or equal.
- f. Wiring for fabricated refrigerator and freezer cabinets shall be UL approved insulated cable from exterior junction box to internal components, within insulation unless code requires metallic conduit:
  - 1) Conduit shall be Electrical Metallic Tubing, rigid or flexible (Greenfield). For freezer applications, Seal-Tite Flex or approved equal shall be used.
  - 2) Internal wiring shall be UL approved rubber covered 600 volt rated conductor, except door heaters, which shall be Nichrome wire with silicone braided jacket, having resistance of 10.4 watts per lineal foot.
  - 3) Mount convenience outlets, lighting receptacles, (rubber or porcelain) and door switches in approved boxes. Convenience outlets for evaporators shall be twist lock type. Solid connections, as for freezer evaporators, shall be made vapor tight.
- g. Exposed flexible steel conduit on kitchen equipment shall be neoprene jacketed Seal - Tite conduit equal to Anaconda type "UA". UL approved, complete with approved liquid tight connectors on each end, and designed to provide electrical grounding continuity.
- h. Exposed electrical conduit used in kitchen wet area applications, except for flexible connections, shall be rigid galvanized steel. Thin wall conduit (EMT) shall not be permitted for wet areas. Exposed outlet boxes shall be liquid tight type, with threaded hubs.
- 8. Convenience and Power Outlets
  - a. Make cutouts and install appropriate boxes or outlets in fabricated fixtures, complete with wiring, conduit, outlet and stainless steel cover plate.
  - b. Outlets and plugs shall conform to NEMA standards.
  - c. Electrical outlets and devices shall be first quality "Specification Grade".
  - d. Furnish GFCI outlets where adjacent to sink compartments, as per the National Electrical Code.
- 9. Plugs and Cords: Where cords and plugs are provided, they shall comply with National Electrical Manufacturer's Association (NEMA) requirements. Indicate NEMA configuration for each applicable item.
- 10. Heating Equipment
  - a. Install electric and heating equipment as to be readily cleanable or removable for cleaning.



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- b. Steam heated custom fabricated equipment shall be a self-contained assembly, complete with control valves located in an accessible position.
- 11. Motors: Totally enclosed type, except drip-proof type where not exposed to a dust or moisture condition; ball bearings, except sleeve bearings on small timing motors; windings impregnated to resist moisture; horse-power and duty-cycle ratings as required for the service indicated.
- 12. Power Characteristics: Refer to Division 26 specifications for project power characteristics. Also, refer to individual equipment requirements, for loads and ratings.

**2.4 FABRICATION OF METAL WORK**

**A. General Fabrication Requirements**

- 1. Remove burrs from sheared edges of metalwork, ease the corners and smooth to eliminate cutting hazard. Bend sheets of metal at not less than the minimum radius required to avoid grain separation in the metal. Maintain flat, smooth surfaces without damage to finish.
- 2. Reinforce metal at locations of hardware, anchorages, and accessory attachments wherever metal is less than 14 gauge (2.0mm) or requires mortised application. Conceal reinforcements to the greatest extent possible. Weld in place, on concealed faces.
- 3. Exposed screws or bolt heads, rivets, and butt joints made by riveting straps under seams and then filled with solder will not be accepted. Where fasteners are permitted, provide Phillips head, flat or oval head machine screws. Cap threads with acorn nuts, unless fully concealed in inaccessible construction, and provide nuts and lock washers unless metal for tapping is at least 12 gauge (2.5mm). Match fastener head finish with finish of metal fastened.
- 4. Where components of fabricated metal work are indicated to be galvanized and involve welding or machining of metal heavier than 16 gauge (1.6mm), complete the fabrication and provide hot-dip galvanizing of each component, after fabrication, to the greatest extent possible (depending upon available dip-tank sizes). Comply with ASTM A123.
- 5. Welding and Soldering
  - a. Materials 18-gauge (1.27mm), or heavier, shall be welded.
  - b. Seams and joints shall be shop welded or soldered as the nature of the material may require.
  - c. Welds must be ground smooth and polished to match original finish.
  - d. Where galvanizing has been burned off, clean and touch up the weld with high grade aluminum paint.
- 6. Provide removable panels for access to mechanical and electrical service connections, which are concealed behind or within food service equipment, but only where access is not possible and not indicated through other work.
- 7. Closures: Where ends of fixtures, splash backs, shelves, etc., are open, fill by forming the metal or welding sections, if necessary, to close entire opening flush to walls or adjoining fixtures.
- 8. Rolled Edges: Rolled edges shall be as detailed, with corners bull nose, ground and polished.
- 9. Coved Corners: Stainless steel food service equipment shall have 1/2 inch (13mm) or larger radius coves in horizontal and vertical corners, and intersections, per NSF standards.

**B. Metal and Gauges**

- 1. Except as otherwise indicated, fabricate exposed metalwork from stainless steel. Fabricate the following components from the gauge of metal indicated and other components from not less than 20 gauge (0.8mm) metal:
  - a. Table and counter tops: 14 gauge.
  - b. Sinks and drain boards: 14 gauge.
  - c. Shelves: 16 gauge.
  - d. Front drawer and door panels: 18 gauge (double pan construction).

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| e. | Single pan doors and drawer fronts:   | 16 gauge. |
| f. | Enclosed base cabinets:               | 18 gauge. |
| g. | Enclosed wall cabinets:               | 18 gauge. |
| h. | Exhaust hoods and ventilators:        | 18 gauge. |
| i. | Pan-type insets and trays:            | 16 gauge. |
| j. | Removable covers and panels:          | 18 gauge. |
| k. | Skirts and enclosure panels:          | 18 gauge. |
| l. | Closure and trim strips over 4" wide: | 18 gauge. |
| m. | Hardware reinforcement:               | 12 gauge. |
| n. | Gusset plates:                        | 10 gauge. |
| o. | Custom channel bases:                 | 14 gauge. |
- C. Work-Surface Fabrication
1. Fabricate metal work surfaces by forming and welding to provide seamless construction using welding rods matching sheet metal, grinding and polishing. Where necessary for disassembly, provide waterproof gasketed draw-type joints with concealed bolting.
  2. Reinforce work surfaces 30 inches on center both ways with galvanized or stainless steel concealed structural members. Reinforce edges, which are not self-reinforced, by formed edges.
- D. Metal Top Construction
1. Metal tops shall be one-piece welded construction, including field joints. Secure to a full perimeter galvanized steel channel frame cross-braced not farther than 2'-6" (760mm) on center. Fasten top with stud bolts or tack welds. If hat sections are used in lieu of channels, close ends.
  2. Use properly designed draw fastening, trim strip, or commercial joint material to suit requirement, only if specified.
- E. Structural Framing
1. Except as otherwise indicated, provide framing of minimum 1 inch (25mm) pipe-size round pipe or tube members with mitered and welded joints and gusset plates ground smooth. Provide 14 gauge (2.0mm) stainless steel tube for exposed framing, and galvanized steel pipe for concealed framing.
  2. Where indicated, flange rear and end edges up to form splashes integrally with top, with vertical and horizontal corners coved of not less than 1/4 inch (6mm) radius, die formed. Turn back splashes 1 inch to wall across top and ends with rounded edge on break, unless otherwise specified.
  3. For die-crimped edges, use inverted "V" 1/2 inch (13mm) deep inside and 2 inch (38mm) deep on outside, unless otherwise shown. For straight down flanges, make 1- 3/4 inch (45mm) deep on outside. For bull nose edges, roll down 1-3/4 inch (45mm).
  4. Edges: die-formed, integral with top. For rounded corners, form to 1 inch radius, weld, and polish to original finish.
- F. Field Joints: For any field joint required because of size of fixture, use butt-joints, reinforce on underside with angles of same material, bolt together with non-corrosive bolts and nuts, field weld, grind and polish.
- G. Pipe Bases: Construct pipe bases of 1-5/8 inch (41mm) diameter 18 gauge (1.2mm) stainless steel tubing. Fit legs with polished stainless steel sanitary adjustable bullet feet to provide for adjustment of approximately 1-1/2 inch (38mm), without exposing threads. Space legs to provide ample support for tops, precluding any possibility of buckling or sagging and in no case more than 6'-0" centers.

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- H. Legs and Cross-rails
1. Equipment legs and cross rails shall be 1-5/8 inch (41mm), 16-gauge (1.59mm) stainless steel tubing.
  2. Welds at cross rails shall be continuous and ground smooth. Please note: tack welds are not acceptable.
  3. Camber bottom of legs inward and fit with a stainless steel bullet-type foot with not less than 2 inch (50mm) adjustment. Flanged feet with bolt holes may be required dependent on design applications. Provide proper type feet in compliance with local codes. Use stainless steel in all applications.
  4. Peg free standing legs to floor with 1/4 inch (6mm) stainless steel rod.
  5. Components
    - a. Stainless Steel Gusset: Stainless steel exterior to fit 1-5/8 inch (41mm) tubing, with Allen screw for fastening and adjustment. Not less than 3 inches (76mm) diameter at top and 3-3/4 inch (95mm) long. Outer shell 16-gauge (1.6mm) stainless steel, reinforced with 12-gauge (2.5mm) mild steel insert welded interior shell, or approved equal.
    - b. Stainless Steel Low Counter Legs: Stainless steel exterior 5-3/4 inch (146mm) minimum, 7 inch (178mm) maximum length with stainless steel 3- 1/2 inch (89mm) square plate with four counter-sunk holes, welded to top for fastening.
    - c. Stainless Steel Adjustable Foot: Stainless steel 1-1/2 inch (38mm) diameter tapered at bottom to 1 inch (25mm) diameter, fitted with threaded cold rolled rod for minimum 1-1/2 inch (38mm) diameter x 3/4 inch (19mm) threaded bushing plug welded to legs, or approved equal. Push-in foot not acceptable.
  6. Fasten legs to equipment with gussets, as follows:
    - a. Sinks: Reinforced with bushings and set screw.
    - b. Metal Top Tables and Dish Tables: Welded to galvanized steel channels, 14- gauge (1.98mm) or heavier, anchored to top with screws through slotted holes.
    - c. Wood Top Tables: Welded to stainless steel channels, 14-gauge (1.98mm) or heavier, anchored to top with screws through slotted holes.
- I. Shelves
1. Construct solid shelves under pipe base tables of 16 gauge stainless steel, with 1-1/2 inch turned down and under edges on exposed sides, and 2 inch turn up against walls or equipment. Fully weld to pipe legs.
  2. In fixtures with enclosed bases, turn up shelves on back and sides with 1/4 inch (6mm) (minimum) radius and feather slightly to ensure a tight fit to enclosure panels.
- J. Sinks
1. Construct sinks of 14 gauge stainless steel with No.4 finish inside and outside.
  2. Form back, bottom and front of one piece, with ends and partitions welded into place. Partitions: double thickness, 1 inch minimum space between walls. Multiple compartments shall be continuous on the exterior, without applied facing strips or panels.
  3. Cove interior vertical and horizontal corners of each tub not less than 1/4 inch radius, die formed. Outer ends of drain boards to have roll rim risers not less than 3 inches high.
  4. Drill faucet holes in splashes 2-1/2 inches below top edge. Verify center spacing with faucet specified.
  5. Sink insets shall be deep drawn of 16-gauge (1.59mm), or heavier, polished stainless steel. Weld into sink drain boards with 1-1/2 inch x 1-1/2 inch x 14 gauge stainless steel angle brackets, securely welded to sinks and galvanized cross angles spot welded to underside of drain boards to form an integral part of the installation.

**FOOD SERVICE EQUIPMENT**

6. The bottom of each compartment shall be creased such as to ensure complete drainage to waste opening. Slope bottom of sink bowls toward outlet.
- K. Drains, Wastes and Faucets
1. Furnish and install T&S Brass faucets model B-3940-01 stainless steel rotary drain assembly with connected overflow assembly, in die-drawn inset type sinks and bain-marie sinks.
  2. Other custom fabricated sinks shall be furnished with T&S Brass faucets model B3940-01 stainless steel rotary drain assembly, with S/S cap nut over overflow outlet. Waste connection shall have 2 inch (50mm) external thread size, with 1-1/2 inch (38mm) internal thread size.
  3. Rotary Handle: Of sufficient length to extend to front edge of sink. No riveting, screws or soldering permitted to fit drains to sinks, with all parts of drains easily removable for servicing and replacement. Rotary handle bracket to be provided as part of the sink fabrication.
  4. Water pans for steam tables shall be fitted with 1 inch (25mm) drains with chrome-plated brass stand pipes.
  5. All faucets furnished with equipment included in this Section shall be lead-free and comply with NSF Standard #61, Section #9, such as manufactured by Fisher, Chicago, or T&S. Where the itemized specifications list a faucet by manufacturer and model, the Kitchen Equipment Contractor (KEC) shall verify that the listed faucet complies with this requirement.
  6. If the listed faucet does not comply, the Kitchen Equipment Contractor (KEC) shall submit similar model which does comply from the same manufacturer where available or from one of the above manufacturers.
- L. Workmanship
1. Best quality in the trade. Field verify dimensions before fabricating, conform all items to dimensions of building, neatly fit around pipes, offsets and other obstructions.
  2. Fabricate only in accordance with approved shop drawings, showing pipes, obstructions to be built around, and location of utilities and services.
- M. Enclosures
1. Provide enclosures, including panels, housings, and skirts for service lines, operating components and mechanical and electrical devices associated with the food service equipment, except as specifically indicated to be "open".
  2. Where equipment is exposed to customer view, enclose of service lines, operating components, and mechanical and electrical devices.
- N. Casework
1. Enclosure: except as otherwise indicated, provide each unit of casework (base, wall, overhead and free-standing) with a complete-enclosure metal cabinet, including fronts, backs, tops, bottoms, and sides.
  2. Bases shall be made of 18-gauge (1.27mm) stainless steel sheets reinforced by forming the metal.
  3. Ends, partitions and shelves are stainless steel.
  4. Unexposed backs and structural members are galvanized.
  5. Vertical ends and partitions are single wall, with a 2 inch (50mm) face.
  6. Sides and through partitions are flush with bottom rail, welded at intersections.
  7. Shelves: Provide adjustable standards for positioning and support of shelves in casework, except bottom shelf of cabinet mounted on legs or as specified. Turn back of shelf units up 2 inches and hem. Turn other edges down to form open channel. Reinforce shelf units to support 40 pounds per square foot loading, plus 100 percent impact loading.
  8. Bottom front rail of bases set on masonry platform shall be continuously closed and sealed to platform.

**FOOD SERVICE EQUIPMENT**

- O. Doors
  - 1. Metal doors shall be double-cased stainless steel. Outer pans shall be 18-gauge (1.27mm) stainless steel with corners welded, ground smooth and polished. Inner pan shall be 20-gauge (.95mm) stainless steel fitted tightly into outer pan with a sound-deadening material such as Celotex or Styrofoam used as a core. The two pans shall be tack welded together and joints solder filled. Doors shall finish approximately 3/4 inch (19mm) thick and be fitted with flush recessed type stainless steel door pulls.
  - 2. Wood doors shall be fabricated as detailed. If Formica or other plastic surfaces are used, sides and backs must be laminated.
  - 3. Hinged doors shall be mounted on heavy-duty NSF approved hinges, or as noted on plans or specifications.
- P. Drawer Assemblies
  - 1. Assemblies shall consist of removable drawer body mounted in a ball bearing slide assembly with fully enclosed housing.
  - 2. Slide assembly consists of one pair of 200 pound stainless steel roller bearing extension slides, with side and back enclosure panels, front spacer angle, two drawer carrier angles secured to slides and stainless steel front.
  - 3. Drawer bodies for general storage are to be 20 inches x 20 inches (508mm x 508mm), with 18 gauge stainless steel containers.
  - 4. Drawers intended to hold food products shall be removable type with 12 x 20 (305mm x 508mm) stainless steel food pans in a stainless steel assembly.
  - 5. Drawer fronts are double cased, 3/4 inch (19mm) thick with 18 gauge (1.27mm) stainless steel welded and polished front pan. Steel back pan is tightly fitted and tack welded. Sound deaden with rigid insulation material.
  - 6. Provide drawers with replaceable soft neoprene bumpers or for refrigerated drawers, a full perimeter soft gasket.
- Q. Closed Base: Where casework is indicated to be located on a raised-floor base, prepare casework for support without legs and for anchorage and sealant application, as required for a completely enclosed and concealed base.
- R. Support from Floor: Equip floor supported mobile units with casters and equip items indicated as roll-out units with manufacturer's standard one-directional rollers. Otherwise, and except for closed-base units, provide pipe or tube legs with adjustable bullet-design feet for floor supported items of fabricated metalwork. Provide 1-1/2 inch adjustment of feet (concealed threading).
- S. Shop Painting
  - 1. Clean and prepare metal surfaces to be painted. Remove rust and dirt. Apply treatment to zinc coated surfaces which have not been mill phosphatized. Coat welded and abraded areas of zinc coated surfaces with galvanize repair paint.
  - 2. Apply 1.5 mil (dry film thickness) metal primer coating, followed by 2, 1.0 mil (dry film thickness) metal enamel finish coatings.
  - 3. Bake primer and finish coatings in accordance with paint manufacturer's instructions for a baked enamel finish.
- T. Sound Deadening
  - 1. Sound deaden underside of metal tops, drain boards, under shelves, cabinet interior shelves, etc., above the underbracing/reinforcing/framing only.

**FOOD SERVICE EQUIPMENT**

**2.5 FILTER EXHAUST HOODS, WATER WASH VENTILATOR FABRICATION AND ULTRAVIOLET**

**A. Filter Exhaust Hoods**

1. 18 Gauge type 304 stainless steel external welded construction, in accordance with the latest edition of NFPA No.96, including all applicable appendices. Exposed welds to be ground and polished.
2. Grease Removal: UL classified, non-adjustable, stainless steel grease filters with drip-channel gutters, drains and collection basins.
3. Light Fixtures: Furnish type of fixture specified. Fixtures shall be UL listed for hoods, NSF approved, with sealed safety lenses and stainless steel exposed conduit for wiring.
4. Exhaust Duct: Furnish welded stainless steel formed duct collars at ceiling or wall duct connections, where exposed. Furnish exposed to view ductwork as specified. Verify size and location of duct connections required in this contract, before fabrication. Other ductwork will be by the Mechanical Section.
5. Fire Extinguishing System: Pre-piped liquid chemical or water fire suppressant system, as specified, complying with applicable local and NFPA regulations. Wet chemical fire suppression systems shall comply with UL 300 Standards.

**B. Water Wash Ventilator**

1. 18 Gauge type 304 stainless steel external welded construction, in accordance with the latest edition of NFPA No.96, including all applicable appendices. Exposed welds to be ground and polished.
2. Control panel shall be of same manufacture as ventilator, with time clock control for automatic operation. Provide stainless steel trim strips for recessed control cabinet applications. Provide stainless steel chase for surface mounted control panel from top of panel to ceiling, full width and depth of panel.
3. Light Fixtures: Furnish type of fixture specified. Fixtures shall be UL listed for hoods, NSF approved, with sealed safety lenses, with stainless steel exposed conduit for wiring.
4. Exhaust Duct: Furnish welded stainless steel formed duct collars at ceiling or wall duct connections. Verify size and location of duct connections required in this contract, before fabrication. Other ductwork will be by the Mechanical Section.
5. Fire Extinguishing System: Pre-piped liquid chemical or water fire suppressant system, as specified, complying with applicable local and NFPA regulations. Wet chemical fire suppression systems shall comply with UL 300 Standards.

**C. Ultra-Violet Component Grease Elimination Hood**

1. If applicable for this project, refer to Hood Manufacture's Drawings in the Food Service Design Issue of Construction Set, FS-8 sequence.

**2.6 REFRIGERATION EQUIPMENT**

**A. General**

1. Furnish either single or multiple compressor units, as specified or recommended by the manufacturer for the sizes and variations between connected evaporator loads as indicated.
2. Furnish units of the capacities indicated, arranged to respond to multiple-evaporator thermostats and defrosting timers. Include coils, receivers, compressors, motors, motor starters, mounting bases, vibration isolation units, fans, dryers, valves, piping, insulation, gauges, winter control equipment and complete automatic control system.

**FOOD SERVICE EQUIPMENT**

3. Refrigerant: Pre-charge units with type or types recommended by manufacturer for services indicated, with quick-disconnect type connections where specified, ready to receive refrigerant piping runs to evaporators and (where remote) to condensers. All refrigerant and associated components shall comply with the requirements of the Montreal Protocol Agreement. No CFC refrigerants or associated components shall be allowed on this Project. HFC refrigerants and components shall be used where available. HCFC refrigerants and components, with a minimum 2010 phase-out date, and intermediate replacement refrigerants are to be used only when HFC refrigerants are not available. Kitchen Equipment Contractor (KEC) shall be responsible for coordinating with manufacturers. Provide refrigerant leak monitoring devices where required by federal, state, or local codes.
  4. The minimum outdoor operating ambient temperature for design of units is -10 degrees Fahrenheit, or as applicable for extreme low local conditions. The maximum indoor design temperature for operation of compressor units is 95 degrees Fahrenheit. The maximum outdoor ambient design temperature shall be determined with prevailing conditions at mounting location(s) of compressor(s), such as sun exposure, limited ventilation, high fences/walls, roof color and materials, local climatic extremes, etc., but in no case shall it be less than 100 degrees Fahrenheit.
- B. Components
1. Coils: Coils for fabricated refrigerators shall have vinyl plastic coatings, stainless steel housings and shall be installed in such a manner as to be replaceable.
  2. Expansion Valves: Remote refrigeration system shall be complete with thermostatic expansion valves at the evaporator.
  3. Thermometers
    - a. Fabricated refrigerated compartments to be fitted minimally with a flush dial thermometer, with chrome plated bezels and to be provided as specified.
    - b. Thermometers shall be adjustable and shall be calibrated after installation.
    - c. Thermometers shall have an accuracy of  $\pm 2$  degrees Fahrenheit (1 degree Centigrade).
  4. Hardware
    - a. Refrigerator hardware for fabricated refrigerator compartments shall be heavy-duty components.
    - b. Self-closing hinges.
    - c. Latches to be magnetic edge mount type, unless specified or detailed otherwise.
  5. Locks
    - a. Doors and drawers for walk-in coolers/freezers and reach-in refrigerated compartments, both fabricated and standard, shall be fitted with cylinder locking type latches and provided with master keys.
- C. Cold Pans: Ice pans, refrigerated pans and cabinets shall be provided with breaker strips, where adjoining top or cabinet face materials, to prevent transfer of cold.
- D. All open top mechanically cooled custom fabricated or standard buy-out refrigerators and/or cold pans shall comply with NSF Standard #7 requirements, as of April 1, 1998. The Kitchen Equipment Contractor (KEC) shall verify that the specified unit complies with this requirement or submit a similar model, which does comply, from the same manufacturer where available.

**FOOD SERVICE EQUIPMENT**

- E. Ventilation of Refrigerated Equipment
  - 1. Adequate ventilation shall be provided for custom fabricated equipment with integral refrigeration condensing units, both built-in and drop-in. If flow through ventilation cannot be provided, provide flow direction partitions and an additional fan capable of cooling the condensing unit.
  - 2. If, in the opinion of the Kitchen Equipment Contractor (KEC), additional room ventilation is required to ensure correct operating temperatures of standard buy-out, custom fabricated or remote refrigeration condensing units, or compressor rack assemblies, they shall so state in a letter to the Architect for evaluation and direction.

2.7 MISCELLANEOUS MATERIALS

- A. Nameplates: Whenever possible, locate nameplates and labels on manufactured items, in accessible position, but not within customer's normal view. Do not apply name-plates or labels on custom fabricated work, except as required for compliance with governing regulations, insurance requirements, or operator performance.
- B. Manufactured Equipment Items: Furnish items as scheduled or herein specified. Verify dimensions, spaces, rough-in and service requirements, and electrical characteristics before ordering. Provide trim, accessories and miscellaneous items for complete installation.
- C. Insert Pans
  - 1. General: Provide cut-outs, openings, drawers, or equipment specified or detailed to hold stainless steel insert pans with a full complement of pans as follows:
    - a. One (1) stainless steel, 20-gauge (.95mm) minimum, solid insert pan for each space, sized per plans, details, or specifications.
    - b. Where pan sizes are not indicated in plans, details, or specifications, provide one full-size pan for each opening.
    - c. Provide maximum depth pan to suit application and space.
  - 2. Provide 18-gauge (1.27mm) removable stainless steel adapter bars where applicable.
  - 3. Provide all cut-outs and openings or equipment specified or detailed to hold stainless steel insert pans with a hinged stainless steel removable night cover.
- D. Tray Slides: Before fabrication of counters with tray slides, verify:
  - 1. Size and shape of tray. Edge of tray shall not overhang outer support/slider by more than 2". If edge of tray exceeds this dimension, notify Architect, in writing, for evaluation and adjustment, if necessary.
  - 2. Configuration of corners, turns, and shape of tray slides for proper support and safe guidance of trays.
  - 3. Tray slide capable of supporting 200 pounds per linear foot, live load.
- E. Self-leveling dispensers: Verify type and make of ware, dimensions and weight, request samples from Operator and submit to the dispenser manufacturer for proper sizing and calibration of dispensers.
- F. Carbon dioxide (co') equipment: Where equipment requires connection with compressed co' cylinder for operation, provide proper sized cylinder manifold and control system (integral with equipment) with proper connectors for Department of Transportation (DOT) approved type cylinders, complete with cylinder safety devices and supports.



**FOOD SERVICE EQUIPMENT**

- G. Reasonable quietness of operation of equipment is a requirement. The Kitchen Equipment Contractor will be required to replace or repair any equipment producing out-of-the-ordinary intolerable noise. This also includes providing and installing bumpers and gaskets for doors and drawers on fabricated and standard manufactured items and sound insulation where feasible.

2.8 ITEMIZED SPECIFICATIONS

- A. Refer to the following pages for specific specification information on each item included in this Section.

ITEM 1 SOILED LAUNDRY CART: 1 REQUIRED

- A. R&B Wire Products, model 4616 \*H011 general purpose Poly Truck. Color: grey.

ITEM 2 STACKING COMMERCIAL WASHER/DRYERS: 2 REQUIRED

- A. One is future.
- B. Dexter, model T-450 Express Stack Washer-Dryer (electric units) \*H011. Provide with FSS Fire Safety System.

ITEM 3 FOLDING TABLE: 1 REQUIRED

- A. Pacific Stainless Products, model WKS-3630-A6S \*H011 fully welded table with the following accessories:
  - 1. One model SDAS-202006S stainless steel drawer assembly as shown.
  - 2. Model TMSC 14" wide full length cantilever shelf. Install with 18" clearance from table top. Seal post openings in backsplash.
  - 3. Right end splash.
- B. Install assembly complete.

ITEM 4 MOBILE UTILITY CARTS: 2 REQUIRED

- A. Lakeside, model 221 \*H011.

ITEM 5 HAND WASHING SINKS: 3 REQUIRED

- A. Advance Tabco, model 7-PS-62 \*H011.
- B. Seal to wall.

ITEM 6 CUBE ICE MACHINE WITH STORAGE BIN: 1 REQUIRED

- A. Existing equipment. Relocate and reinstall in location shown.

ITEM 7 DINING SUPPORT COUNTER: 1 REQUIRED

- A. Fabricate as detailed and construct top and back/end splashes of one piece all welded 14 gauge stainless steel. Reinforce underside of top and install on a cabinet base constructed of steel sheets; stainless steel where exposed. Doors shall be double-pan stainless steel construction. Include the following:

**FOOD SERVICE EQUIPMENT**

1. Door hardware: Blum model 170 concealed hinges and stainless steel bar pulls. Include magnetic catches and cylinder locks; keyed alike.
  2. Pacific Stainless, model WSH4812DD. Install with 18" clearance above counter top. Seal to wall.
- B. Clip and seal to wall.
- C. Finished base material furnished and installed by General Contractor.
- ITEM 8 CATERING SHELVING: 1 LOT REQUIRED
- A. InterMetro, MetroMax 4 \*H011 polymer shelving. Shelf section shall be five tier high using 86 inch high individual posts with stationary leg set. Refer to plan for shelf sizes.
  - B. Verify room size before ordering.
- ITEM 9 CLEAN DISHTABLE: 1 REQUIRED
- A. Fabricate as detailed and construct top and back splash of one piece all welded 14 gauge stainless steel. Reinforce underside of top with enclosed stainless steel hat sections. Sound deaden underside of top and mount on a stainless steel leg stand consisting of circular gussets, tubular legs, and adjustable bullet feet. Reinforce legs with 16 gauge stainless steel shelf as shown. Include the following:
    1. Wall mount shelf as detailed
  - B. Install assembly complete.
- ITEM 10 VENTLESS WAREWASHER WITH BOOSTER HEATER: 1 REQUIRED
- A. Hobart, model AM15VLT\*H011 with electric tank heat. Include the following:
    1. Sense-A-Temp 70° rise booster.
    2. Three each sheet pan and combination racks.
    3. Flanged and seismic feet.
    4. Door lock.
  - B. Install assembly complete.
- ITEM 11 HOSE REEL WITH CONTROL CABINET: 1 REQUIRED
- A. Fisher, model 2980 \*H011. Include model 1801 reel rinse control box assembly.
  - B. KEC is to coordinate recess in wall with General Contractor for cabinet.
  - C. Seal assembly to wall.
- ITEM 12 SOILED DISHTABLE WITH POTWASHING SINKS: 1 REQUIRED
- A. Fabricate as detailed and construct top and back/end splashes of one piece all welded 14 gauge stainless steel. Include all welded integral stainless steel sinks as shown. Reinforce underside of top with enclosed stainless steel hat sections. Sound deaden underside of top and sink compartments and mount on a stainless steel leg stand consisting of circular gussets, tubular legs, and adjustable bullet feet. Reinforce legs with 16 gauge stainless steel shelf and/or leg braces as shown. Soiled Dishtable shall incorporate the following:

**FOOD SERVICE EQUIPMENT**

1. Fisher Manufacturing, model 53457 spray rinse faucet with 8" swing spout centered behind pre-rinse sink. Include wall bracket.
  2. Two Fisher Manufacturing, model 53120 splash mount faucets at potwashing sinks.
  3. Four Fisher Manufacturing, model 22411 rotary waste assemblies with 14 gauge stainless steel lever waste brackets.
  4. Provide one 16 gauge stainless steel removable perforated sink insert strainer with all welded rack guides for pre-rinse sink. Insert to be 12" deep.
  5. Provide one piece all welded 14 gauge stainless steel removable rack guides at each potwashing sink held in place with stainless steel pins.
  6. Wall mount shelf as detailed.
- B. Install assembly complete.
- C. Clip and seal to walls.
- ITEM 13 CORNER/CHANNEL GUARDS: 1 LOT REQUIRED
- A. Fabricate as detailed and construct vertical corner/channel guards and low wall caps of one piece all welded 14 gauge stainless steel. Install in locations shown on Sheet FS1.1. Install with stainless steel screws.
- B. Seal guards to walls and at joints as required.
- ITEM 14 NOT USED
- ITEM 15 VEGETABLE PREP SINK TABLE: 1 REQUIRED
- A. Pacific Stainless Products, model DCS-1824-14-B18R-B24L \*H011 fully welded sink table. Sink table shall incorporate the following:
1. Fisher Manufacturing, model 53457 spray rinse faucet with 8" swing spout centered between sinks. Include wall bracket.
  2. Two Fisher Manufacturing, model 22411 rotary waste assemblies with 14 gauge stainless steel lever waste brackets welded to underside of sinks.
  3. Model PRSTM table mount pottracks with shelves above each drainboard. Seal post openings in backsplash.
  4. Sound deaden underside of top and sink compartments.
  5. Stainless steel under shelf below right drain board.
  6. Provide space for parking Item 16 Waste Receptacle under left drainboard.
- B. Install assembly complete. Clip and seal to wall.
- ITEM 16 WASTE RECEPTACLE: 1 REQUIRED
- A. Existing equipment. Relocate and reinstall in location shown.
- ITEM 17 WALK-IN COLD STORAGE ROOMS: 2 REQUIRED
- A. Imperial Manufacturing, modular sandwich panel design Foam-A-Lite cold storage room complete in configuration shown on Sheet FS1.1. Each room shall incorporate the following:
1. Walk-ins are to be outdoor units. Refer to factory quote #19-IB-25068 for specific outdoor features.
  2. Standing Seam Roofing specified by Architectural Division.

**FOOD SERVICE EQUIPMENT**

3. Provide one cooler walk-in door and door frame 36 inch x 78 inch stainless steel inside and out with 14 inch x 14 inch insulated glass window and 36" high 1/8" polished aluminum diamond treadplate interior and exterior kick plates. Door hinged as shown on plan. Include Kason #944 deadbolt mortise lockset with interior safety release, Kason #1229 chrome pull handle, Kason #1094000013 concealed mounting door closer, and three Kason #1248 chrome spring assisted hinges. Hinge doors as shown on plans. Provide matching metal flashing around building wall door opening.
  4. Provide 36" high 1/8" polished aluminum diamond treadplate wainscot on exposed exterior face of walk-in cooler facing interior of Kitchen only.
  5. Exposed exterior, closure panels, and trim strips to adjacent walls and ceiling shall be 20 gauge stainless steel finish facing interior of Kitchen only. Exposed interior shall be .040 stucco embossed aluminum except ceiling which shall be .040 aluminum with baked white acrylic finish. Unexposed surfaces shall be 26 gauge galvanized steel.
  6. Finished outdoor exterior finish shall be baked on white enamel.
  7. Finished interior height of 8 foot-0 inches. All wall insulation shall be 4 inch thick foamed in place, Class 1, urethane insulation. Ceiling panels shall be 5-1/2" wood framed and shall slope away from the building.
  8. Install in floor depression complete with 6" Class 1 R-Max thermal insulation board and vapor barrier of 15 lb. felt protective slip sheet applied over insulation and flashed up height of cove and joints lapped 6" minimum. See Sheet FS3.1 for depression details.
  9. Install surface mounted 4-1/2 inch diameter dial thermometers above cooler door and label per room.
  10. Provide 3/8 inch diameter nylon coil hangers mounted on 3 inch x 3 inch aluminum plates with nuts and retainers to support evaporator hung from ceiling panel.
  11. Furnish penetrations to accommodate all electrical, plumbing, and refrigeration lines. Furnish stainless steel escutcheons.
  12. Provide Kason 1810 LED cooler ceiling light fixtures as noted on Sheet FS1.4. Field connections under Division 26. Include lamps.
  13. Provide Kason, model 1908-603 press type switches mounted inside and outside of room as indicated on electrical plan.
  14. All electrical conduit shall be run concealed within the walk-in walls or above the ceiling panels (coordinate with electrician).
  15. Refer to Architectural Room Finish Schedule for cooler wearing floor material inside and out by Division 9.
  16. Provide 6" high stainless steel cove base for interior of walk-in. Seal to floor and wall panels.
  17. Temperature monitor/alarm system provided with Trenton ESP/KE2 System under Item 18.
  18. Roofing flashing to overlap building roof and top of walk-in.
  19. Seismic tie-downs and restraints to meet codes.
- B. Walk-ins shall comply with current state energy codes.
- C. Walk-ins shall be installed by this manufacturer or this manufacturer's certified installer only and must have a minimum 5 years' experience installing Imperial walk-ins.
- D. Walk-in doors are to be secured in the "open" position until the concrete sub-floor cures and until manufacturer states that it is safe to close. Oxidized panels will be replaced at the Contractors' expense.

**FOOD SERVICE EQUIPMENT**

ITEM 18 REFRIGERATION SYSTEMS: 2 REQUIRED

- A. System A: Cooler @ +35°F to +40°F
  1. Evaporator: Trenton TEHA010M8-HTC3; 9,258 BTU at 20°F suction temperature. Include expansion valve, drier strainer, liquid line solenoid, and room thermostat.
  2. Condensing Unit: Trenton TPLP209MAS1BR6-ESP; 8,676 BTU at 90° ambient air temperature. Include crank case heater.
- B. System B: Freezer @ -10°F to +0°F
  1. Evaporator: Trenton TEHA025L6-HTC3; 9,300 BTU at -10°F suction temperature. Include expansion valve, drier-strainer, liquid line solenoid, room thermostat, and electric defrost system.
  2. Condensing Unit: Trenton TPLP209LES2BR6-ESPE; 9,000 BTU at +90°F ambient air temperature. Include crank case heater.
- C. Each system shall incorporate the following:
  1. Flexible vibration eliminator in suction line.
  2. Circuit breaker, automatic starting switch, motor protectors and pressure limit switch, all enclosed with interconnecting wire installed in a junction box ready for line connections.
  3. Liquid line dehydrator filter of ample capacity.
  4. Suction line filter of ample capacity.
  5. Thermal expansion valve for evaporator.
  6. Thermostat set to cut-in at -3°F and cut-out at -6°F for freezer. Cut-in at +38°F and cut-out at +34°F for refrigerator.
  7. Suction pressure regulator.
  8. Crank case heaters.
  9. Refrigerant Lines: Hard copper type "L" with "Silfos" brazed joints. Use refrigeration service tubing.
  10. Full charge refrigerant and oil.
  11. Condensing units are located outside on the roof as shown on Sheet FS1.01. Verify exact location with Architectural plans. Raised pad specified by architectural division.
  12. Trenton ESP/KE2 System Smart Controller. Locate at Instructor's desk; verify location.
- D. Where refrigerant suction lines are trapped, use next size smaller pipe in vertical portion of the trap than that indicated to acquire sufficient gas velocity for proper oil return.
- E. Provide anti-sweat pipe covering 3/4 inch Armstrong Armaflex or equivalent for suction lines from evaporator to condensing unit.
- F. Provide painted 1 inch drain tubing from evaporator to nearest indirect drain as shown on Sheet FS2. Trap at outlet end.
- G. Provide Raychem, model H611250 heating cable with H900 power connection to wrap all drain lines running through freezer.
- H. Evaporators and condensing units as shown on the Contract Documents shall be installed under the supervision of a licensed Refrigeration Contractor subject to review by the Consultant.
- I. Provide testing, charging, adjusting, operational testing, and cleaning of equipment and lines.

**FOOD SERVICE EQUIPMENT**

ITEM 19 WALK-IN COOLER SHELVING: 1 LOT REQUIRED

- A. InterMetro, MetroMax 4 \*H011 polymer shelving. Shelf section shall be four tier high using 74 inch high individual posts with stationary leg set. Refer to plan for shelf sizes.
- B. Verify room size before ordering.

ITEM 20 MOBILE SHEET PAN RACKS: 3 REQUIRED

- A. New Age, model 1331 \*H011.

ITEM 21 WALK-IN FREEZER SHELVING: 1 LOT REQUIRED

- A. InterMetro, MetroMax 4 \*H011 polymer shelving. Shelf section shall be four tier high using 74 inch high individual posts with stationary leg set. Refer to plan for shelf sizes.
- B. Verify room size before ordering.

ITEM 22 DRY STORAGE SHELVING: 1 LOT REQUIRED

- A. InterMetro, MetroMax 4 \*H011 polymer shelving. Shelf section shall be five tier high using 86 inch high individual posts with stationary leg set. Refer to plan for shelf sizes.
- B. Verify room size before ordering.

ITEM 23 APPLIANCE STORAGE SHELVING: 1 LOT REQUIRED

- A. One (1) new and one (1) existing.
- B. New shelf section shall be InterMetro, MetroMax 4 \*H011 polymer shelving. Shelf section shall be five tier high using 86 inch high individual posts with stationary leg set. Refer to plan for shelf sizes.
- C. Verify room size before ordering.

ITEM 24 NOT USED

ITEM 25 NOT USED

ITEM 26 NOT USED

ITEM 27 STUDENT WORK STATIONS: 4 REQUIRED

- A. Pacific Stainless Products, model WKS-8436-IS \*H011 fully welded table with the following accessories:
  - 1. One model SDAS-202006S stainless steel drawer assembly as shown.
  - 2. Adjustable stainless steel feet.
  - 3. Partial stainless steel under shelf to allow space for parking Item 29 Ingredient Bin.
  - 4. Stainless steel under table mount electrical receptacle at end of table per Sheet FS1.04.
- B. Install assembly complete.

ITEM 28 FOOD PROCESSORS: 4 REQUIRED

- A. Existing equipment. Relocate and reinstall in location shown.

**FOOD SERVICE EQUIPMENT**

ITEM 29 MOBILE INGREDIENT BINS: 4 REQUIRED

- A. Existing equipment. Relocate and reinstall in location shown.

ITEM 30 5-QUART MIXERS: 4 REQUIRED

- A. Existing equipment. Relocate and reinstall in location shown.

ITEM 31 20-QUART MIXERS: 2 REQUIRED

- A. Existing equipment. Relocate and reinstall in location shown.

ITEM 32 MOBILE MIXER CARTS: 2 REQUIRED

- A. Advance Tabco, model MX-SS-242 \*H011 with optional caster set, two with brakes.

ITEM 33 CANOPY HOOD WITH FIRE PROTECTION SYSTEM: 1 REQUIRED

- A. Captive-Aire, model 6630ND-2-PSP-F \*H011 2'-6" high 18 gauge stainless steel canopy hood. Refer to factory file #3719325. The hood shall incorporate the following:
  - 1. DCV.
  - 2. Top, ends, and back of hood to be insulated for zero clearance to combustibles.
  - 3. U.L. listed damper assembly.
  - 4. LED light fixtures. Furnish and install lamps.
  - 5. Model HMI light and fan on/off switch. Furnish loose for installation by Division 16.
  - 6. Ansul R-102 Chemical Fire Protection System with Automan Regulated Release Assembly furnished and installed by Captive-Aire housed in 12" long utility cabinet at right end of hood. Install in accordance with NFPA bulletin 96, including all current amendments to protect this hood including surface protection as required. All piping and conduit shall be run concealed in walls or above ceiling, except where exposure is necessary for functional reasons. Exposed piping shall be chrome plated or run in stainless steel sleeves. Include reset relays and manual remote pull station. System shall connect to mechanical gas shut-off valve furnished loose by Captive-Aire. All contactors are furnished by the Electrical Division for shut down of electric supply to all equipment in the event of system activation. System control cabinet shall be installed in location shown.
  - 7. Include 18 gauge stainless steel removable closure panels and trim as required to seal hood to ceiling and walls. Verify ceiling height. Submit shop drawings prior to fabrication.
  - 8. Install hood with 80" clearance from finished floor.
- B. Exhaust and supply duct work and fans furnished and installed by Division 23.

ITEM 34 STAINLESS STEEL WALL FLASHING: 1 LOT REQUIRED

- A. Fabricate 20 gauge stainless steel Number 4 finish wall flashing bonded to gypsum board with heat resistant mastic beginning directly above base tile on wall and terminating 2" above bottom edge of canopy hood. Flashing shall run full length of canopy hood. Continue flashing 18" beyond perimeter of hood if required by authority having jurisdiction.
- B. Install flashing with no exposed fasteners or screws in interlocking sections of equal lengths. Verify that surfaces are flat and smooth with a maximum variation of 1/16" in 10 feet.
- C. Install assembly complete

**FOOD SERVICE EQUIPMENT**

**ITEM 35 TRIPLE DECK OVENS: 1 REQUIRED**

- A. Blodgett, model 911-TRIPLE \*H011 with the following accessories:
  - 1. 6" heavy-duty caster set; front two with brakes.
  - 2. Model 911-QHT Rokite shelves.
  - 3. 36" long gas quick disconnect assemblies with cable restraints.
- B. Install assembly complete.

**ITEM 36 BROILER WITH STAND: 1 REQUIRED**

- A. Existing equipment. Relocate and reinstall in location shown.

**ITEM 37 DOUBLE STACK CONVECTION OVENS: 1 REQUIRED**

- A. Top oven to be new/bottom oven existing equipment. Remove top oven and relocate and reinstall in location shown.
- B. New top oven to be Bakers Pride, model BCO-G1 \*H011 with the following accessories:
  - 1. 48" long gas quick disconnect assembly with cable restraint.
  - 2. Stacking kit to install above existing Bakers Pride convection oven.
- C. Install assembly complete.

**ITEM 38 OPEN BURNER RANGES: 3 REQUIRED**

- A. Garland, model M43R-C \*H011. Provide with the following accessories:
  - 1. Rear gas connection with 3' flex connector kit.
  - 2. Stainless steel sides.
  - 3. Gas manifold end caps and cover.
  - 4. 6" diameter casters; front two with brakes.
  - 5. 3/4" quick disconnect hose with restraining cable.
  - 6. Range mount single deck high shelf.
  - 7. T & S Posi-Set Caster Placement Devices for back caster set.
- B. Install assembly complete.

**ITEM 39 NOT USED**

**ITEM 40 MOBILE HOT HOLDING/PROOFING CABINET: 1 REQUIRED**

- A. Existing equipment. Relocate and reinstall in location shown.

**ITEM 41 WALL MOUNT SHELVES: 2 REQUIRED**

- A. Pacific Stainless Products, model WSH6614DD \*H011.
- B. Seal to walls.

**ITEM 42 NOT USED**

**ITEM 43 MICROWAVE OVEN: 1 REQUIRED**

- A. Existing equipment. Relocate and reinstall in location shown.



**FOOD SERVICE EQUIPMENT**

ITEM 44 MOBILE INGREDIENT BINS: 4 REQUIRED

- A. Existing equipment. Relocate and reinstall in location shown.

**PART 3 - EXECUTION**

3.1 SUPERVISION

- A. A competent supervisor, representing the Kitchen Equipment Contractor (KEC), shall be present at all times during progress of the Kitchen Equipment Contractor (KEC)'s work.

3.2 SITE EXAMINATION

- A. Verify site conditions under the provisions of the General Conditions, Supplementary Conditions and applicable provisions of Division 1 Sections. Notify the Architect, in writing, of unsatisfactory conditions for proper installation of food service equipment.
- B. Verify wall, column, door, window, and ceiling locations and dimensions. Fabrication and installation should not proceed until dimensions and conditions have been verified and coordinated with fabrication details.
- C. Verify that wall reinforcement or backing has been provided and is correct for wall supported equipment. Coordinate placement dimensions with wall construction Section.
- D. Verify that ventilation ducts are of the correct characteristics, and in the required locations.
- E. Verify that utilities are available, of the correct characteristics, and in the required locations.

3.3 INSTALLATION

- A. Sequence installation and erection to ensure correct mechanical and electrical utility connections are achieved.
- B. Install items in accordance with manufacturer's instructions.
- C. Set each item of non-mobile and non-portable equipment securely in place, leveled and adjusted to correct height. Anchor to supporting substrate where indicated, and where required for sustained operation and use without shifting or dislocation. Conceal anchorages wherever possible. Adjust counter tops and other work surfaces to a level tolerance of 1/16 inch (maximum offset, and plus or minus on dimension, and maximum variation in 2'-0" run from level or indicated slope). Provide anchors, supports, bracing, clips, attachments, etc., as required to comply with the local seismic restraint requirements. The Guidelines for Seismic Restraint of Kitchen Equipment, as prepared for the Sheet Metal Industry Fund of Los Angeles and endorsed by SMACNA, should be followed.
- D. Complete field assembly joints in the work (joints which cannot be completed in the shop) by welding, bolting-and-gasketing, or similar methods as indicated and specified. Grind welds smooth and restore finish. Set or trim flush, except for "T" gaskets as indicated.
- E. Provide closure plates and strips where required, with joints coordinated with units of equipment.
- F. Provide sealants and gaskets all around each unit to make joints airtight, waterproof, vermin-proof, and sanitary for cleaning purposes.

**FOOD SERVICE EQUIPMENT**

- G. Joints up to 3/8 inch wide will be stuffed with backer rod to shape sealant bead properly, at 1/4 inch depth.
- H. At internal corner joints, apply sealant or gaskets to form a sanitary cove of not less than 3/8 inch radius.
- I. Shape exposed surfaces of sealant slightly concave with edges flush with faces of materials at joint.
- J. Provide sealant filled or gasketed joints up to 3/8 inch joint width. Wider than 3/8 inch, provide matching metal closure strips, with sealant application each side of strips. Anchor gaskets mechanically or with adhesives to prevent displacement.
- K. Treat enclosed spaces, inaccessible after equipment installation, by covering horizontal surfaces with powdered borax at a rate of 4 ounces per square foot.
- L. Insulate to prevent electrolysis between dissimilar metals.
- M. Cut and drill components for service outlets, fixtures, piping, conduit, and fittings.
- N. Coordinate the installation of approved dry pendant sprinkler head in each cooler and freezer. Sprinkler heads should be installed in coolers/freezers only if required by local codes.
- O. Verify and coordinate the mounting heights of all wall shelves and equipment, with equipment located below them for proper clearances.
- P. Coordinate with the Plumbing and Electrical Divisions and provide holes in food service equipment for plumbing and electrical service to and through the fixtures, as required. This includes welded sleeves, collars, ferrules, or escutcheons. Locate these services so that they do not interfere with intended use and/or servicing of the fixture. No alterations of the building are allowed without written permission by the General Contractor and/or Architect. (i.e. – routing refrigerant lines).

3.4 ADJUSTING

- A. Test and adjust equipment, controls and safety devices to ensure proper working order and conditions.
- B. Repair or replace equipment which is found to be defective in its operation, including units which are below capacity or operating with excessive noise or vibration.

3.5 CLEANING AND RESTORING FINISHES

- A. After completion of installation and completion of other major work in food service areas, remove protective coverings and clean food service equipment internally and externally.
- B. Restore exposed and semi-exposed finishes, to remove abrasions and other damages, polish exposed metal surfaces and touch-up painted surfaces. Replace work, which cannot be successfully restored.
- C. Polish glass, plastic, hardware and accessories, fixtures and fittings.
- D. Wash and clean equipment and leave in a condition ready for the Owner to sanitize and use.

**FOOD SERVICE EQUIPMENT**

**3.6 TESTING, START-UP AND INSTRUCTIONS**

- A. Delay the start-up of equipment until service lines have been tested, balanced, and adjusted for pressure, voltage and similar considerations and until water and steam lines have been cleaned and treated for sanitation.
- B. Make arrangements for demonstration of food service equipment operation and maintenance in advance with the Owner/Operator.
- C. Demonstrate food service equipment to familiarize the Owner and the Operator on operation and maintenance procedures, including periodic preventative maintenance measures required. Include an explanation of service requirements and simple on-site service procedures as well as information concerning the name, address and telephone number of qualified local source of service. The individual performing the demonstration shall be knowledgeable of operating and service aspects of the equipment.
- D. Provide a written report of the demonstration to the Owner, outlining the equipment demonstrated and malfunctions or deficiencies noted. Indicate individuals present at demonstration.
- E. Final Cleaning: After testing and start-up, clean the food service equipment and leave in a condition ready for the Owner to sanitize and use.

**3.7 CLEAR AWAY**

- A. Throughout the progress of their work, the Kitchen Equipment Contractor (KEC) shall keep the working area free from debris and shall remove rubbish from premises resulting from work being done by them. At the completion of their work, the Kitchen Equipment Contractor (KEC) shall leave the premises in a clean and finished condition.

**END OF SECTION**



ROLLER WINDOW SHADES

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide roller shades as herein specified and at locations indicated in the schedule at the end of this section.
- B. Section Includes:
  - 1. Manually operated interior roller-screen room darkening shades in exterior window openings as indicated on the Drawings.

1.2 PERFORMANCE REQUIREMENTS

- A. Fire: Provide shade fabrics tested in accordance with NFPA 701 - Vertical Burn Test and rated "PASS".
- B. Toxicity: Provide shade fabrics tested in accordance with University of Pittsburgh Toxicity Protocol including LC50 analysis and toxicity characteristics.
- C. American Type Culture Collection: Anti-microbial results.
- D. Results for ATCC6538 (*Staphylococcus aureus*) and ATCC13388 (*Pseudomonas aeruginosa*) indicating minimum 5mm (0.197") "No Growth Contact Area".
- E. Results for ATCC9642, ATCC9644, ATCC9348 and ATCC9645 indicating "No Growth".
- F. Electrical: Control systems and components approved AS A SYSTEM by either Underwriter Laboratories (UL) or Electronic Testing Laboratories (ETL).

1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets, performance data, and installation instructions for each item required.
- B. Shop Drawings:
  - 1. Interior Elevations at 1:32 [ $3/8" = 1'-0"$ ] scale minimum indicating shade layout, seam/batten locations and coordination with surrounding conditions.
  - 2. Floor plans or reflected ceiling plans showing overall arrangement of shades.
  - 3. Head, jamb and sill details as necessary to coordinate work with surrounding conditions and construction.
  - 4. Shade schedule coordinating room number, window type, opening size(s), quantities and key to details.
- C. Samples:
  - 1. Selection Samples:
    - a. 3" x 5" shade cloth fabric swatches for initial fabric color selection from manufacturer's full range of available fabrics.
- D. Manufacturer's Instructions: Manufacturer's standard installation instructions.

**ROLLER WINDOW SHADES**

**1.4 QUALITY ASSURANCE**

- A. Qualifications:
  - 1. Manufacturer: 20-years minimum experience manufacturing products comparable to those specified in this section.
  - 2. Installer: 5-years minimum experience installing products comparable to those specified in this section.
- B. Field Samples: Install large size sample of selected fabric for final verification of color.
- C. Do not fabricate shades without obtaining field dimensions for each opening. Coordinate construction of surrounding conditions to allow for timely field dimension verification.

**1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Do not deliver items to the project until all concrete, masonry, plaster, painting and other wet work has been completed and is dry.
- B. Deliver shades to project in labeled protective packaging. Uniquely labeled to identify each shade for each opening. Schedule delivery to prevent delays to completion of work but to minimize on site storage time.
- C. Store materials in a dry secure place. Protect from weather, surface contaminants, corrosion, construction traffic and all other potential damage.

**1.6 WARRANTY**

- A. Installation: Provide Contractor's warranty under provisions of Section 01 70 00, Execution and Closeout Requirements that installation shall be free from defects for a period of not less than 1-year.
- B. In the event of a warranted product failure, the Shade Contractor will, at no cost to owner, facilitate acquisition and delivery of all necessary components to the Owner.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Manufacturer: McGee Blinds and Awning., or accepted substitute.

**2.2 COMPONENTS**

- A. Shadebands: Construction of shadeband includes the fabric, the hembar and hempocket, and the attachment of the shadeband to the roller tube.
  - 1. Total room darkening 3-layer fiberglass fabric, white.
  - 2. Hembars and Hempockets:
    - a. Fabric hempocket with RF - welded seams (including welded ends) and concealed hemweights. Hemweights must be of appropriate size and weight for shadeband and must be continuous inside a sealed hempocket. Match hempocket construction for all shades in same rooms.
- B. Manually Operated Hardware and Shade Brackets:
  - 1. Provide Skyline clutch system with white powder coated steel brackets.
  - 2. Pull chain to be stainless steel beaded chain with heavy duty hold down bracket.

**ROLLER WINDOW SHADES**

- C. Shade Roller And Shadecloth Attachment:
  - 1. Provide for positive mechanical attachment of shadeband without requiring use of adhesives, adhesive tape, staples or rivets. Two sided pressure sensitive adhesive tape is not acceptable.
  - 2. Attach shadebands to tube such that removal and replacement of a shadeband can be accomplished without removing either the tube from the brackets or without removing shade brackets. Shadebands must be replaceable on site.
  - 3. Drive Chain: #10 qualified stainless steel chain rated to 90-pound minimum breaking strength.

2.3 FINISHES

- A. Steel Components: Cadmium-plated, satin-finished, or bonderized prior to painting with Manufacturer's standard baked-enamel finish.

**PART 3 - EXECUTION**

3.1 EXAMINATION

- A. Examine substrate and conditions for installation. Do not commence installation until conditions are satisfactory. Commencement of installation indicates acceptance of site conditions by Contractor. Notify the Design Professional upon inspection when the project conditions are unacceptable for shade installation. "Beginning of installation" means acceptance of substrate and project conditions.

3.2 INSTALLATION

- A. Install units to comply with the Manufacturer's instructions for the type of mounting and operation required. Provide units plumb, true, and securely anchored in place with recommended hardware and accessories to provide smooth operation without binding.
- B. Install units within the following tolerances.
  - 1. Maximum Variation Of Gap At Window Opening Perimeter: 1/4", per 8 feet ( $\pm 1/8$ ") of shade height.
  - 2. Maximum Offset From Level: 1/16" per 5 feet of shade width.

3.3 ADJUSTING

- A. Adjust drive/brake mechanism of units for smooth operation. Adjust shade and shadecloth to hang flat without buckling or distortion. Replace any units or components that do not hang properly or operate smoothly.

3.4 CLEANING

- A. Touch up damaged finishes and repair minor damage in order to eliminate evidence of repair. Remove and replace work that cannot be satisfactorily repaired.
- B. Clean exposed surfaces, including metal and shadecloth, using non-abrasive materials and methods recommended by the Shadecloth Manufacturer. Remove and replace work that cannot be satisfactorily cleaned.

3.5 DEMONSTRATION

- A. Demonstrate operation method and instruct Owner's personnel in the proper operation and maintenance of the window shade systems.

**ROLLER WINDOW SHADES**

**3.6 SCHEDULE OF WINDOWS OPENINGS TO BE PROVIDED WITH ROLLER SHADES**

A. Window Type A

**END OF SECTION**



**WATER BASED FIRE SUPPRESSIONS SYSTEMS**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Work included: Designing and providing complete automatic wet fire sprinkler system modifications for all project building areas in accordance with the latest edition of NFPA 13 and locally enforced codes and regulations.
- B. Provide 100% fire sprinkler protection of the entire project area per NFPA and local fire bureau requirements.
- C. Provide sprinkler protection as required for kitchen spaces above ceiling areas and soffits with combustible (wood) construction.
- D. Provide fire protection for new walk-in cooler and freezer as required.
- E. Obtain fire protection water service from existing building branches and mains. Verify with existing piping and heads at the site.
- F. Coordinate with appropriate sub-contractors to provide operable flow, tamper and miscellaneous appurtenances required for complete systems per NFPA and the local fire bureau.
- G. Include all permit costs in the contract price.

**1.2 SUBMITTALS**

- A. Transmit submittals per architectural specifications to the architect for review. The submittals shall be bound in three-ring binders, have major topic tabs and an index. Submittal items larger than 8 1/2" x 11 shall be a reproducible drawing.
- B. Include shop drawings with the submittals where necessary to determine clearance, where the contractor proposes alternate equipment or material arrangements, and when requested by the owner's representative.
- C. The owner's representative must approve all material and equipment prior to installation.
- D. Submittals shall include:
  - 1. Manufacturer's catalog or technical data showing performance, dimensions, materials of construction and recommended methods of installation.
  - 2. Submit locations of all inspector test stations, building drains, alarm bells and other visible appurtenances to the owner's representative for review.
  - 3. Specifically note locations of exposed piping on the shop drawings for Owner's representative review.
  - 4. Provide information and coordinate with electrical contractor as to locations and power requirements for all alarms, tamper switches, flow switches etc.
  - 5. After Owner's representative's review, prepare fire protection system shop drawings as required by code showing location piping, alarm valves, piping sizes, test tees and valves, drain valves and other related items. Submit drawings to the governing fire bureau and appropriate insurance services for review per owner's requirements. After changes by the reviews are made, submit final sets of approved drawings to the Owner's representative.
  - 6. Final submittals are to include the governing fire bureau stamp of design acceptance.

**WATER BASED FIRE SUPPRESSIONS SYSTEMS**

**1.3 OPERATION AND MAINTENANCE DATA**

- A. Transmit operation and maintenance data per architectural specifications to the architect for review. The submittals shall be bound in three-ring binders, have major topic tabs and an index. Items larger than 8 1/2" x 11 shall be a reproducible drawing.
- B. O&M data shall include:
  - 1. Contractor name, address and telephone number.
  - 2. Maintenance instructions.
    - a. Include illustrations, diagrams, and instructions for installation, startup, operation, inspections, maintenance, parts list, data sheets and other necessary materials.
    - b. Include complete electrical, schematic and connection diagrams for each equipment item.
    - c. Where the literature covers more than one model, check off neatly in ink correct model number and data for the model number including all specified options.
    - d. Copy of Written Guarantee.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Sprinkler Heads: Tyco, Viking, Gem, Central, Reliable or approved equal.
  - 1. Sprinkler Heads: Heads to be U.L. listed standard product of the manufacturer.
  - 2. Non-Ceiling Area: Upright with standard brass finish.
  - 3. Sidewall Heads: Satin chrome finish.
  - 4. Ceiling Pendant: Recessed heads with white escutcheon plates.

**2.2 DESCRIPTION**

- A. Piping Material:
  - 1. Mains and Risers: Black Steel: Schedule 10 black steel or steel tubing with flanged, threaded or mechanical joint fittings.
  - 2. Branches: Schedule 40 with threaded fittings.
- B. Provide test orifices, miscellaneous valves, signing and appurtenances as required.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. General: Provide only NFPA approved and U.L., Inc. listed components.
- B. Obtain fire protection water service from existing piping at the site.
- C. Provide complete hydraulically designed system(s) as required by the Uniform Building Code, NFPA Standard 13 and the governing fire bureau.
  - 1. Determine the hazard level, area coverage requirement, flow requirements, head spacing, etc. from a review of architectural plans and specifications.
  - 2. Provide all piping, alarms, fire department connections, fire hose cabinets, test orifices, miscellaneous valves, signing and appurtenances as required.

**WATER BASED FIRE SUPPRESSIONS SYSTEMS**

3. The exact number of heads and design required will be determined by the contractor based upon drawings approved by the local fire bureau. The contractor is to provide fully designed and functional sprinkler systems meeting the requirements of NFPA and the local fire bureau. Provide all design, heads and equipment required for the complete functional systems.
  4. Coordinate sprinkler mains with drain fixtures and verify adequate drain receptors are available for the system, inspectors test, etc.
  5. Coordinate pipe routing with other trades requiring ceiling space for the installation of their equipment. Locate riser, valves, controls and accessories in the location approved and coordinated with the owner's representative. Coordinate with other trades and specialty drawings to determine exact riser location in room.
- D. Provide hangers, brackets, supports, anchors and related appurtenances, as required, to support all piping and equipment provided under this section. Piping and equipment supports shall conform to NFPA Standard 13.
- E. Anchorage and Seismic Restraints:
1. Provide supports for all piping and equipment as required by the manufacturers of specific equipment and the project governing code authorities.
  2. Provide seismic restraints on all mechanical equipment in conformance with the IBC. Costs for seismic calculations are to be included in the bid price.
  3. Provide anchorage data directly to the governing code jurisdiction for anchorage sway bracing and seismic restraints. Submittals to show locations and sufficient support details as required by the governing code jurisdiction.
- F. Sprinkler Head Installation: Spaces with multiple heads are to have the heads spaced symmetrically within the space. If more than the minimum head number is required for a symmetrical pattern within the space coordinated with other ceiling appurtenances, the symmetrical and coordinated appearance will govern the final layout and design.
- G. Piping Installation: Fire protection piping systems to be installed in conformance with NFPA Standard 13. Install all piping in a true and even manner with lines pitched for drainage and system arranged so it can be entirely emptied of water.
- H. Coordinate electrical connections for all flow and tamper switches, alarms and other fire protection system electrical connections required and include the cost of those connections in the contract price. Include in the contract price provisions to bring power to all points of connection related to the sprinkler fire protection system.
- I. Non-Ceiling Areas:
1. Piping locations shall be exposed and coordinated with lights, ducts and other equipment.
  2. Review all exposed sprinkler head locations with the owner's representative prior to installation.
  3. All fire protection piping exposed in the pool and pool equipment spaces to be painted with corrosion resistant primer and paint specifically formulated for that type of environment. Verify color selection with the Architect prior to application.
- J. Perform all tests and arrange for required inspections of installed system as required by NFPA Standard 13. Submit certificates of inspection and tests to Owner's representative.
- K. Install spare sprinkler cabinet where directed by Owner's representative.

**WATER BASED FIRE SUPPRESSIONS SYSTEMS**

**3.2 FIRESTOPPING PENETRATIONS IN FIRE-RATED WALL / FLOOR ASSEMBLIES**

- A. Contractors shall provide proper sizing when providing sleeves or core-drilled holes to accommodate their through penetrating items. All voids between sleeve or core-drilled hole and pipe passing through, shall be firestopped to meet the requirements of ASTM E-814.

**END OF SECTION**

**BASIC PLUMBING REQUIREMENTS**

**PART 1 - GENERAL**

**1.1 OTHER REQUIREMENTS**

- A. The Bidding, General and Supplementary of this project manual and specific sections as noted apply to the work specified in Plumbing Division 22 which encompasses Sections 22 00 00 through 22 42 00. This Section 22 00 00 applies to all sections of Division 22 Plumbing.

**1.2 SCOPE**

- A. It is the intent of these specifications and the accompanying drawings to describe complete plumbing systems installations for all building areas, new and renovation.
- B. Furnish and install all material, labor and equipment in accordance with these documents.
- C. Include all incidental items and work not specifically shown or specified but required by good practice in a complete system.
- D. The drawings and specifications are complementary. What is called for in one shall be called for in both.
- E. The drawings are diagrammatic but should be followed as closely as possible. Where required by jobsite conditions, relocate and provide fittings, etc., as required. Provide an allowance in the contract bid to furnish additional pipe and fittings required for coordination with structure and other construction trades.

**1.3 DEFINITIONS**

- A. Or approved equal: Requires approval prior to bid date.
- B. Indicated:
  - 1. The term "indicated" is a cross reference to details, notes, or schedules on the drawings, other paragraphs or schedules in the specifications, and similar means of recording requirements in the Contract Documents.
  - 2. Where terms such as "shown," "noted," "scheduled," and "specified" are used instead of "indicated," it is for the purpose of helping the reader locate the cross reference, and no limitation of location is intended except as specifically noted.
- C. Directed, Requested, Etc.: Where not otherwise explained, terms such as "directed," "requested," "authorized," "selected," "approved," "required," "accepted," and "permitted" mean "directed by the Engineer," "requested by the Engineer," etc. However, no such implied meaning will be interpreted to extend the Engineer's responsibility into the Contractor's area of construction supervision.
- D. Site or Project Site: The space available to the Contractor for the performance of the work, either exclusively or in conjunction with others performing the work as part of the project. The extent of the project site is shown on the plumbing drawings and is not identical with the description of the land upon which the project is to be built.
- E. Approved:
  - 1. Where used in conjunction with the Architect's response to submittals, requests, applications, inquiries, reports and claims by the Contractor, the meaning of the term "approved" will be held to the limitations of the Architect's responsibilities and duties as specified in the General and Supplementary Conditions.

**BASIC PLUMBING REQUIREMENTS**

2. In no case will "approval" by the Architect be interpreted as a release of the Contractor from responsibilities to fulfill requirements of the Contract Documents.

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

1.4 STANDARDS AND CODES

A. Provide all equipment and material and perform all work in accordance with all local, state and national codes and regulations.

B. For work on this project, comply with appropriate standards published by the following:

- |   |      |
|---|------|
| 1. American Gas Association   | AGA  |
| 2. American National Standards Institute  | ANSI |
| 3. Acoustical Society of America  | ASA  |
| 4. American Society of Mechanical Engineers   | ASME |
| 5. American Society for Testing and Materials   | ASTM |
| 6. City and County of Jurisdiction  |      |
| 7. State of Oregon  |      |
| 8. National Fire Protection Association   | NFPA |
| 9. Underwriters' Laboratories   | UL   |
| 10. International Building Code (w/State of Oregon Amendments)                                      | UBC  |
| 11. International Mechanical Code (w/State of Oregon Amendments - Oregon Mechanical Specialty Code) | UMC  |
| 12. Uniform Plumbing Code (w/State of Oregon Amendments - Plumbing Specialty Code)                  | UPC  |

1.5 APPROVAL OF EQUIPMENT AND MATERIALS

A. Manufacturer's trade names, catalog numbers and material specifications used in this specification are intended to establish the quality of equipment or materials expected. Materials and manufacturers not listed require approval prior to the bid date.

B. Approval of substitute equipment or materials will be based upon performance, quality and other factors deemed important by the Architect. The Contractor will be responsible for making all changes in this and other associated work required as a result of the substitution. Additional or modified structural calculations and roof penetrations required to accommodate the substitution will be the responsibility of the contractor.

1.6 SUBMITTALS

A. Transmit five sets of submittals to the Architect for review. The submittals shall be bound in three-ring binders, have major topic tabs and an index. In order to expedite approval of certain items, it is not necessary to transmit complete submittals initially. The initial transmittal will include the binder, expected tabs and an index indicating which items are included, the date each is transmitted, and which items are yet to be transmitted. Future transmittals shall include a revised index.

B. Furnish performance data and technical information on all materials and equipment to be used on the project.

C. Include shop drawings with the submittals where necessary to determine clearance, where the Contractor proposes alternate equipment or material arrangements, and when requested by the Architect.

**BASIC PLUMBING REQUIREMENTS**

- D. Items transmitted for approval must be received in the Architect's office within 45 days of contract award. The Architect prior to installation must approve all material and equipment.
- E. Review of submittals or shop drawings by the Architect does not relieve the Contractor from the requirements of the Contract Documents unless specific approval has been requested for a given deviation.

**1.7 QUALITY ASSURANCE**

- A. Maintain the highest standards of workmanship throughout the project.
- B. Use the latest editions of applicable and specifically referenced standards.
- C. Inspect all material and equipment upon arrival at the site and return any which is not in new condition.

**PART 2 - PRODUCTS**

Not Used

**PART 3 - EXECUTION**

**3.1 COORDINATION**

- A. Cooperate with other trades to assure that construction proceeds in an orderly and timely manner. Contract cost increases due to improperly sequenced work with other trades will not be allowed.
- B. Study the new and existing architectural, structural, electrical, shop and any specialty drawings as appropriate and specifications to determine required coordination.
- C. Prepare detailed shop drawings where necessary to assure proper fit and necessary clearance.
- D. Refer to electrical drawings to verify voltage and phase of plumbing equipment.

**3.2 PERMITS, FEES AND INSPECTIONS**

- A. Obtain all required permits and pay for all fees and connection charges.
- B. Schedule any required inspections.

**3.3 MATERIALS AND WORKMANSHIP**

- A. Furnish all materials and equipment in new condition, free from defects and of size, make, type and quality specified. Installation shall be in a neat and workmanlike manner.
- B. When two or more items of the same kind, type or class are required, use items of a single manufacturer.

**3.4 MEASUREMENTS**

- A. Take all measurements from reference datums established by the plumbing contractor.

**3.5 DELIVERY, HANDLING AND STORAGE**

- A. Receive all material and equipment at the jobsite or shop.
- B. Use proper and sufficient equipment to handle all products employed in the project.

**BASIC PLUMBING REQUIREMENTS**

- C. Where storage of material or equipment is necessary, it shall be a clean and weatherproof area. Seal any openings and cover the product to assure that there will be no corrosion or foreign matter introduced. Assure that it will be in new condition when placed in service.

**3.6 EQUIPMENT INSTALLATION, BRACING AND SUPPORT**

- A. Install all equipment in strict accordance with the manufacturer's instructions unless otherwise indicated.
- B. The drawings in general are based upon one of the specific manufacturers listed for a particular equipment item. The other specified manufacturers and additional approved manufacturers of equipment may require deviations from the drawings to properly install the particular equipment in accordance with the manufacturer's recommendations and to provide the system results required. Provide all work necessary in the base bid price to install this equipment.
- C. Where the installation shown or specified is contrary to the manufacturer's instructions, advise the Architect in writing of the differences before proceeding with the installation.
- D. Anchorage to Floors, Roofs, Etc., Sway Bracing and Seismic Restraints:
  - 1. The contractor is responsible to determine the means and methods of equipment installation and support.
  - 2. Provide supports for all apparatus as specified, detailed, as required by the manufacturers of specific equipment and the project governing code authorities. Anchor all roof and base/floor mounted equipment with size and spacing of anchor bolts or other attachment means as recommended by the respective equipment manufacturer.
  - 3. Provide seismic restraints on all mechanical equipment in conformance with the 2014 Oregon Structural Specialty Code, Section 1613 "Earthquake Loads" and ASCE 7. Costs for seismic calculations are to be included in the bid price.
  - 4. Provide deferred submittals directly to the governing code jurisdiction for anchorage to floors, roofs, etc., sway bracing and seismic restraints. Submittals to show locations and sufficient support details as required by the governing code jurisdiction.
  - 5. Provide supplementary drawings and calculations as required by governing code jurisdictions noting seismic support data/calculations as required for permit purposes.
  - 6. Mechanical seismic criteria is as follows:

a.	Risk Category	III
b.	Seismic Design Category	D
c.	Component Importance Factor (Ip)	
1)	Natural gas system / components	1.5
2)	Other plumbing components	1.5
- E. Maintain a copy of the manufacturer's installation instructions at the jobsite for all equipment.

**3.7 SLEEVES AND INSERTS**

- A. Provide sleeves at all locations where piping and ductwork passes through building construction.
- B. Sleeves for interior walls and floors shall be 22-gauge galvanized or heavier as required. Sleeves for exterior walls shall be cast iron, wall thickness as required.
  - 1. Wall sleeves shall be installed in all exterior walls and all interior masonry or fire-rated walls in a manner that preserves the fire-rated or watertight integrity of the wall.
  - 2. Interior wall sleeves for uninsulated pipe shall allow minimum 1/4-inch clearance all around pipe for pipe movement. Allow 1-inch clearance around pipe at building expansion joints.



**BASIC PLUMBING REQUIREMENTS**

- 3. Interior wall sleeves for insulated piping shall be selected to encompass the pipe and insulation and allow minimum 1/4-inch clearance around insulation for pipe movement. Allow 1-inch clearance around pipe and insulation at building expansion joints.
- 4. Floor sleeves shall extend 4-inches above the floor and shall be sealed watertight. Floor sleeves shall be oversized to allow 1/2-inch minimum space all around pipe or pipe and insulation where applicable. Seal space between pipe and sleeve with Dow Corning Fire Stop System, 3M brand CP25 or approved equal. Sealant must be between pipe and sleeve. Sealant between insulation and sleeve is not acceptable. Install firestop materials in complete accordance with the manufacturer's instructions and in compliance to applicable UL listings..
- C. Seal space between pipe and sleeve with Dow Corning Fire Stop System, 3M Brand CP25 or approved equal where piping penetrates firewall or floors. Sealant must be between pipe and sleeve; sealant between insulation and sleeve is not acceptable. Install firestop materials in complete accordance with the manufacturer's instructions and in compliance to applicable UL listings.
- D. Utilize Linkseals or similar closures on core-drilled penetrations through below grade walls. Repair existing below grade waterproofing systems as applicable.

3.8 FLOOR, WALL AND CEILING PLATES

- A. Provide escutcheon plates where all exposed piping passes through finished walls, floors and ceilings, including accessible cabinet spaces.
- B. Floor plates: deep recessed, cast brass, chrome plated.
- C. Wall and ceiling plates: spun aluminum, chrome plated.
- D. Secure plates to pipe or structure. Plates shall not penetrate insulation vapor barriers. Size plates to sufficiently cover pipe sleeves and openings in finish materials.

3.9 ACCESS DOORS AND PANESL

- A. Manufacturers: CESCO, Milcor, Elmdor. CESCO used as basis of selection.
- B. Non-rated panels: Style W, SR-1, SR-2, P, PX as required for wall or ceiling construction, 12 inch x 12 inch or larger as required for ease of access.
- C. Fire-rated panels: Style FB, U.L. listed for 1-1/2 hr for fire rated stud and masonry wall systems.
- D. Provide access panels where shown on the drawings or as required for proper access to mechanical appurtenances. Coordinate the installation of access panels is with the specific building construction penetrated. Coordinate access panel installation with Manufacturers instructions.
- E. Locate and size access doors to facilitate equipment service and optimize the safety of the maintenance personnel. Minimum access door size to be 18"x 18".

3.10 PROTECTION

- A. Protect all work, material and equipment from loss or damage until the Owner accepts the project.
- B. As the work progresses, keep all equipment covered and cap all piping that may temporarily be left unconnected.
- C. Notify all other trades of any required precautions necessary to protect the work.

**BASIC PLUMBING REQUIREMENTS**

**3.11 ACCESSIBILITY**

- A. Provide convenient access by location or access panel to all equipment requiring periodic service.

**3.12 ELECTRICAL WORK**

- A. Materials and work to be provided as a part of this Plumbing Division 22 are:
  - 1. Equipment control wiring.
  - 2. Interlock wiring.
  - 3. Motor starters.
- B. Wherever possible, provide all interconnect wiring within or on a piece of equipment with the equipment unless shown or specified otherwise. An electrician licensed to perform this type of work shall perform all field wiring.

**3.13 RELATED WORK**

- A. The following work and materials are specified elsewhere:
  - 1. Pipe chases, equipment pads and foundations, trenches, painting, air louvers, louvered penthouse and access panels except as otherwise specified in this division.
  - 2. Framed openings, wood grounds and nailing strips, masonry, concrete and other architectural and structural elements.
- B. The following work and materials are specified in Electrical Division:
  - 1. Power wiring.
  - 2. Disconnect switches.
  - 3. Furnishing and installation of disconnect switches.
  - 4. Installation of magnetic starters.

**3.14 CLEANING**

- A. Maintain premises and public properties free from accumulations of waste, debris and rubbish during construction.
- B. Clean all plumbing equipment of dust, grease, iron cuttings, unnecessary stamps or shipping labels, etc.
- C. Touch up factory-painted surfaces, as necessary, with paint of matching color.

**3.15 RECORD DRAWINGS**

- A. Maintain one set of construction drawings at the jobsite for the sole purpose of recording work of the plumbing contract, as actually installed. Upon request, the Architect will make the original tracings available to the plumbing contractor for printing the drawings. The Contractor shall pay the reproduction costs.
- B. Record all piping by dimensions from gridlines, below grade, above floor, etc. Show location of all access panels, cleanouts, rough-in for future, etc.
- C. Make record drawings available to the Architect for review or reproduction during construction. The Architect will pay any printing costs.
- D. Deliver record drawings to the Architect promptly upon completion of the project.

**BASIC PLUMBING REQUIREMENTS**

3.16 OPERATION AND MAINTENANCE MANUALS:

- A. Submit three copies of the Operation and Maintenance Manuals to the Architect for approval before project completion. Bind the instruction books with three-ring 8-1/2" x 11" side binders with plastic covers. Include an index and tabs for major systems and equipment. Operation and Maintenance Manuals shall include the following:
- B. Directories:
  - 1. Supplier Directory: Alphabetical list of principal subcontractors and suppliers of equipment giving names, addresses and telephone numbers.
  - 2. Equipment Directory: List of plumbing equipment installed such as, pumps, water heaters, plumbing fixtures, etc., giving drawing reference numbers, location, area served, manufacturer with model number and supplier.
- C. Manufacturer's Literature:
  - 1. Show name, address and phone number of the nearest service facility authorized by the manufacturer.
  - 2. Include illustrations, diagrams, and instructions for installation, startup, operation, inspections, maintenance, parts list, data sheets and other necessary materials.
  - 3. Include complete electrical, schematic and connection diagrams for each equipment item.
  - 4. Include the name, address and phone number of contractor(s) who furnished and who installed equipment and systems.
  - 5. Where the literature covers more than one model, check off neatly in ink correct model number and data for the model number including all specified options.
  - 6. In those instances where the equipment, its mode of control, or both, is job assembled for special functions, then provide written operating and maintenance instructions prepared by the assembler on 8-1/2" x 11" sheets.
- D. Maintenance Instructions:
  - 1. Where instructions for maintenance are not included in the manufacturer's literature, provide supplemental data to enable proper maintenance of the equipment installed.
  - 2. Include specific lubrication methods and recommended frequencies along with procedures and precautions for inspection and routine service.
- E. Copy of Written Guarantee.
- F. Recommended Spare Parts Stock.

3.17 OWNER MEETING

- A. Schedule a meeting between the Contractor's representative and the Owner for the purpose of reviewing operation and maintenance of the building mechanical systems. The Contractor's representative shall be well qualified and knowledgeable of the systems in this facility.
- B. The meeting shall be scheduled to allow the Owner and appropriate subcontractors and equipment suppliers to attend.
- C. The meeting shall be scheduled promptly upon completion of the project and approval of the Operation and Maintenance Manuals.
- D. The Contractor shall review the Operation and Maintenance Manuals and record drawings in detail with the Owner.

**BASIC PLUMBING REQUIREMENTS**

**3.18 CUTTING AND PATCHING**

- A. Cut work as required for installation and patch to match original conditions as directed and approved by Architect. Do not cut structural portion without Architect's approval.
- B. When masonry construction must be penetrated, provide a steel pipe sleeve in opening and grout in place in a neat manner. Leave grout surface to match existing finish.
- C. Prior to cutting any existing work, locate all concealed utilities to eliminate any possible service interruption or damage.

**3.19 FIRESTOPPING PENETRATIONS IN FIRE-RATED WALL/FLOOR ASSEMBLIES**

- A. Contractors shall provide proper sizing when providing sleeves or core-drilled holes to accommodate the through penetrating items. All voids between sleeve or core-drilled hole and pipe passing through, shall be firestopped to meet the requirements of ASTM E-814.
- B. Fire stop penetrations in accordance with the U.L. listed assemblies provided by the manufacturers of the products used.

**3.20 CONTRACT COST DATA**

- A. Furnish to the Architect a cost breakdown of the Plumbing Contract with major systems and equipment broken out with itemized costs.

**3.21 CHANGE ORDERS**

- A. All supplemental cost proposals by the Contractor shall be accompanied with a complete itemized breakdown of labor and materials cost without exception.
- B. Contractor's estimating sheets for the supplemental cost proposals shall be made available to the Architect. Labor must be separated and allocated for each item of work.

**3.22 VERIFICATION OF EXISTING CONDITIONS**

- A. Verify field conditions and measurements prior to the manufacture or order of materials and equipment.
- B. Produce shop drawings with details as required to verify proper installation of materials & equipment in conformance with applicable codes and the manufacturer's requirements.

**BASIC PLUMBING REQUIREMENTS**

3.23 SYSTEMS WIRING

	ITEM		FURNISHED BY	INSTALL BY	POWER WIRING	CONTROL WIRING
1.	Division 22 Equipment Motors		Div. 22	Div. 22	Div. 26	Div. 22
2.	Motor Starters, Contactors and Overload Heaters – Integral		Div. 22	Div. 26	Div. 26	Div. 22
3.	Motor Control Centers		Div. 26	Div. 26	Div. 26	Div. 22
4.	Fused & Unfused Disconnect Switches		Div. 26	Div. 26	Div. 26	-----
5.	Manual Operation Switches		Div. 26	Div. 26	Div. 26	Div. 26
6.	Control Relays & Transformers		Div. 22	Div. 22	Div. 22	Div. 22
7.	Energy Management Control Panels		Div. 22	Div. 22	Div. 22	Div. 22
8.	Motorized Solenoid Valves		Div. 22	Div. 22	Div. 22	Div. 22

**END OF SECTION**



**METERS AND GAGES FOR PLUMBING PIPING**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section prescribes the requirements for materials and methods of installation of gauges and instruments specified, shown on the drawings or required by good practice.

**1.2 SUBMITTALS**

- A. Manufacturer's catalog or technical data substantiating

**PART 2 - PRODUCTS**

**2.1 PRESSURE GAUGES**

- A. Manufacturers: Marshalltown, Ashcroft, Marsh or approved equal. Marshalltown used as basis for selection.
- B. Type: Figure 224WF with 4 1/2" dial, bottom stem connection, midrange reading during system operation and Figure 123 cock.

**2.2 THERMOMETERS**

- A. Manufacturers: Marshalltown, Ashcroft, Marsh, Palmer, Tel-Tru or approved equal. Marshalltown used as basis for selection.
- B. Type: Model V-3 adjustable model with 3 1/2 inch dial, 50 to 250 F. range for hot water.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Install all gauges and thermometers where shown on the drawings and in accordance with manufacturer's recommendations.
- B. Pressure gauge and thermometers shall be installed or located to be easily read from the floor.

**END OF SECTION**





**GENERAL DUTY VALVES FOR PLUMBING**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Work included: Providing of all required valves, cocks and faucets.

**1.2 SUBMITTALS**

- A. Provide submittals in accordance with Section 22 00 00.
- B. Submittals shall include manufacturer's catalog or technical data showing performance, dimensions, materials of construction and recommended methods of installation.

**1.3 OPERATION AND MAINTENANCE DATA**

- A. Provide O&M data in accordance with Section 22 00 00.
- B. O&M data will include manufacturer's literature and Maintenance instructions.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Gate Valves, Ball Valves and Drain Valves: Hammond, Stockham, Nibco, Milwaukee or approved equal. Hammond used as basis of selection.

**2.2 DESCRIPTION**

- A. All valves used in potable water applications are to be third party certified by a state recognized certifying agency to comply with 2014 Federal Lead free act.
- B. Gate Valve (Domestic Water Service): Hammond part UP-647, Class 125, 200 PSI non-shock cold water rated solder type bronze body gate valve with solid wedge disc, integral seat, threaded bonnet, non-rising stem, iron handwheel.
- C. Ball Valves (Domestic Water Service): Ball valves for domestic water service shall be Hammond part 8604 (threaded ends) / 8614 (soldered ends), 150 SWP / 600 WOG, 400 PSI non-shock cold water rated 3-piece bronze body ball valve with full port, blow out proof stem, RTFE seats and PTFE packing, free floating chrome plated brass ball.
- D. Drain Valves: Hose end valve, 150 WWP, adjustable packing nut and stuffing box, Buna-N seats, iron handwheel. Provide cap & chain.
- E. Horizontal Swing Check Valves: Hammond part UP-943, 125 lb. screwed, swing check valve with renewable Teflon composition disc.
- F. Vertical/Spring and Silent Check Valves: Acceptable Manufacturers: Metra-Flex or TRW Mission Duo Check II, ASA 150 Class, semi-steel or cast iron body, bronze trim.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Provide valves at connections to equipment, where shown on the drawings or as required.

**GENERAL DUTY VALVES FOR PLUMBING**

- B. Install all valves with stem horizontal or above, accessible and same size as connected piping.
- C. Provide separate support for valves where necessary.
  - 1. Install check valves in horizontal position only

**END OF SECTION**

**HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT**

**PART 1 - GENERAL**

1.1 SUMMARY

- A. Work included: Providing of all required hangers and supports for piping, and equipment.

1.2 SUBMITTALS

- A. Provide submittals in accordance with Section 22 00 00.
- B. Submittals shall include:
  - 1. Manufacturer's technical literature for all products used indicating service for each type of hanger.
  - 2. Include proposed pre-manufactured piping and duct vibration isolation products.
  - 3. Submit literature or describe duct-supporting method.

**PART 2 - PRODUCTS**

2.1 MANUFACTURERS

- A. M-CO, Grinnell, Super Strut. M-CO used for selection.
- B. Vibration Isolators:
  - 1. Type of isolator, base, and minimum static deflection shall be as required for each specific equipment application as recommended by isolator or equipment manufacturer but subject to minimum requirements indicated herein.
  - 2. Uniform Loading: Select and locate isolators to produce uniform loading and deflection even when equipment weight is not evenly distributed.
  - 3. Mason Industries products used as basis of selection.

2.2 DESCRIPTION

- A. Pipe Attachments:
  - 1. Non-insulated ferrous pipe (1/2 to 1-1/2 inch): Figure 100.
  - 2. Non-insulated ferrous pipe (2 inch and larger): Figure 400.
  - 3. Non-insulated copper pipe: Figure 101.
  - 4. Insulated pipe: Figures 1031 and 4031.
  - 5. Riser clamp, ferrous pipe: Figure 510.
  - 6. Riser clamp, plastic DWV: Figure 515.
- B. Upper Attachments: Attachment to wood structures where weights permit shall be Figure 325 or 328.
- C. Structural Attachments: Provide all necessary structural attachments such as concrete anchors, beam clamps, hanger flanges and brackets. Hangers shall not be suspended from other piping, equipment, etc.
- D. Miscellaneous items such as hanger rod, rod couplings, turnbuckles, etc. shall be standard figure numbers of the same manufacturer as the attachments.
- E. All-threaded rods for pipe supports shall be no less than 3/8" diameter.
- F. All floor mounted equipment to be placed on a 4-inch high concrete housekeeping pad.

**HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT**

- G. Rooftop pipe supports:
  - 1. B-line DBR series or equal.
  - 2. Rubber block supports: DBP Series 6"Wx4"Tx4.8L
    - a. Accessories fastened directly into rubber material with weather resistant type 12 lag screws.
    - b. 14 ga galv. Channel.
    - c. Roller supports.
  - 3. Electro-plated steel brackets, axle & hardware.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Provide hangers and supports in accordance with the instructions furnished by the manufacturers of these devices.
- B. For horizontal pipe lines install pipe hangers with maximum hanger spacing and maximum hanger rods as recommended in Table 6 of the 2016 edition of the ASHRAE Guide and Data Book, Systems and Equipment Chapter 41: Where concentrated loads of valves, fittings, etc. occur, closer spacing will be necessary and shall be based on the weight to be supported and the maximum recommended loads for the hanger components. Cast iron soil pipe shall be supported at every joint.
- C. Horizontal banks of piping for plumbing piping only, i.e. domestic hot and cold water, may be supported on a common steel channel strut member spaced not more than the shortest allowable span required on the individual pipe. Piping to be maintained at these relative lateral positions using clamps, slips or free to roll axially or slide using a Figure 125 insulated protector at all points of support for insulated lines.
- D. Provide additional structural members where required to support piping or ductwork.
- E. Provide hangers and support devices in accordance with the equipment manufacturer's instructions for all equipment.
- F. Anchorage to Floors, Roofs, Etc., Sway Bracing and Seismic Restraints:
  - 1. The contractor is responsible to determine the means and methods of equipment installation and support.
  - 2. Provide supports for all apparatus as specified, detailed, as required by the manufacturers of specific equipment and the project governing code authorities. Anchor all roof and base/floor mounted equipment with size and spacing of anchor bolts or other attachment means as recommended by the respective equipment manufacturer
  - 3. Always consult roofing manufacturer for roof membrane compression capacities.
  - 4. Gas pipe spacing subject to local gas authorities.
  - 5. Use properly sized pipe clamps to suit pipe size(s).
  - 6. Provide seismic restraints on all mechanical equipment in conformance with the 2009 Oregon Structural Specialty Code Section 1613 "Earthquake Loads". Costs for seismic calculations are to be included in the bid price.
  - 7. Provide deferred submittals directly to the governing code jurisdiction for anchorage to floors, roofs, etc., sway bracing and seismic restraints. Submittals to show locations and sufficient support details as required by the governing code jurisdiction.
  - 8. Provide supplementary drawings and calculations as required by governing code jurisdictions noting seismic support data/calculations as required for permit purposes.

**END OF SECTION**

**VIBRATION AND SEISMIC CONTROLS FOR PLUMBING PIPING AND EQUIPMENT**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Work included: Providing of all seismic restraints and vibration isolation for plumbing equipment.

**1.2 QUALITY ASSURANCE**

- A. Equipment: All plumbing equipment mounted on vibration isolators shall be provided with seismic restraints capable of resisting a horizontal force of 100 percent of the weight of the equipment furnished.
- B. Piping: Refer to specification section 22 05 29, Hangers and Supports for Plumbing Piping and Equipment.

**1.3 SUBMITTALS**

- A. Provide submittals in accordance with Section 22 00 00.
- B. Submittals shall include:
  - 1. Manufacturer's technical literature for all products used including weights, dimensions and standard connections.
  - 2. Indicate service for each type of hanger.

**PART 2 - PRODUCTS**

**2.1 GENERAL REQUIREMENTS**

- A. Type of isolator, base, and minimum static deflection shall be as required for each specific equipment application as recommended by isolator or equipment manufacturer but subject to minimum requirements indicated herein.
- B. Uniform Loading: Select and locate isolators to produce uniform loading and deflection even when equipment weight is not evenly distributed.
- C. Mason Industries products used as basis of selection.

**2.2 VIBRATION ISOLATORS**

- A. Piping Systems:
  - 1. Provide isolation by either floor mount or hangers with 3/4-inch deflection.
  - 2. Provide oversized wall penetrations, line with neoprene and seal with resilient caulk or firestop material as appropriate.
  - 3. Isolate domestic water piping from structure with Holdrite. Attach to one side of double stud wall.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Provide vibration isolation above for the noted plumbing systems. Install all vibration isolation devices in accordance with manufacturer's installation instructions. Provide additional support members, unistrut bracing, etc as required for proper installation of isolation devices.

**VIBRATION AND SEISMIC CONTROLS FOR PLUMBING PIPING AND EQUIPMENT**

- B. Inspection and Adjustments: Check for vibration and noise transmission through connections and floor. Adjust, repair, or replace isolators as required to reduce vibration and noise transmissions to specified levels.
- C. On all sides of suspended equipment, provide bracing for rigid supports and provide restraints for resiliently supported equipment. The slack cable restraint method, Mason Industries, or equal, is acceptable.

**3.2 ADJUSTING**

- A. Adjust vibration isolators after equipment is at operating weight.
- B. Adjust limit stops on restrained spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.
- C. Adjust active height of spring isolators.
- D. Adjust seismic restraints to permit free movement of equipment within normal mode of operation.
- E. Torque anchor bolts according to equipment manufacturer's recommendations to resist seismic forces.

**END OF SECTION**

**IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT**

**PART 1 - GENERAL**

1.1 SUMMARY

- A. Work included: Providing of all required identification systems for equipment and piping.

1.2 SUBMITTALS

- A. Provide submittals in accordance with Section 22 00 00.
- B. Submittals shall include:
1. List of proposed equipment and valve tags.
  2. Product information on piping markers.

**PART 2 - PRODUCTS**

2.1 MANUFACTURERS

- A. W. H. Brady Co. or Seton.

2.2 DESCRIPTION

- A. Equipment Identification: Equipment identification tags shall be three-ply, white center, black face plastic plates with 1/2" high letters for major and 1/4" high letters for minor equipment.
- B. Piping Markers:
1. All vinyl self-sticking labels.
  2. Markers shall comply with the district standard for width, size of letters, background colors, etc. Markers to comply with the following color convention:

<u>Service</u>	<u>Color</u>
Steam	Aluminum
Hot Water Heating	Tan
Cooling Water	White
Chilled Water	Green
Domestic Cold Water	Blue
Domestic Hot Water	Gold
Natural gas	Yellow
Compressed Air	Black
Fire Service Water	Red
Waste and Vent	Brown

3. Labels shall indicate "supply", return" or "recirculation" as applicable to the piping system.
- C. Valve Tags: Tags shall be not less than one inch in diameter, 0.64 brass. Information included on the tag will be:
1. Valve Type.
  2. Service Line (i.e. Hot Water).
  3. Sequential number associated with the project.
- D. Utility Markers: Brady Identoline plastic tape, 6 inch.
- E. Ceiling Markers: Standard label tape type.

**IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT**

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Provide each piece of roof equipment with a manufacturer's standard nameplate indicating manufacturer's name, model number, capacities and characteristics.
- B. In addition, provide each piece of equipment with a plastic tag indicating its designation on this project and the area served. Mount this tag with screws, where possible, in a clearly visible location.
- C. Affix piping markers to pipe or insulation in locations that make them clearly visible. Secure markers with two wraps of "Scotch Reinforced Tape" at each end.
- D. Locate markers at intervals of 15 to no more than 50 feet allowing visual identification of a line from any point along that line and as follows: At each valve, where a pipe passes through a wall, direction of flow on each leg of a "T" and on lower quarters of the line on horizontal runs where view is not obstructed.
- E. Provide arrow markers to indicate direction of flow away from each pipe identification marker.
- F. Affix valve tags to valves using brass chain.
  - 1. Provide an approved copy of the valve schedule in each Operation and Maintenance Manual.
  - 2. Furnish one copy of the schedule framed under glass to the owner's representative
  - 3. Information will include:
    - a. Valve locations by plan room number.
    - b. Function of the valve (i.e. equipment isolated).
    - c. Service Line (i.e. Hot Water).
- G. Provide plastic tape utility markers over all buried piping. Provide identification on tape. Install over the entire length of the underground piping utilities. Install plastic tape along both sides and the centerline of the trenches, at the elevation of approximately 12 inches above the top of utility.
- H. Provide ceiling labels for all equipment located above drop or hard ceilings. The markers shall indicate the equipment symbol associated with the contract documents and the type of equipment. Locate the labels per the following:
  - 1. Lay-in Ceiling - Locate the label on the ceiling grid member closest to the equipment location.
  - 2. Hard Ceiling - Locate the label on the access panel servicing the unit or closest access point.

**END OF SECTION**



**TESTING OF PLUMBING**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Work Included: Pressure testing of piping.

**1.2 OPERATION AND MAINTENANCE DATA**

- A. Provide O&M data in accordance with Section 22 00 00.
- B. O&M data shall include certificate of completion, inspection and test by authority having jurisdiction on required piping systems.

**1.3 QUALITY ASSURANCE**

- A. Code Compliance: Perform required tests in the presence of the authority having jurisdiction.

**PART 2 - PRODUCTS**

**2.1 DESCRIPTION**

- A. The Contractor shall furnish instruments, gauges, meters and necessary connection points for performance of the tests.

**PART 3 - EXECUTION**

**3.1 GENERAL**

- A. Piping: Test prior to concealment, insulation being applied, and connection to equipment, fixtures, or specialties. Conduct tests with all valves but those used to isolate the test section 10% closed.
- B. Leaks: Repair all leaks or replace defective pipe or fittings and retest until stipulated results are achieved.
- C. Notification: Advise the Architect 48 hours in advance of each test. Failure to so notify will require test to be rescheduled.
- D. Testing Equipment: Provide all necessary pumps, gauges, connections similar items required to perform the tests.

**3.2 TESTING REQUIREMENTS**

- A. Sanitary Systems: Test entire system or sections of system by closing all openings in piping except the highest opening and filling system with water to the point of overflow. If the system is tested in sections, plug each opening except the highest opening of the section under test and fill each section with water, but none with less than 6 feet head of water above the maximum estimated ground water level. Keep the water in system, or in portions under test, for 24 hours before testing begins. Test for six (6) hours with a maximum of 0.3 gallon per hour per inch diameter per 100 feet run of loss allowed. Locate and repair leaks. The maximum pressure on the lowest system invert is not to exceed 16 feet of head.

**TESTING OF PLUMBING**

- B. Piping - General: Test all piping as noted below, with no leaks or loss in pressure for the time indicated. Repair or replace defective piping until tests are completed successfully.

<u>System</u>	<u>Pressure</u>	<u>Medium</u>	<u>Duration</u>
Domestic Water Systems	150 psig	water	4 hours
Misc. Piping	1.5x normal oper. pressure	nitrogen or water as appropriate	4 hours

**END OF SECTION**

**PLUMBING INSULATION**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Work included: Providing of all required insulation for equipment.

**1.2 SUBMITTALS**

- A. Provide submittals in accordance with Section 22 00 00.
- B. Submittals shall include:
  - 1. Data to show compliance with flame and smoke rating.
  - 2. Manufacturer's catalog or technical data showing performance, dimensions, materials of construction and recommended methods of installation.

**1.3 QUALITY ASSURANCE**

- A. Insulation materials and accessories such as adhesives, cement, etc. shall have composite fire and smoke hazard ratings, as tested by procedures indicated in NFPA 255 and U.L. 723, not to exceed a flame spread index of 25 and a smoke developed index of 50. Products or their shipping cartons shall have identification of the flame spread and smoke developed index.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Owens-Corning, Certain-teed, Johns Manville or approved equal.

**2.2 DESCRIPTION**

- A. Domestic Water Insulation
  - 1. Manville Micro-Lok AP-T molded fiberglass.
  - 2. Pipe fittings: Manville Zeston one-piece premolded PVC covers with fiberglass blanket insulation.
  - 3. Foam filled elbows are not acceptable.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Piping:
  - 1. Domestic Cold Water: Provide 1/2-inch minimum pipe insulation on domestic cold water piping.
  - 2. Domestic Hot Water and Hot Water Return:
    - a. Provide 1-inch pipe insulation on domestic hot water and domestic hot water return less than or equal to 2 inches diameter.
    - b. Provide 1-1/2 inch pipe insulation on domestic hot water and domestic hot water return greater than 2 inches.
  - 3. Insulate fittings on piping utilizing preformed pipe covering.
  - 4. Insulate all valve bodies, fittings, unions, flanges and equipment with insulation equal to the attached service piping.
  - 5. Seal all insulation to maintain a vapor barrier.

**PLUMBING INSULATION**

6. Provide 1-inch pipe insulation on horizontal storm/overflow storm drain piping and roof/overflow roof drain bodies. Seal all insulation to maintain a vapor barrier.

**END OF SECTION**

**FACILITY WATER DISTRIBUTION**

**PART 1 - GENERAL**

1.1 SUMMARY

- A. Work included: Providing of all required pipes and pipe fittings.

1.2 OPERATION AND MAINTENANCE DATA

- A. Submit certificates of inspections and tests to owner.

1.3 QUALITY ASSURANCE

- A. Piping material and installation to meet requirements of the local plumbing, fire and building codes and serving utility requirements.
- B. Pipe Cleaning: Should any pipe be plugged, the piping shall be disconnected, cleaned and reconnected without additional cost to Owner.
- C. Damage to the building or systems resulting from failure to properly clean the system shall be corrected without additional expense to the Owner.

**PART 2 - PRODUCTS**

2.1 MANUFACTURERS

- A. Pipe and fittings: Standard product of manufacturer.
- B. Flexible connectors: Anaconda, Aeroquip or approved equal.
- C. Seismic/expansion joint flex piping: Unisource, Metraflex, Mason. For other manufacturers, submit substitution request.

2.2 DESCRIPTION

- A. Copper Pipe - Plumbing:
  - 1. Pipe: Hard drawn copper type "L" above grade and hard drawn copper type "K" below grade, ASTM B88.
  - 2. Fittings: Wrought copper solder type.
  - 3. Solder
    - a. Above ground: 2" and smaller - Lead free, 95-5, tin silver and flux.
    - b. Below ground: 2 1/2" and larger - Lead free, brazing alloy and flux.
- B. Seismic/Expansion joint flex piping
  - 1. 150 psi rating, capable of + or - 4" movement in any direction.
  - 2. Sweat, weld or flanged ends as applicable to system connected.
  - 3. Copper for domestic piping.
  - 4. FM and NFPA rating for fire service.
  - 5. Domestic water piping expansion loops to be specifically UL listed for use in potable water systems.
  - 6. Unisource V-BF11 seismic expansion. Materials and connections to match system piping material construction and size.

**FACILITY WATER DISTRIBUTION**

**PART 3 - EXECUTION**

**3.1 PREPARATION - MEASUREMENTS, LINES AND LEVELS**

- A. Check dimensions at the building site and establish lines and levels for the work specified in this Division.

**3.2 PIPING INSTALLATION**

- A. Install water distribution system sized in conformance with the drawings.
- B. Install unions in all non-flanged piping connections to apparatus and adjacent to all screwed control valves, traps, and appurtenances requiring removal for servicing, so located that piping may be disconnected without disturbing the general system.
- C. Provide easily accessible shut off valves on each branch of piping, to facilitate maintenance and repair without shutting down supply to large sections of the building.
- D. Install all piping as to vent and drain.
- E. Support all piping independently at apparatus so that the equipment shall not carry its weight.
- F. Dielectric Fittings: Provide dielectric couplings, unions or flanges between dissimilar metals. Additionally, provide dielectric couplings as required to isolate cathodically protected piping and equipment. Fittings shall be suitable for the pressure and temperature to be encountered.
- G. Domestic water piping joints
  1. Above ground:
    - a. 2" and smaller - soldered.
    - b. 2-1/2" and larger - brazed.
  2. Below ground: Brazed.
- H. Screwed Joints: Ream pipe ends. Apply dope or tape to male threads only. Brass joints shall be made with Teflon tape only. Make up fitting with not over two threads showing beyond the fitting end. Make junctions of galvanized pipe to cast iron with tapped spigots or half couplings screwed to the end of galvanized pipe to form a spigot end.
- I. Solder Type Joints:
  1. Clean the copper tubing and fittings thoroughly with steel wool before applying the flux. The copper tubing shall have all burrs removed, be reamed to full bore, and be true and round for all joints.
  2. Apply heat uniformly to secure penetration of the filler material. Leave full bead around the entire circumference of the joint to show proper penetration and sealing.
  3. Flux shall not be used for copper-to-copper joints. Flux shall be used for joining copper to brass or bronze. In those cases where flux is used, particular care shall be exercised in applying the flux to avoid leaving any excess inside the completed joints.
- J. Provide flexible connectors at all piping connections to mechanical equipment.
- K. Provide seismic bracing and support per SMACNA "Seismic Restraint Manual Guidelines for Mechanical Systems", see drawings for Seismic Hazard Level.

**FACILITY WATER DISTRIBUTION**

- L. Provide expansion loops/fittings as noted on the drawings and where piping passes through building expansion/seismic joints. Install the loops in accordance with the manufacturer's instructions. Provide hangers and guides as recommended.
- M. Flush piping system of all construction dirt.
- N. Chlorination: Disinfect the domestic hot and cold water piping as follows:
  - 1. Fill systems with a solution of 50 ppm available chlorine for four hours
  - 2. During this time, open and close all valves at least twice.
  - 3. Flush the system with water until the residual chlorine content is not more than 1 ppm.
- O. Test piping system per Section 22 05 93.

**3.3 SPECIALTIES INSTALLATION**

- A. Install all piping specialties where shown on the drawings and in accordance with manufacturer's recommendations.

**END OF SECTION**





**DOMESTIC WATER PIPING SPECIALTIES**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section prescribes the requirements for materials and methods of installation of piping specialties for piping systems where indicated required by code or as good practice dictates.

**1.2 SUBMITTALS**

- A. Catalog or technical data on automatic flow control valves for proposed manufacturer.
- B. Operating and maintenance data.

**PART 2 - PRODUCTS**

**2.1 UNIONS**

- A. Type: 150 malleable iron, brass to iron seat, ground joint, black or galvanized to match pipe. 200-psi wog bronze, ground joint, solder type for copper tubing. Where dissimilar metals join, dielectric unions, couplings or flanges shall be installed.

**PART 3 - EXECUTION**

**3.1 INSTALLATION - GENERAL**

- A. Provide unions at all mechanical equipment connections as required allowing equipment removal from piping without destruction or cutting of piping or pipe joints.

**END OF SECTION**



**FACILITY SANITARY SEWERS**

**PART 1 - GENERAL**

1.1 SUMMARY

- A. Work included: Providing of all required sanitary waste and vent systems' piping, and utility connections for all services specified or shown on the drawings or required by demolition.

1.2 OPERATION AND MAINTENANCE DATA

- A. Submit certificates of inspections and tests to owner.

1.3 QUALITY ASSURANCE

- A. Piping material and installation shall meet requirements of the local plumbing, fire and building codes and serving utility requirements.
- B. Pipe Cleaning: Should any pipe be plugged, the piping shall be disconnected, cleaned and reconnected without additional cost to Owner.
- C. Damage to the building or systems resulting from failure to properly clean the system shall be corrected without additional expense to the Owner.

**PART 2 - PRODUCTS**

2.1 MANUFACTURERS

- A. Pipe and fittings: Standard product of manufacturer.
- B. Flexible connectors: Anaconda, Aeroquip or approved equal.

2.2 PIPE AND PIPE FITTINGS

- A. DESCRIPTION
  - 1. General: The following generally describes piping materials for plumbing and mechanical systems.
  - 2. Sanitary Waste Systems: Cast iron pipe above grade and below grade to five feet beyond building lines and below grade where depth of bury is less than 24 inches.
  - 3. Vent Systems: Cast iron or galvanized steel pipe.
  - 4. Miscellaneous Condensate and Indirect Drains: Type "L" hard drawn copper tubing for plumbing service.

2.3 MATERIAL DESCRIPTION:

- A. Galvanized Steel Pipe:
  - 1. Pipe: Schedule 40 galvanized steel pipe conforming to A120.
  - 2. Fittings: Galvanized screwed cast iron.
- B. Cast Iron Pipe:
  - 1. Pipe: Hubless cast iron soil pipe, CISPI 301 / ASTM A888.
  - 2. Fittings:
    - a. Hubless cast iron fittings - CISPI 310 or cast iron hub and spigot fittings ASTM A74.
    - b. Underground couplings - Clamp-all Corporation, Husky SD4000 or approved equal.

**FACILITY SANITARY SEWERS**

- c. Aboveground couplings - couplings meeting CISPI designation 310 except rain drain couplings in systems greater than 25 feet of water column (use Huskey SD4000.)
  - d. Couplings to steel or plastic pipe - Fernco "lowflex" or approved equal.
- C. Copper Pipe - Plumbing:
  - 1. Pipe: Hard drawn copper type "L" above grade and hard drawn copper type "K" below grade, ASTM B88.
  - 2. Fittings: Wrought copper solder type.
  - 3. Solder
    - a. Above ground: 2" and smaller - Lead free, 95-5, tin silver and flux.
    - b. Below ground: 2 1/2" and larger - Lead free, brazing alloy and flux.

**PART 3 - EXECUTION**

**3.1 PREPARATION - MEASUREMENTS, LINES AND LEVELS**

- A. Check dimensions at the building site and establish lines and levels for the work specified in this Division.

**3.2 PIPING INSTALLATION**

- A. Install unions in all non-flanged piping connections to apparatus and adjacent to all screwed control valves, traps, and appurtenances requiring removal for servicing, so located that piping may be disconnected without disturbing the general system.
- B. Install all piping as to vent and drain.
- C. Cleanouts in underground or acid waste systems shall be line size for mains up to 4" diameter. For mains having a diameter of greater than 4", cleanouts shall be 4" diameter.
- D. Support all piping independently at apparatus so that the equipment shall not carry its weight.
- E. Dielectric Fittings: Provide dielectric couplings, unions or flanges between dissimilar metals. Additionally, provide dielectric couplings as required to isolate catholically protected piping and equipment. Fittings shall be suitable for the pressure and temperature to be encountered.
- F. Screwed Joints: Ream pipe ends. Apply dope or tape to male threads only. Brass joints shall be made with Teflon tape only. Make up fitting with not over two threads showing beyond the fitting end. Make junctions of galvanized pipe to cast iron with tapped spigots or half couplings screwed to the end of galvanized pipe to form a spigot end.
- G. Solder Type Joints:
  - 1. Clean the copper tubing and fittings thoroughly with steel wool before applying the flux. The copper tubing shall have all burrs removed, be reamed to full bore, and be true and round for all joints.
  - 2. Apply heat uniformly to secure penetration of the filler material. Leave full bead around the entire circumference of the joint to show proper penetration and sealing.
- H. Flux shall be used for copper-to-copper joints. Flux shall be used for joining copper to brass or bronze. In those cases where flux is used, particular care shall be exercised in applying the flux to avoid leaving any excess inside the completed joints.
- I. Provide flexible connectors at all piping connections to mechanical equipment.

**FACILITY SANITARY SEWERS**

- J. Waste and Vent Systems
    - 1. Install waste, storm, overflow storm and vent piping system sized in conformance with the drawings.
    - 2. Grade horizontal waste runs 1/4 inch per foot where possible. Piping 4 inches and greater may be run at 1/8 inch per foot minimum when approved by the Administrative Authority.
    - 3. Make all changes in direction with appropriate fittings.
    - 4. Collect vents together in ceiling space and extend through roof for minimum penetrations.
    - 5. Flash and counterflash all vents through the roof.
    - 6. Verify exact location of all fixtures from architectural drawings.
    - 7. Test piping system per Section 22 05 93.
  - K. Miscellaneous Condensate and Drain Systems:
    - 1. Install condensate system sized in conformance with the drawings.
    - 2. Slope lines in direction of flow.
    - 3. Install indirect waste fittings as shown on the Drawings, providing access as required by code.
    - 4. Indirect drains in kitchen area are to spill to floor sinks above the flood level of the floor sink and in location that allows removal of grate and does not create splashing during discharge.
    - 5. Test piping system per Section 22 05 93.
- 3.3 FIRESTOPPING PENETRATIONS IN FIRE-RATED WALL/FLOOR ASSEMBLIES
- A. Contractors shall provide proper sizing when providing sleeves or core-drilled holes to accommodate their through penetrating items. All voids between sleeve or core-drilled hole and pipe passing through, shall be firestopped to meet the requirements of ASTM E-814.

**END OF SECTION**



**FACILITY STORM DRAINAGE**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Work included: Providing of all required facility storm drainage systems' piping and utility connections for all services specified or shown on the drawings.

**1.2 QUALITY ASSURANCE**

- A. Piping material and installation to meet requirements of the local plumbing, mechanical, building codes and serving utility requirements.

**1.3 OPERATION AND MAINTENANCE DATA**

- A. Submit certificates of inspections and tests to owner.

**1.4 QUALITY ASSURANCE**

- A. Piping material and installation to meet requirements of the local plumbing, fire and building codes and serving utility requirements.
- B. Pipe Cleaning: Should any pipe be plugged, the piping shall be disconnected, cleaned and reconnected without additional cost to Owner.
- C. Damage to the building or systems resulting from failure to properly clean the system shall be corrected without additional expense to the Owner.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Pipe and fittings: Standard product of manufacturer.
- B. Flexible connectors: Anaconda, Aeroquip or approved equal.

**2.2 DESCRIPTION**

- A. Cast Iron Pipe:
  - 1. Pipe: Hubless cast iron soil pipe, CISPI 301 / ASTM A888.
  - 2. Fittings:
    - a. Hubless cast iron fittings - CISPI 301 or cast iron hub and spigot fittings ASTM A74.
    - b. Underground couplings - Clamp-all Corporation, Husky SD4000 or approved equal.
    - c. Aboveground couplings - couplings meeting CISPI designation 301 except rain drain couplings in systems greater than 25 feet of water column (use Huskey SD4000.)
    - d. Couplings to steel or plastic pipe - Fernco "lowflex" or approved equal.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Storm Systems:
  - 1. Install storm sized in conformance with the drawings.
  - 2. Grade horizontal waste runs 1/4 inch per foot where possible. Piping 3" and greater may be run at 1/8 inch per foot minimum when approved by the Administrative Authority.

**FACILITY STORM DRAINAGE**

3. Make all changes in direction with appropriate fittings.
4. Verify exact location of all drains from architectural drawings.
5. Test piping system per Section 22 05 19.

**3.2 FIRESTOPPING PENETRATIONS IN FIRE-RATED WALL/FLOOR ASSEMBLIES**

- A. Contractors shall provide proper sizing when providing sleeves or core-drilled holes to accommodate their through penetrating items. All voids between sleeve or core-drilled hole and pipe passing through, shall be firestopped to meet the requirements of ASTM E-814, in accordance with Section 21 01 00 - Firestopping.

**END OF SECTION**



**GAS PIPING**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Work included
  - 1. Providing of all required gas pipe systems.
  - 2. Pressure testing of piping.

**1.2 SUBMITTALS**

- A. Provide submittals in accordance with Section 22 00 00.
- B. Submittals shall include:
  - 1. Manufacturer's technical literature for all products used.
  - 2. List of selected flow control valves with pressure ranges and flow indicated.

**1.3 OPERATION AND MAINTENANCE DATA**

- A. Provide O&M data in accordance with Section 22 00 00.
- B. O&M data shall include:
  - 1. Manufacturer's literature.
  - 2. Maintenance instructions.

**1.4 QUALITY ASSURANCE**

- A. Piping material, installation and testing to meet requirements of the local plumbing, fire and building codes and serving utility requirements. Perform required pipe tests in the presence of the authority having jurisdiction.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Pipe and fittings: Standard product of manufacturer.
- B. Unions: Standard product of manufacturer.
- C. Flexible gas connectors: Standard product of manufacturer.

**2.2 DESCRIPTION**

- A. Natural Gas Piping Above Ground: Black steel pipe inside building construction, black steel pipe painted with rust inhibiting paint outside building construction.
  - 1. Pipe: Schedule 40 black steel pipe conforming to ASTM A53/ A53M.
  - 2. Fittings: 150 psi screwed malleable iron for 2" and smaller, Schedule 40 weld fittings conforming to ASTM A234 for 2-1/2" and larger.
- B. Pressure testing of piping: Instruments, gauges, meters and necessary connection points for performance of the tests shall be furnished by the Contractor.
- C. Unions: 150 malleable iron, brass to iron seat, ground joint, black or galvanized to match pipe. 200-psi wog bronze, ground joint, solder type for copper tubing. Where dissimilar metals join, dielectric unions, couplings or flanges shall be installed.

**GAS PIPING**

- D. Flexible gas connectors: Flexible gas piping components shall have been tested and certified as meeting requirements on ANSI LC-1b. System components shall bear permanent certification identification by the Product Research Committee of the International Association of Plumbing and Mechanical Officials (IAPMO). Connectors shall be in compliance with applicable codes and regulations and as recommended by the manufacturer of the connector and the equipment being served.

**PART 3 - EXECUTION**

**3.1 PREPARATION - MEASUREMENTS, LINES AND LEVELS**

- A. Check dimension at the building site and establish lines and levels for the work specified in this Division.

**3.2 INSTALLATION**

- A. Natural Gas Systems:
  - 1. Install natural gas system sized in conformance with the drawings.
  - 2. Provide branch shutoff valves and pressure regulators.
  - 3. Test piping system per this section.
  - 4. Clean the piping of grease and construction debris.
  - 5. Paint the piping with a primer/rust inhibiting paint suitable for use in the specific application.
- B. Pressure testing of piping:
  - 1. Piping: Test prior to concealment, insulation being applied, and connection to equipment, fixtures, or specialties. Conduct tests with all valves but those used to isolate the test section 10% closed.
  - 2. Leaks: Repair all leaks or replace defective pipe or fittings and retest until stipulated results are achieved.
  - 3. Notification: Advise the Architect 48 hours in advance of each test. Failure to so notify will require test to be rescheduled.
  - 4. Testing Equipment: Provide all necessary pumps, gauges, connections similar items required to perform the tests.
- C. Provide shutoff valves at equipment connections.
- D. Install unions in all non-flanged piping connections to apparatus and adjacent to all screwed control valves, traps, and appurtenances requiring removal for servicing, so located that piping may be disconnected without disturbing the general system.
- E. Support all piping independently at apparatus so that the equipment shall not carry its weight.
- F. Screwed Joints: Ream pipe ends. Apply dope or tape to male threads only. Brass joints shall be made with Teflon tape only. Make up fitting with not over two threads showing beyond the fitting end. Make junctions of galvanized pipe to cast iron with tapped spigots or half couplings screwed to the end of galvanized pipe to form a spigot end.
- G. Provide reducers as required for changes in pipe size, equipment connections and valves.
- H. Install unions in all non-flanged piping connections to apparatus and adjacent to all screwed control valves, traps, and appurtenances requiring removal for servicing, so located that piping may be disconnected without disturbing the general system.
- I. Provide seismic bracing and support per SMACNA "Seismic Restraint Manual Guidelines for Mechanical Systems", Seismic Zone 4.

**GAS PIPING**

3.3 TESTING REQUIREMENTS

- A. Piping - General: Test all piping as noted below, with no leaks or loss in pressure for the time indicated. Repair or replace defective piping until tests are completed successfully.

<u>System</u>	<u>Test Pressure</u>	<u>Test Medium</u>	<u>Test Duration</u>
Natural gas piping	60 psig	air	4 hours

3.4 FIRESTOPPING PENETRATIONS IN FIRE-RATED WALL/FLOOR ASSEMBLIES

- A. Contractors shall provide proper sizing when providing sleeves or core-drilled holes to accommodate their through penetrating items. All voids between sleeve or core-drilled hole and pipe passing through, shall be firestopped to meet the requirements of ASTM E-814, in accordance with Section 22 00 00 - Sleeves and Inserts.

**END OF SECTION**



**COMMERCIAL PLUMBING FIXTURES**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Work included: Providing of all plumbing fixtures, pumps, fixture trim, cleanouts and appurtenances as shown or required.
- B. Product Certification: Provide only products certified for use in the State of Oregon.

**1.2 SUBMITTALS**

- A. Provide submittals in accordance with Section 22 00 00.
- B. Submittals shall include manufacturer's catalog literature for all products used.

**1.3 OPERATION AND MAINTENANCE DATA**

- A. Provide O&M data in accordance with Section 22 00 00.
- B. O&M data shall include:
  - 1. Manufacturer's literature.
  - 2. Maintenance instructions.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Floor drains and Floor sinks: J.R. Smith, Zurn, Watts, or approved equal.
- B. Supplies and Stops: Speedway, McQuire, Zurn or Eastman.
- C. Floor Drains and Floor Sinks: Jay R. Smith, Wade, Josam or Zurn.
- D. Cleanouts: Jay R. Smith, Wade, Josam or Zurn.
- E. Carriers: Jay R. Smith
- F. Priming Valves: Precision Plumbing Products..
- G. Water Hammer Arrestors: Smith or Precision Plumbing Products.
- H. Grease traps/interceptor : Schier.
- I. Mixing Valve: Leonard, Powers, or approved equal.

**2.2 DESCRIPTION**

- A. Water Closet (WC-1):
  - 1. Kohler "Wellcome" Model K-4302, white vitreous china, elongated 16-1.2" high ADA compliant bowl, siphon jet action, 1.5 gpf, floor mounted.
  - 2. Sloan "Royal" model 111, diaphragm type, 1.6 gpf, flush valve, dual filtered by-pass, chloramine resistant rubber compounds, vandal resistant cap, ADA compliant handle, sweat solder adapter, cast set screw wall flange.

**COMMERCIAL PLUMBING FIXTURES**

3. Olsonite No. 10SSC, Heavy duty elongated, solid, white plastic open front seat less cover with stainless steel hinge post and self-sustaining hinge.
- B. Lavatory (L-1):
  1. Kohler "Greenwich" model K-2032, overall dimensions 20-3/4" x 18-1/4", wall hung with model 64839 hanger, white vitreous china lavatory with front overflow, faucet ledge drilled for 4" centers.
  2. Chicago model 2200-4CP, chrome plated brass faucet with single lever metal handle, deck mounted with cover plate, chrome plated brass grid drain, 4-3/4" spout with E2805 vandal resistant 0.5 gpm aerator.
  3. Pre-formed manufactured insulation kit for trap, waste and water supplies.
  4. Chrome plated brass grid drain.
  5. Provide floor mounted wall carrier. Refer to Architectural drawings for ADA mounting height.
- C. Grease Trap
  1. See drawings.
- D. Floor Drain (FD-1): J.R. Smith, Fig. 2005-02-A-NB-U-P050, Duco cast iron body, nickel bronze adjustable strainer head, 2" outlet, vandal proof screws.
- E. Floor Sink (FS-1): J.R. Smith, Fig. 3110, 12" Square, 8" deep, Duco cast iron body, nickel bronze dome bottom strainer, 2" outlet, vandal proof screws, clamping ring for waterproof flooring and trap primer connection. Provide grate as per plans.
- F. Floor Sink (FS-2): J.R. Smith, Fig. 3110, 12" Square, 8" deep Duco cast iron body, nickel bronze dome bottom strainer, 3" outlet, vandal proof screws, clamping ring for waterproof flooring and trap primer connection. Provide grate as per plans.
- G. Mixing Valve (MV-1): Watts LFMMV-1/2", Thermostatic, lead free construction, complete with stops and checkes. Minimum flow 0.5 GPM.
- H. Cleanout: J.R. Smith, Fig. 4021-U, nickel bronze top with vandal proof screws for floor and bronze plug, Fig. 4556-NB cleanout tees with bronze plug, nickel bronze frame with stainless steel cover for walls, Fig. 4243-U cleanout for exterior planting and paved areas, cast iron with bronze plug.
- I. Supplies and Stops: Flexible supplies with loose key angle stops to wall with canopy flanges and all exposed surfaces chrome plated.
- J. Priming Valves: Precision Plumbing Products, Inc., Oregon P1 or P2.
- K. Traps:
  1. Exposed Traps: 17-gauge chrome plated tubing adjustable P-trap with slip bushing.
  2. Concealed or Below Grade: Coated cast iron P-trap, recessed screw joint or to match cast iron pipe.
  3. Support Rims: Stainless steel rims, if sink not furnished with integral rim.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Provide plumbing fixture trim where applicable on fixture.
- B. Plumbing Fixtures:

**COMMERCIAL PLUMBING FIXTURES**

1. Plumbing Fixtures Mounting Heights: All fixtures standard rough-in catalogued heights unless specified or shown otherwise on the architectural drawings.
  2. Cleanout:
    - a. Where required for purposes intended.
    - b. Cover set flush with finished surface.
  3. Floor Drain: Set top flush with finished floor unless otherwise noted on architectural drawings.
- C. Priming Valves:
1. All floor drain and Floor Sink traps to be primed with priming valves with 3/8" copper pipe.
  2. Six traps maximum primed from one priming valve.
  3. Where priming valves are installed in finished rooms, conceal in wall and provide access door.
  4. Install shutoff valve ahead of priming valve.
- D. Water Hammer Arrestors (WHA): Provide where shown and where recommended by Plumbing Drainage Institute (PDI). Furnish access panel to allow repair or replacement.
- E. Drawings are diagrammatic and may not show all required cleanouts and fittings. Provide additional required items at no additional cost.

**END OF SECTION**





**BASIC HVAC REQUIREMENTS**

**PART 1 - GENERAL**

**1.1 OTHER REQUIREMENTS**

- A. The Bidding, General and Supplementary of this project manual and specific section as noted apply to the work specified in Mechanical Division 15 which encompasses Sections 23 00 00 through 23 82 19. This Section 23 00 00 applies to all sections of Mechanical Division 23.

**1.2 SCOPE**

- A. It is the intent of these specifications and the accompanying drawings to describe complete mechanical systems installations for all building areas, new and renovation.
- B. Furnish and install all material, labor and equipment in accordance with these documents.
- C. Include all incidental items and work not specifically shown or specified but required by good practice in a complete system.
- D. The drawings and specifications are complementary. What is called for in one shall be called for in both.
- E. The drawings are diagrammatic but should be followed as closely as possible. Where required by jobsite conditions, relocate and provide fittings, etc., as required. Provide an allowance in the contract bid to furnish additional pipe and ductwork fittings required for coordination with structure and other construction trades.
- F. Prepare and submit a utility coordination plan noting any disruptions of existing building services for approval by the school district, attaching any sketches, drawing excerpts, or step-by-step sequences / schedules required to fully-explain the proposed activities. Submit the coordination plan 2 weeks in advance of the planned activities.
- G. Immediately notify the school district representative if existing mechanical elements are damaged or have been inadvertently damaged during the course of construction.

**1.3 DEFINITIONS**

- A. Or approved equal: Requires approval prior to bid date.
- B. Indicated:
  - 1. The term "indicated" is a cross reference to details, notes, or schedules on the drawings, other paragraphs or schedules in the specifications, and similar means of recording requirements in the Contract Documents.
  - 2. Where terms such as "shown," "noted," "scheduled," and "specified" are used instead of "indicated," it is for the purpose of helping the reader locate the cross reference, and no limitation of location is intended except as specifically noted.
- C. Directed, Requested, Etc.: Where not otherwise explained, terms such as "directed," "requested," "authorized," "selected," "approved," "required," "accepted," and "permitted" mean "directed by the Engineer," "requested by the Engineer," etc. However, no such implied meaning will be interpreted to extend the Engineer's responsibility into the Contractor's area of construction supervision.

**BASIC HVAC REQUIREMENTS**

- D. Site or Project Site: The space available to the Contractor for the performance of the work, either exclusively or in conjunction with others performing the work as part of the project. The extent of the project site is shown on the Mechanical drawings and is not identical with the description of the land upon which the project is to be built.
- E. Approved:
1. Where used in conjunction with the Architect's response to submittals, requests, applications, inquiries, reports and claims by the Contractor, the meaning of the term "approved" will be held to the limitations of the Architect's responsibilities and duties as specified in the General and Supplementary Conditions.
  2. In no case will "approval" by the Architect be interpreted as a release of the Contractor from responsibilities to fulfill requirements of the Contract Documents.
- F. Provide: The term "provide" means to furnish and install, complete and ready for the intended use.

1.4 STANDARDS AND CODES

- A. Provide all equipment and material and perform all work in accordance with all local, state and national codes and regulations.
- B. For work on this project, comply with the latest edition of the appropriate standards published by the following:
- |     |  |            |
|-----|--|------------|
| 1.  | Air Diffusion Council  | ADC        |
| 2.  | American Gas Association   | AGA        |
| 3.  | Air Movement and Control Association                               | AMCA       |
| 4.  | American National Standards Institute                              | ANSI       |
| 5.  | Air-Conditioning and Refrigeration Institute                       | ARI        |
| 6.  | Acoustical Society of America                                      | ASA        |
| 7.  | American Society of Heating, Refrigerating and Air-Conditioning    | ASHRAE     |
| 8.  | American Society of Mechanical Engineers                           | ASME       |
| 9.  | American Society for Testing and Materials                         | ASTM       |
| 10. | Multnomah County, Oregon.  |            |
| 11. | City of Portland, Oregon.  |            |
| 12. | National Environmental Balancing Bureau                            | NEBB       |
| 13. | National Electrical Manufacturers Association                      | NEMA       |
| 14. | National Fire Protection Association                               | NFPA       |
| 15. | Sheet Metal and Air Conditioning Contractors' National Association | SMACNA     |
| 16. | Underwriters' Laboratories   | UL         |
| 17. | Oregon Structural Specialty Code                                   | OSSC / UBC |
| 18. | Oregon Mechanical Specialty Code                                   | OMSC / UMC |
| 19. | Oregon Plumbing Specialty Code                                     | OPSC / UPC |
| 20. | Oregon Energy Efficiency Specialty Code                            |            |

1.5 APPROVAL OF EQUIPMENT AND MATERIALS

- A. Manufacturer's trade names, catalog numbers and material specifications used in this specification are intended to establish the quality of equipment or materials expected. Materials and manufacturers not listed require approval prior to the bid date.
- B. Approval of substitute equipment or materials will be based upon performance, quality and other factors deemed important by the Architect. The Contractor will be responsible for making all changes in this and other associated work required as a result of the substitution. Additional or modified structural

**BASIC HVAC REQUIREMENTS**

calculations and roof penetrations required to accommodate the substitution will be the responsibility of the contractor.

**1.6 SUBMITTALS**

- A. Transmit five sets of submittals to the Architect for review. The submittals shall be bound in three-ring binders, have major topic tabs and an index. In order to expedite approval of certain items, it is not necessary to transmit complete submittals initially. The initial transmittal will include the binder, expected tabs and an index indicating which items are included, the date each is transmitted, and which items are yet to be transmitted. Future transmittals shall include a revised index.
- B. Furnish performance data and technical information on all materials and equipment to be used on the project.
- C. Include shop drawings with the submittals where necessary to determine clearance, where the Contractor proposes alternate equipment or material arrangements, and when requested by the Architect.
- D. Items transmitted for approval must be received in the Architect's office within 45 days of contract award. The Architect prior to installation must approve all material and equipment.
- E. Review of submittals or shop drawings by the Architect does not relieve the Contractor from the requirements of the Contract Documents unless specific approval has been requested for a given deviation.

**1.7 QUALITY ASSURANCE**

- A. Maintain the highest standards of workmanship throughout the project.
- B. Use the latest editions of applicable and specifically referenced standards.
- C. Inspect all material and equipment upon arrival at the site and return any which is not in new condition.

**PART 2 - PRODUCTS**

Not Used

**PART 3 - EXECUTION**

**3.1 COORDINATION**

- A. Cooperate with other trades to assure that construction proceeds in an orderly and timely manner. Contract cost increases due to improperly sequenced work with other trades will not be allowed.
- B. Study the architectural, electrical, shop and any specialty drawings as appropriate and specifications to determine required coordination.
- C. Prepare detailed shop drawings where necessary to assure proper fit and necessary clearance.
- D. Refer to electrical drawings to verify voltage and phase of mechanical equipment.

**3.2 PERMITS, FEES AND INSPECTIONS**

- A. Obtain all required permits and pay for all fees and connection charges.
- B. Schedule any required inspections.

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3.3 MATERIALS AND WORKMANSHIP

- A. Furnish all materials and equipment in new condition, free from defects and of size, make, type and quality specified. Installation shall be in a neat and workmanlike manner.
- B. When two or more items of the same kind, type or class are required, use items of a single manufacturer.

3.4 MEASUREMENTS

- A. Take all measurements from reference datums established by the mechanical contractor.

3.5 DELIVERY, HANDLING AND STORAGE

- A. Receive all material and equipment at the jobsite or shop.
- B. Use proper and sufficient equipment to handle all products employed in the project.
- C. Where storage of material or equipment is necessary, it shall be a clean and weatherproof area. Seal any openings and cover the product to assure that there will be no corrosion or foreign matter introduced. Assure that it will be in new condition when placed in service.

3.6 EQUIPMENT INSTALLATION, BRACING AND SUPPORT

- A. Install all equipment in strict accordance with the manufacturer's instructions unless otherwise indicated.
- B. The drawings in general are based upon one of the specific manufacturers listed for a particular equipment item. The other specified manufacturers and additional approved manufacturers of equipment may require deviations from the drawings to properly install the particular equipment in accordance with the manufacturer's recommendations and to provide the system results required. Provide all work necessary in the base bid price to install this equipment.
- C. Where the installation shown or specified is contrary to the manufacturer's instructions, advise the Architect in writing of the differences before proceeding with the installation.
- D. Anchorage to Floors, Sway Bracing and Seismic Restraints:
  - 1. The contractor is responsible to determine the means and methods of equipment installation and support.
  - 2. Provide supports for all apparatus as specified, detailed, as required by the manufacturers of specific equipment and the project governing code authorities. Anchor all roof structure and base/floor mounted equipment with size and spacing of anchor bolts or other attachment means as recommended by the respective equipment manufacturer.
  - 3. Provide seismic restraints on all mechanical equipment in conformance with applicable OSSC sections. Costs for seismic calculations are to be included in the bid price.
  - 4. Provide deferred submittals directly to the governing code jurisdiction for anchorage to floors, roofs, etc., sway bracing and seismic restraints. Submittals to show locations and sufficient support details as required by the governing code jurisdiction.
  - 5. Provide supplementary drawings and calculations as required by governing code jurisdictions noting seismic support data/calculations as required for permit purposes.
  - 6. Mechanical seismic criteria is as follows:
    - a. Risk Category III
    - b. Seismic Design Category D
    - c. Component Importance Factor (Ip)
      - 1) General building HVAC systems 1.5

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2) Fire protection 1.5

- E. Maintain a copy of the manufacturer's installation instructions at the jobsite for all equipment.

**3.7 SLEEVES AND INSERTS**

- A. Provide sleeves at all locations where piping and ductwork passes through building construction.
1. Sleeves for interior walls and floors shall be 22 gauge galvanized or heavier as required.
  2. Sleeves for exterior walls shall be cast iron, wall thickness as required.
  3. Wall sleeves shall be installed in all exterior walls and all interior masonry or fire-rated walls in a manner that preserves the fire-rated or watertight integrity of the wall.
  4. Interior wall sleeves for uninsulated pipe shall allow minimum 1/4-inch clearance all around pipe for pipe movement. Allow 1-inch clearance around pipe at building expansion joints.
  5. Interior wall sleeves for insulated piping shall be selected to encompass the pipe and insulation and allow minimum 1/4-inch clearance around insulation for pipe movement. Allow 1-inch clearance around pipe and insulation at building expansion joints.
  6. Floor sleeves shall extend 4-inches above the floor and shall be sealed watertight. Floor sleeves shall be oversized to allow 1/2-inch minimum space all around pipe or pipe and insulation where applicable. Seal space between pipe and sleeve with Dow Corning Fire Stop System, 3M brand CP25 or approved equal. Sealant must be between pipe and sleeve. Sealant between insulation and sleeve is not acceptable. Install firestop materials in complete accordance with the manufacturer's instructions and in compliance to applicable UL listings.
- B. Seal space between pipe and sleeve with Dow Corning Fire Stop System, 3M Brand CP25 or approved equal where piping penetrates firewall or floors. Sealant must be between pipe and sleeve; sealant between insulation and sleeve is not acceptable. Install firestop materials in complete accordance with the manufacturer's instructions and in compliance to applicable UL listings.
- C. Utilize Linkseals or similar closures on core-drilled penetrations through below grade walls. Repair existing below grade waterproofing systems as applicable.

**3.8 FLOOR, WALL AND CEILING PLATES**

- A. Provide escutcheon plates where all exposed piping and ductwork passes through finished walls, floors and ceilings, including accessible cabinet spaces.
- B. Floor plates: deep recessed, cast brass, chrome plated.
- C. Wall and ceiling plates: spun aluminum, chrome plated.
- D. Secure plates to pipe or structure. Plates shall not penetrate insulation vapor barriers. Size plates to sufficiently cover pipe sleeves and openings in finish materials.

**3.9 ACCESS DOORS AND PANELS**

- A. Manufacturers: CESCO, Milcor, Elmdor. CESCO used as basis of selection.
- B. Non-rated panels: Style W, SR-1, SR-2, P, PX as required for wall or ceiling construction, 12 inch x 12 inch or larger as required for ease of access.
- C. Fire-rated panels: Style FB, U.L. listed for 1-1/2 hr for fire rated stud and masonry wall systems.

**BASIC HVAC REQUIREMENTS**

- D. Provide access panels where shown on the drawings or as required for proper access to mechanical appurtenances. Coordinate the installation of access panels is with the specific building construction penetrated. Coordinate access panel installation with manufacturer's instructions.
- E. Locate and size access doors to facilitate equipment service and optimize the safety of the maintenance personnel. Minimum access door size to be 18"x 18".

**3.10 PROTECTION**

- A. Protect all work, material and equipment from loss or damage until the Owner accepts the project.
- B. As the work progresses, keep all equipment covered and cap all ducts and piping that may temporarily be left unconnected.
- C. Notify all other trades of any required precautions necessary to protect the work.

**3.11 ACCESSIBILITY**

- A. Provide convenient access by location or access panel to all equipment requiring periodic service.

**3.12 ELECTRICAL WORK**

- A. See Paragraph 3.21 for materials and work to be provided as a part of this Mechanical Division 23:
- B. Wherever possible, provide all interconnect wiring within or on a piece of equipment with the equipment unless shown or specified otherwise. An electrician licensed to perform this type of work shall perform all field wiring.

**3.13 RELATED WORK**

- A. The following work and materials are specified elsewhere:
  - 1. Pipe chases, equipment pads and foundations, trenches, painting, air louvers, louvered penthouse and access panels except as otherwise specified in this division.
  - 2. Framed openings, wood grounds and nailing strips, masonry, concrete and other architectural and structural elements.

**3.14 CLEANING**

- A. Maintain premises and public properties free from accumulations of waste, debris and rubbish during construction.
- B. Clean all mechanical equipment of dust, grease, iron cuttings, unnecessary stamps or shipping labels, etc.
- C. Touch up factory-painted surfaces, as necessary, with paint of matching color.

**3.15 RECORD DRAWINGS**

- A. Maintain one set of construction drawings at the jobsite for the sole purpose of recording work of the mechanical contract, as actually installed. Upon request, the Architect will make the original tracings available to the mechanical contractor for printing the drawings. The Contractor shall pay the reproduction costs.
- B. Deliver record drawings to the Architect promptly upon completion of the project.

**BASIC HVAC REQUIREMENTS**

3.16 OPERATION AND MAINTENANCE MANUALS:

- A. Submit three copies of the Operation and Maintenance Manuals to the Architect for approval before project completion. Bind the instruction books with three-ring 8-1/2" x 11" side binders with plastic covers. Include an index and tabs for major systems and equipment. Operation and Maintenance Manuals shall include the following:
- B. Directories:
  - 1. Supplier Directory: Alphabetical list of principal subcontractors and suppliers of equipment giving names, addresses and telephone numbers.
  - 2. Equipment Directory: List of equipment installed such as fans, air supply units, pumps, heating and cooling equipment, plumbing fixtures, etc., giving drawing reference numbers, location, area served, manufacturer with model number and supplier.
- C. Manufacturer's Literature:
  - 1. Show name, address and phone number of the nearest service facility authorized by the manufacturer.
  - 2. Include illustrations, diagrams, and instructions for installation, startup, operation, inspections, maintenance, parts list, data sheets and other necessary materials.
  - 3. Include complete electrical, schematic and connection diagrams for each equipment item.
  - 4. Include the name, address and phone number of contractor(s) who furnished and who installed equipment and systems.
  - 5. Where the literature covers more than one model, check off neatly in ink correct model number and data for the model number including all specified options.
  - 6. In those instances where the equipment, its mode of control, or both, is job assembled for special functions, then provide written operating and maintenance instructions prepared by the assembler on 8-1/2" x 11" sheets.
- D. Maintenance Instructions:
  - 1. Where instructions for maintenance are not included in the manufacturer's literature, provide supplemental data to enable proper maintenance of the equipment installed.
  - 2. Include specific lubrication methods and recommended frequencies along with procedures and precautions for inspection and routine service.
- E. Copy of Written Guarantee.
- F. Recommended Spare Parts Stock.

3.17 HVAC SYSTEMS TRAINING

- A. Training must be on fully operational system, or the training must be repeated when the system is fully operational at no additional cost to the Owner. Training must be scheduled through the David Douglas School District representative at a time that is convenient to district personnel. The David Douglas School District representative must be notified of any changes, re-scheduling or modifications to the training schedule.
  - 1. Provide a written agenda to the attendees outlining the general scope of the training session and the building equipment involved. Submit the written training outline to the district representative prior to the training date.
  - 2. Maintain a start-up log notebook in the job trailer containing signed copies of the manufacturer's start-up sheets for all equipment.

**BASIC HVAC REQUIREMENTS**

3. Training walk-throughs to be performed by a contractor field project manager or technician who is fully knowledgeable with the project specifics and has had continuous involvement during the course of the project. The individual is to be knowledgeable in the specific installation details and maintenance of the project equipment.
  4. All training to be video recorded and provided to Owner.
- B. Maintenance Training: Maintenance training will take place within 30 days after substantial completion. This session to include a detailed review of the HVAC system record drawings and equipment installation instructions. The instructor shall then walk through the building identifying the location of the equipment installed and specific function(s) related to the overall mechanical systems. The training shall include answering maintenance personnel questions, troubleshooting and diagnostics procedures, repair instructions and preventive maintenance. This training will include all maintenance staff per the David Douglas School District.

3.18 CUTTING AND PATCHING

- A. Cut work as required for installation and patch to match original conditions as directed and approved by Architect. Do not cut structural portion without Architect's approval.
- B. When masonry construction must be penetrated, provide a steel pipe sleeve in opening and grout in place in a neat manner. Leave grout surface to match existing finish.
- C. Prior to cutting any existing work, locate all concealed utilities to eliminate any possible service interruption or damage.

3.19 CHANGE ORDERS

- A. All supplemental cost proposals by the Contractor shall be accompanied with a complete itemized breakdown of labor and materials cost without exception.
- B. Contractor's estimating sheets for the supplemental cost proposals shall be made available to the Architect. Labor must be separated and allocated for each item of work.

3.20 VERIFICATION OF EXISTING CONDITIONS

- A. Verify field conditions and measurements prior to the manufacture of shop fabricated materials and equipment.
- B. Produce shop drawings with details as required verifying proper installation of materials & equipment in conformance with applicable codes and the manufacturer's requirements.

3.21 SYSTEMS WIRING AND RELATED DEVICES

	<b>FURNISHED ITEM</b>	<b>BY</b>	<b>INSTALL BY</b>	<b>POWER WIRING</b>	<b>CONTROL WIRING</b>
1.	Division 23 Equipment Motors	Div. 23	Div. 23	Div. 26	Div. 23



**BASIC HVAC REQUIREMENTS**

	<b>FURNISHED ITEM</b>	<b>BY</b>	<b>INSTALL BY</b>	<b>POWER WIRING</b>	<b>CONTROL WIRING</b>
2.	Remote Motors Starters, Contactors and Overload Heaters – Integral	Div. 23	Div. 26	Div. 26	Div. 23
3.	Fused & Unfused Disconnect Switches	Div. 26	Div. 26	Div. 26	-----
4.	Manual Operation Switches	Div. 26	Div. 26	Div. 26	Div. 26
5.	DDC Controls, Relays and Sensors	Div. 23	Div. 23	Div. 23	Div. 23
6.	Kitchen Equipment VFD's	Food Service	Div. 26	Div. 26	Div. 26

**END OF SECTION**



**HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Work included: Providing of all required hangers and supports for ductwork and equipment

**1.2 SUBMITTALS**

- A. Provide submittals in accordance with Section 23 00 00.
- B. Submittals shall include:
  - 1. Manufacturer's technical literature for all products used indicating service for each type of hanger.
  - 2. Include proposed pre-manufactured piping and duct vibration isolation products.
  - 3. Submit literature or describe duct-supporting method.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Caddy, Grinnell, Super Strut, Gripple, Kinline, Unistrut, B-Line. Caddy used for selection.

**2.2 DESCRIPTION**

- A. Upper Attachments: Attachment to wood structures where weights permit shall be Figure 325 or 328.
- B. Structural Attachments: Provide all necessary structural attachments such as concrete anchors, beam clamps, hanger flanges and brackets. Hangers shall not be suspended from other piping, equipment, etc.
- C. Miscellaneous items such as hanger rod, rod couplings, turnbuckles, etc. shall be standard figure numbers of the same manufacturer as the attachments.
- D. Support of piping or HVAC related conduit on roof surfaces to be C-Port system manufactured by B-line or approved equal.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Powder-actuated tools or devices are not acceptable for use without specific approval of the owner's representative.
- B. Provide hangers and supports in accordance with the instructions furnished by the manufacturers of these devices. Support ductwork as required by the UMC and per SMACNA recommendations.
- C. Provide additional structural members where required to support piping or ductwork.
- D. Provide hangers and support devices in accordance with the equipment manufacturer's instructions for all equipment.
- E. Anchorage to Floors, Roofs, Etc., Sway Bracing and Seismic Restraints:
  - 1. The contractor is responsible to determine the means and methods of equipment installation and support.

**HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT**

2. Provide supports for all apparatus as specified, detailed, as required by the manufacturers of specific equipment and the project governing code authorities. Anchor all roof and base/floor mounted equipment with size and spacing of anchor bolts or other attachment means as recommended by the respective equipment manufacturer.
3. Provide seismic restraints on all mechanical equipment in conformance with the Oregon Structural Specialty Code, Section 1613 "Earthquake Loads" and ASCE 7. Costs for seismic calculations are to be included in the bid price.
4. Provide deferred submittals directly to the governing code jurisdiction for anchorage to floors, roofs, etc., sway bracing and seismic restraints. Submittals to show locations and sufficient support details as required by the governing code jurisdiction.
5. Provide supplementary drawings and calculations as required by governing code jurisdictions noting seismic support data/calculations as required for permit purposes.

**END OF SECTION**

**IDENTIFICATION FOR HVAC EQUIPMENT**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Work included: Providing of all required identification systems for HVAC equipment and piping.

**1.2 SUBMITTALS**

- A. Provide submittals in accordance with Section 23 00 00.
- B. Submittals shall include list of proposed equipment tags.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. W. H. Brady Co., Seton or equal.

**2.2 DESCRIPTION**

- A. Equipment Identification: Equipment identification tags shall be three-ply, white center, black face plastic plates with 1/2" high letters for major and 1/4" high letters for minor equipment.
- B. The presence of above ceiling equipment items shall be marked using label tape markers affixed to the ceiling grid. The markers shall indicate equipment category and equipment number. Coordinate color-coding and lettering requirements with the owner's representative.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Provide each piece of equipment with a manufacturer's standard nameplate indicating manufacturer's name, model number, capacities and characteristics.
- B. In addition, provide each piece of equipment with a plastic tag indicating its designation on this project (such as MAU-1, EF-1) and the area served. Mount this tag with screws, where possible, in a clearly visible location.
- C. Attach ceiling markers to the ceiling grid noting access locations of equipment mounted above the ceiling.

**END OF SECTION**



**TESTING, ADJUSTING AND BALANCING FOR HVAC**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A Work Included: Providing system balance work as specified.

**1.2 OPERATION AND MAINTENANCE DATA**

- A. Provide O&M data in accordance with Section 23 00 00.
- B. O&M data shall include copies of system balance data.

**1.3 QUALITY ASSURANCE**

- A. Conduct the systems balance work in accordance with standard procedures and recognized practices outlined by ASH RAE and SMACNA. Record all actual equipment nameplate and operating data at the site. Test and balance to be performed by an independent air balance company certified by NEBB or AABC.
- B. Contract with Pacific Coast Air Balancing, Neudorfer Engineers Inc., Accurate Balancing Agency Inc., Air Balancing Specialty Inc., Precision Test and Balance Inc. or approved equal to perform the system balance work on this project.

**PART 2 - PRODUCTS**

Not Used

**PART 3 - EXECUTION**

**3.1 GENERAL**

- A. Install new air filters in the units before the start of testing and balancing.
- B. Confirm in writing that all wiring and controls for mechanical equipment have been installed, completed and tested.
- C. Preparation: Prior to test run, Contractor shall have performed a rough balance and the following:
  - 1. Verify correct rotation of all fans.
  - 2. Check for excessive vibration and noise.
  - 3. Verify filter installation in filter assembly.
  - 4. Check proper calibration and settings of controls.
  - 5. Confirm that ductwork has been sealed.
- D. Makeup air unit:
  - 1. Assure that air filters are clean, if not new, prior to beginning air balance work.
  - 2. Adjust fan drives to obtain fan speed required for air volumes. Speed shall be set to the minimum to provide required air volume at furthest run without excessive static pressure. Provide sheave changes as required to achieve desired fan speed.
  - 3. Include the following in the logs:
    - a. Total air volume.
    - b. Supply air temperature on full heating.
    - c. Static pressure drops across unit.

**TESTING, ADJUSTING AND BALANCING FOR HVAC**

- d. Total pressure drops for system.
  - e. Fan speed or RPM.
  - f. Motor voltage, amperage.
- E. Exhaust fans:
  - 1. Measure exhaust air volumes and system pressures.
  - 2. Adjust speed control or belt drive to obtain required air volume.
  - 3. Include the following in the logs:
    - a. Total air volume.
    - b. Total pressure drops for system.
    - c. Fan speed or RPM.
    - d. Motor voltage, amperage.
- F. Air distribution systems including building supply / return systems:
  - 1. Adjust air volumes at diffusers and grilles to within plus or minus 5% of the values shown on the plans.
  - 2. Adjust diffusers and grilles for proper direction and throw.
  - 3. Log all readings taken.
  - 4. Mark final position of all balancing dampers.
- G. Controls and sequence commissioning
  - 1. Cycle the makeup air unit and exhaust fans control systems through the entire range of functions and verify proper operation and sequencing of heating, outside air damper operation fan start / stop, thermostat / sensor operation, etc.
  - 2. Provide the following as a separate portion of the test and balance log:
    - a. Type and characteristics of the individual controls serving each unique system in the building.
    - b. Written verification that the equipment controls and sequencing appears to be correct and functioning properly at the time of performance of the system test and balance work.

**END OF SECTION**



## HVAC INSULATION

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Work included: Providing of all required insulation for ductwork.

#### 1.2 SUBMITTALS

- A. Provide submittals in accordance with Section 23 00 00.
- B. Submittals shall include:
  - 1. Data to show compliance with flame and smoke rating.
  - 2. Manufacturer's catalog or technical data showing performance, dimensions, materials of construction and recommended methods of installation.

#### 1.3 QUALITY ASSURANCE

- A. Insulation materials and accessories such as adhesives, cement, etc. shall have composite fire and smoke hazard ratings, as tested by procedures indicated in NFPA 255 and U.L. 723, not to exceed a flame spread index of 25 and a smoke developed index of 50. Products or their shipping cartons shall have identification of the flame spread and smoke developed index.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Duct Insulation / Lining: Manville, Knauf, Owens-Corning, Certain-teed, or approved equal. Manville used as basis of selection.

#### 2.2 DESCRIPTION

- A. External Duct Insulation: Manville Microlite EQ FSK formaldehyde free, fiberglass duct insulation with FSKL jacket, 0.75 lb./cu. ft. Minimum installed R-value = 2.8 / inch.
- B. Duct Lining: Manville Linacoustic 1.5-3.0 lb./cu. ft. made of glass fibers bonded with a thermosetting resin with a "Permacote" coating proving added durability and microbial growth protection. Minimum installed R-value = 4.2 / inch. No fibrous material is to be exposed to the airstream.
- C. Minimum installed R-value (external insulation and lining):
  - 1. General Service (within Building Envelope) - R = Minimum 5.
  - 2. Unconditioned Spaces - R = Minimum 8.
  - 3. Outside Building / Vented Attic Space - R = Minimum 8.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Ductwork Insulation / Lining Application.
  - 1. Rectangular supply air ductwork – Internally lined.
  - 2. Rectangular return air ductwork within 7 feet of a supply air unit – Internally lined.
  - 3. Concealed round supply / return air ductwork - Externally insulated.

**HVAC INSULATION**

- B. Ductwork Interior Lining Application.
1. General Requirements: Apply internal insulation in accordance with manufacturer's recommendations and SMACNA "Duct Liner Application Standard." Apply internal insulation to flat sheet metal with continuous coverage of adhesive.
  2. Use adhesive on all butt edges. Install weld pins and clips on internal insulation 15" on center and no more than 2" maximum from any cut or exposed edge.
  3. Coat all raw duct liner edges within the ductwork. No uncoated fiberglass is allowed within the ductwork.
  4. Weld pins spaced maximum of 15 inch on center in both directions and within 2 inches of corners and joints. Weld pins flush with liner surface.
  5. Complete duct surface coated with adhesive and insulation pressed tightly thereto.
  6. Provide edges at terminal points with metal beading and heavily coated with adhesive.
  7. Heavily coat joints and corners with adhesive.
  8. Damaged areas replaced or heavily coated with adhesive.
  9. Duct dimensions shown are net inside dimension.

**END OF SECTION**

**HVAC DUCTS AND CASINGS**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Work included: Providing of all required sheet metal ductwork specified or shown on the drawings.

**1.2 SUBMITTALS**

- A. Submittals shall include Shop Drawings of any proposed revisions to the ductwork as shown on the drawings.

**PART 2 - PRODUCTS**

**2.1 DESCRIPTION**

- A. Provide G-60 galvanized sheet metal ductwork for supply and return air systems except as specified or shown on the drawings. Provide minimum gauge and reinforcing in accordance with Chapter Sixteen, "Duct Construction" of the Chapter 19 of the ASHRAE "Systems and Equipment" Handbook and the appropriate chapters of the latest edition of the Oregon State Mechanical Specialty Code
- B. Round duct to be sheet metal spiral duct. Snap-lack furnace type pipe is not allowed.
- C. Sheet metal duct only is to be used above hard ceiling areas.
- D. Type 1 Commercial Grease Hood Service:
  - 1. Ductwork to be minimum 16 gage steel or 18 gage stainless steel, all welded and constructed in conformance with the OMSC, applicable NFPA codes and current SMACNA standards. Factory built U.L listed commercial kitchen grease ducts acceptable.
  - 2. Provide appropriate cleanouts of approved construction and location.
  - 3. Construct duct joints, duct to hood joints, exhaust fan connections and grease duct supports in conformance with the UMSC.
- E. Ductwork for the dishwasher exhaust air system shall be constructed of aluminum, gauge and construction per SMACNA. Isolate the ductwork from direct connections to steel sheet metal fittings.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. General.
  - 1. Construct and assemble all supply, return, outside air and general exhaust duct systems in accordance with latest edition of the "HVAC Duct Construction Standards" published by SMACNA, the ASHRAE "Systems and Equipment" Handbook and the appropriate chapters of the latest edition of the OMSC.
  - 2. Cover ductwork openings during construction after delivery to the field prior to and after installation. Seal ends, protect from moisture and running water, adequately support to keep level and at least four inches off the ground.
  - 3. Store in clean dry space or if stored outdoors cover and protect from the elements.
  - 4. Ductwork pressure classifications to be appropriate for the scheduled external system pressures.

**HVAC DUCTS AND CASINGS**

- B. Seal all duct penetrations through walls at both sides of the partition. No air gaps are allowed around ductwork wall penetrations.
- C. Cross brace and reinforce ductwork and plenums with structural steel members to prevent breathing or ballooning.
- D. All joints in the air distribution system shall be sealed airtight with Hardcast CCWI-181 or similar LEED<sup>R</sup> Compliant sealant.
- E. Dishwasher Hood Ductwork:
  - 1. Slope all dishwasher exhaust ductwork to drain back to hood.
  - 2. Provide a hard copper (with appropriate fittings) drain from the hood connection to the adjacent floor sink
- F. Type 1 Commercial Grease Hood:
  - 1. Install the hood per manufacturer's installation instructions at the height noted by the manufacturer.
  - 2. Coordinate with the electrical contractor for service connections to the lighting control J-box, the thermal interlock system and the remote gas shutoff valve.
  - 3. Provide a rated and U.L. listed fire wrap cover to provide a rated shaft for ductwork from the hood discharge to roof as required by the OMSC. Pabco Board, 3M Fire Barrier or Firetemp flexible covering approved. Coordinate specific method employed with space constraints of the proposed construction. Provide all work required for a continuous rated shaft from hood to roof in accordance with the duct wrap manufacturer's installation instructions or a UL listed fire assembly. Provide cleanout access covers of approved construction.
  - 4. Provide appropriate cleanouts of approved construction and location.

**END OF SECTION**

**AIR DUCT ACCESSORIES**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Work included: Providing of all required air duct accessories specified or shown on the drawings.

**1.2 SUBMITTALS**

- A. Provide submittals in accordance with Section 23 00 00.
- B. Submittals shall include: Manufacturer's catalog or technical data showing performance, dimensions, materials of construction and recommended methods of installation.

**1.3 OPERATION AND MAINTENANCE DATA**

- A. Provide O&M data in accordance with Section 23 00 00.
- B. O&M data shall include: Manufacturer's literature and maintenance instructions.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Damper regulators and end bearings: Duro-Dyne, Ventlock or approved equal. Duro-Dyne used as basis of selection.
- B. Turning vanes: Duro Dyne, Elgen All-Tight, General Sheet Metal or approved equal.
- C. Flexible connections: Duro-Dyne or approved equal. Duro-Dyne used as basis of selection.
- D. Control Dampers (Motorized): Greenheck, Ruskin, Cesco or approved equal with Belimo actuators.

**2.2 DESCRIPTION**

- A. Volume Dampers:
  - 1. Damper regulators and end bearings: 3/8-inch Figure SRH-288 for accessible ductwork and Figure SRC-380 for concealed ductwork.
  - 2. Volume dampers shall be fabricated of 18 gage galvanized steel and have a continuous galvanized steel shaft.
- B. Turning vanes: Airfoil double-blade turning vanes. Single-bladed, shop fabricated turning vanes are not acceptable except for supply diffuser plenums, see detail on drawings.
- C. Flexible connections: Duro-Dyne "Insulflex" insulated flexible duct connector.
- D. Control Dampers: Greenheck VCD-18 Low-Leakage Control Dampers.
  - 1. 16-gauge galvanized hat channel with corner braces.
  - 2. Galvanized steel, V-groove blade construction. Extruded vinyl blade seals.
  - 3. Edge seals and flexible metal compressible jamb seals.
  - 4. Synthetic bearings.
  - 5. Square or hex plated steel axles.
  - 6. Opposed blade operation.
  - 7. Frame mounted actuator support.

**AIR DUCT ACCESSORIES**

8. Factory installed jackshaft for all multiple section dampers.
9. Maximum leakage rate of 4 CFM/sq. ft. at 1.0 inches w.g. when tested in accordance with AMCA Standard 500-1998.
10. Belimo actuators.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Cover ductwork openings during construction after delivery to the field prior to and after installation.
- B. Install volume dampers in all branch ducts to outlets and where shown on drawings. Provide regulators on all dampers. Assure that all dampers are aligned with their regulator pointers and left open for the air balance contractor. Permanently mark full open and full closed positions.
- C. Install turning vanes in all mitered elbows.
- D. Install flexible connections between all fans and connected ducts or plenums. Install with 2-inch space between the fan and connecting duct. Fabric should be snug, but not tight. Secure with flanged connections with accurate alignment between fan and duct.
- E. Flexible Ductwork:
  1. Construct and assemble all ductwork and duct systems in accordance with the latest edition of the "HVAC Duct Construction Standards" published by SMACNA, the ASHRAE "Systems and Equipment" Handbook and the appropriate chapters of the latest edition of the Oregon Mechanical Specialty Code.
  2. All joints in the air distribution system shall be sealed airtight.
  3. Support all flexible ductwork on two-foot centers by a minimum one-inch galvanized sheet metal strap running around the duct.
  4. Extend ducts to full length prior to hanging.
  5. Maximum developed length to six feet.
  6. Minimum flexible duct bending radius is twice the duct diameter.
  7. When suspending duct by wire from an overhead support, duct shall be level with minimum sagging and wire should be as nearly vertical as possible.
- F. Install spin-in fittings where shown on the drawings in accordance with the manufacturer's instructions. Locate the extractors in the airstream as appropriate for direction of supply airflow.
- G. Install motorized dampers at locations indicated on the drawings and in accordance with manufacturer's installation instructions.
- H. All joints in the air distribution system shall be sealed airtight with Hardcast CCWI-181 or similar LEED<sup>R</sup> compliant sealant.

**END OF SECTION**

**HVAC FANS**

**PART 1 - GENERAL**

1.1 SUMMARY

- A. Work Included: Providing of all required fans as noted in the contract documents.

1.2 SUBMITTALS

- A. Provide submittals in accordance with Section 23 00 00.
- B. Submittals shall include: Manufacturer's catalog or technical data showing performance, dimensions, materials of construction and recommended methods of installation.

1.3 OPERATION AND MAINTENANCE DATA

- A. Provide O&M data in accordance with Section 23 00 00.
- B. O&M data shall include manufacturer's literature and maintenance instructions.

**PART 2 - PRODUCTS**

2.1 MANUFACTURERS

- A. Captiveaire, Greenheck, Cook, Twin City or approved equal.

2.2 DESCRIPTION

- A. Type 1 Grease Rooftop Exhaust Fan
  1. Packaged backward incline, upblast, belt-drive exhaust fan designed for roof mounting on factory supplied curb. Fan housing to be of heavy gauge aluminum with roll beads on all spun parts. Internal resiliently isolated fan and motor assembly. Manufacturer's standard factory finish.
  2. Fan base ceramic seal for grease ducts.
  3. Grease drain outlet and reservoir with drain connection.
  4. High heat operation, integral heat baffle.
  5. Hinged with flexible electrical cable for inspection.
  6. Ventilated roof curb with extension as required – Verify exact height at the site.
  7. Provide NEMA 3 weatherproof disconnect for outdoor installation.
  8. VFD ready motor for operation with hood manufacturer's variable frequency drive.
  9. Fan shaft grounding rings.
  10. U.L 762 listed – "Power ventilators for Restaurant Exhaust Appliances" for grease hood duty, AMCA certified.

**PART 3 - EXECUTION**

3.1 INSTALLATION

- A. All installations to be in accordance with manufacturer's instructions.
- B. Mount the Type 1 rooftop exhaust fan on the manufacturer's ventilated curb where noted on the architectural drawings. Coordinate with the architectural roof system for proper installation and flashing of rooftop fan curbs. Coordinate curb construction with roof slope.

**HVAC FANS**

- C. Rooftop Type 1 Exhaust Fans Controls.
  - 1. Coordinate with the Type 1 hood specified in the food service drawings for exhaust fan control requirements.
  - 2. Coordinate with the electrical contractor and install all mechanical equipment and devices required for control of the exhaust fans, required interlocks to the makeup air unit and required safety devices.
- D. Connect ductwork.

**END OF SECTION**



**AIR OUTLETS AND INLETS**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Work included: Providing of all required grilles specified or shown on the drawings.

**1.2 SUBMITTALS**

- A. Provide submittals in accordance with Section 23 00 00.
- B. Submittals shall include manufacturer's catalog or technical data showing performance, dimensions, materials of construction and recommended methods of installation.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Price, Krueger, Anemostat, Titus, Nailor or approved equal. Price used as a basis for selection unless specified.

**2.2 DESCRIPTION**

- A. Supply Air Diffuser - Lay-In T-bar Mount: Model SMCD louver face diffuser with outer frame, duct collar and modular inner core assembly allowing directional blade assembly revisions by rotating core modules. Diffuser to be of steel construction and standard white powder finish with Border 36 for flush mounting in standard 24"X24" lay-in T-bar ceiling.
- B. Sidewall Supply Air Grille: Model 520 rectangular steel construction grille, double deflection with horizontal face bars, spaced at 3/4", 1-1/4" margins and standard finish.
- C. Provide opposed blade dampers (OBD) as noted on the drawings.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Install grilles where shown on the drawings and in accordance with manufacturer's instructions.
- B. Install a gasket to assure an airtight seal between ductwork or ceiling and grille.
- C. Install all grilles tight to their respective mounting surfaces.
- D. Install plumb and true with room dimensions and accurately centered on projections as shown on architectural reflected ceiling plans.

**END OF SECTION**



**MAKE-UP AIR UNITS**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Work included: Providing of kitchen make-up air unit.

**1.2 SUBMITTALS**

- A. Provide submittals in accordance with Section 23 0000.
- B. Submittals shall include:
  - 1. Manufacturer's catalog or technical data showing performance, dimensions, materials of construction and recommended methods of installation.
  - 2. Control diagrams.

**1.3 OPERATION AND MAINTENANCE DATA**

- A. Provide O&M data in accordance with Section 23 0000.
- B. O&M data shall include:
  - 1. Manufacturer's literature.
  - 2. Maintenance instructions.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Captiveaire, Greenheck, Modine, Reznor or approved equal .

**2.2 DESCRIPTION**

- A. Make-Up Air Unit
  - 1. Direct fired gas makeup air unit for rooftop installation. Unit consisting of fan, direct fired heater with minimum 30:1 turndown and integral disconnect.
  - 2. Casing shall be of internal frame type construction of galvanized steel with flanged inlet and outlet duct connections.
  - 3. Centrifugal fans shall be double-width, double-inlet. Fan and motor shall be mounted on a common base and shall be internally isolated. All blower wheels shall be statically and dynamically balanced.
  - 4. Fuel System: Provide electronic ignition pilot system for use with natural gas service, AGA approved. Low fire start.
  - 5. Electrical: Must be wired to operate with variable frequency drive control of fan motor.
  - 6. VFD ready motor for operation with hood manufacturer's variable frequency drive.
  - 7. Fan shaft grounding rings.
  - 8. MERV 8 filters.
  - 9. Options / Accessories.
    - a. Separate power circuit to heater for control by the hood manufacturer.
    - b. Provide weather hood with birdscreen for outdoor application.
    - c. Provide factory roof curb.
    - d. Low leakage motorized inlet damper.
    - e. Vertical discharge.
    - f. Curb duct hanger.
    - g. Insulated curb.

**MAKE-UP AIR UNITS**

- h. Gas pressure gauge.
    - i. 120 volt wiring package for VFD integration.
  - 10. Controls:
    - a. Discharge temperature sensor shall be factory mounted and wired to the unit control center.
    - b. Interlock make-up air unit to operate as strictly a 100% outside air unit with heating section when its respective kitchen hood exhaust fan runs. The outside air dampers shall shut on fan shutdown.
    - c. Discharge air thermostat to modulate burners as needed to maintain space heating temperature setpoint and to limit minimum air temperature to 50 degrees and maximum air temperature of 120 degrees, gas controls and safeties.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Install curb / equipment per manufacturer's instructions and make duct connection.
- B. Controls.
  - 1. Coordinate with the Type 1 hood specified in the food service drawings for exhaust fan control requirements.
  - 2. Provide sensors and wiring as required for control of discharge air temperature.
  - 3. Coordinate with the electrical contractor and install all mechanical equipment and devices required for control of the makeup air unit, required interlocks to the exhaust fans and required safety devices. Outside air damper shall close on shutdown.

**END OF SECTION**

**ELECTRICAL GENERAL PROVISIONS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. The General and Supplemental Conditions apply to this Division, including but not limited to:
  - 1. Drawings and Specifications.
  - 2. Public ordinances, permits. Including but not limited to electrical and fire alarm permits.
  - 3. Payments and fees required by governing authorities for work included in this Division.
  - 4. Change orders.
- B. Division 1, General Requirements apply to this Division, including but not limited to:
  - 1. Summary of Work, Section 01 11 00
  - 2. Alternates, Section 01 23 00
  - 3. Project Coordination, Section 01 31 13
  - 4. Submittals, including Shop Drawings, Product Data and Samples, Section 01 33 00.
  - 5. Construction Facilities and Temporary Controls, Section 01 50 00.
  - 6. Materials and Equipment, Section 01 60 00: Product Substitution Procedures.
  - 7. Contract Closeout, Section 01 70 00:
    - a. Project Record Documents.
    - b. Operating and Maintenance Data.
    - c. Systems Demonstrations
  - 8. Cutting and Patching, Section 01 73 29

**1.2 CONTRACT DOCUMENTS**

- A. The Electrical Drawings and Specifications are complementary and what is called for by one shall be as binding as if called for by both. Items shown on the Drawings are not necessarily included in the Specifications. All directives and instructions to furnish, provide, install, complete, test and methods described in these Specifications and Drawings shall be interpreted as directives to the Electrical Contractor unless clearly specified otherwise. It is the intent of these specifications and the accompanying drawings to describe complete and functional electrical systems. If errors or discrepancies are discovered, notify the Architect immediately.

**1.3 SITE VISITATION**

- A. The contractor shall visit the site prior to bidding to familiarize themselves with existing conditions and all other factors which may affect the execution of the work.

**1.4 CODES, ORDINANCES AND REGULATIONS**

- A. The completed installation shall conform to all applicable Federal, State and Local Codes, Ordinances and Regulations.
- B. Obtain all necessary permits and inspections required by the governing authorities having jurisdiction over this work.
- C. Furnish to the Architect a certificate of approval from the inspection authority at the completion of the work, prior to the application for final payment.

**1.5 SCOPE OF WORK**

- A. The work covered by this Specification shall include furnishing all labor, materials, equipment and services to construct and install the complete electrical system as shown on the Drawings and specified herein. Verify all conditions on the job site and lay out work accordingly.

**ELECTRICAL GENERAL PROVISIONS**

- B. The work shall include, but is not necessarily limited to, the following systems:
  - 1. Demolition of existing power & lighting components
  - 2. Dust collection equipment system modifications
  - 3. Lighting & controls systems
  - 4. Mechanical system connections
  - 5. Provide fire alarm design build connections to existing FACP for dust collector. Provide all labor and material including but not be limited to conduit, conductors, control ZAM, and supports
  - 6. Additive Bid Alternate #1 – Wood Shop Dust Collector Feeder. Install new feeder conduit adjacent to the new sprinkler piping, see M2.1 & E2.3. Coordinate with sprinkler installer to utilize pipe supports.
  - 7. Additive Bid Alternate #2 – Metal Shop Lighting. Remove existing luminaires and associated switching as shown on E1.2 Lighting Demolition Plan. Provide new luminaires, lighting controls, LV wiring and associated branch circuiting.
- C. The following equipment and work will be furnished under other Divisions of Work:
  - 1. Equipment control wiring beyond the provisions shown on the Electrical Drawings.

**1.6 WARRANTY**

- A. Provide a written one-year warranty covering the work done under this Division as required by the General Conditions. Incandescent lamps will be excluded from this warranty.
- B. Systems and Apparatus:
  - 1. Free of defects of material and workmanship and in accord with the Contract Documents.
  - 2. Built and installed to deliver its full rated capacity at the efficiency for which it was designed.
  - 3. Operate at full capacity without objectionable noise or vibration.

**1.7 SUBMITTALS**

- A. Refer to Division 1 requirements.
- B. Submit all electrical data in 3-point covered binders, indexed by section number, covering all items of equipment and systems. Submit all electrical items at one time.
- C. The installation and Record Drawings called for under submittals shall show all outlets, devices, terminal cabinets, conduits, wiring and connections required for the complete system described. Drawings will be at the same sheet size and scale as the construction documents. Prints of these drawings shall be submitted prior to starting installation. The Contractor submitted drawings, when approved, will then form the basis for installation.
- D. Submittals will be permitted to be sent by email (PDF). Submittal shall be sent by sections and not one combined PDF file.
- E. Submittals will not be reviewed unless equipment is specifically indicated.

**PART 2 - PRODUCTS**

**2.1 APPROVALS AND SUBSTITUTIONS**

- A. The use of manufacturer's names, models and numbers in this Specification is intended to establish style, quality, appearance and usefulness. Items noted "or equal" do not require prior approval. Items noted "approved equivalent" or "approved substitute" require prior approval.

**ELECTRICAL GENERAL PROVISIONS**

- B. Submit for the Architect's approval, manufacturer's detailed specifications and data sheets for all proposed substitutions. Submittals shall consist of a single sheet, or sheets, if required, for each piece of equipment and shall give the specific data needed for consideration of approval. All pertinent data listed in the Specifications and in Schedules shall be furnished, including all special features. See that all submittals are in proper order, and that all equipment will fit in the space provided.
- C. Submittals will be permitted to be sent by email (PDF). Submittal shall be sent by sections and not one combined PDF file
- D. The Architect reserves the right to require the submission of an actual sample before the acceptance of any product as an equal to that specified.

**2.2 MATERIAL APPROVALS AND SHOP DRAWINGS**

- A. Submit all electrical data in 3-point covered binders, indexed by Section number, covering all items of equipment and systems. Include wiring diagrams where called for.
- B. Review and recommendations by the Architect or Engineer are not to be construed as change authorizations. If discrepancies between the shop drawings submitted and the Contract Documents are discovered either prior to or after the data is processed, the Contract Documents will govern. Shop drawing review will not occur without contract cost data as outlined below.

**PART 3 - EXECUTION**

**3.1 CONTRACT COST DATA**

- A. Furnish to the Architect a cost breakdown of the Electrical Contract.
- B. The cost breakdown shall include separate amounts for material and labor for each category listed below. Include costs data with the shop drawings submittal.
  - 1. Equipment connections
  - 2. Feeders
  - 3. Branch circuit wiring
  - 4. Luminaires & lighting control
  - 5. Fire alarm modifications
  - 6. Demolition
  - 7. Additive Alternate #1 – Dust Collector Feeder
  - 8. Additive Alternate #2 – Metal Shop Lighting

**3.2 CHANGE ORDERS**

- A. All supplemental cost proposals by the Contractor shall be accompanied with a complete itemized breakdown of labor and materials cost without exception. Contractor's estimating sheets for the supplemental cost proposals shall be included. Labor must be separated and allocated for each item of work. Material cost, as used in this section, to be Contractor's actual "invoice" cost. All discounts shall be detailed and shown on the invoice. Labor cost shall be the actual cost per manhour including all taxes and fees. The total estimated cost for any change will be considered a not-to-exceed price. The supplemental cost approval will be based on this estimate but actual change order request for payment will be based on the contractor's actual cost to perform this work and shall be accompanied with a complete itemized breakdown of labor and materials cost with backup invoices, without exception.

**3.3 OPERATING AND MAINTENANCE DATA**

- A. The Contractor shall provide operating instructions and maintenance data, in 3-point covered binders, for all equipment and materials called for under this Division.

**ELECTRICAL GENERAL PROVISIONS**

- B. Submit five copies of operating and maintenance data books for review at least four weeks before final review of the Project. Assemble all data in a completely indexed volume or volumes and identify the size, model, and features indicated for each item.
- C. Maintenance instruction manuals shall include complete cleaning and servicing data compiled in clearly and easily understandable form. Data shall show serial numbers of each piece of equipment and complete lists of replacement parts.

**3.4 ELECTRONIC INFORMATION**

- A. Electronic record information in AutoCAD format will be provided to the electrical contractor upon request. A drawing release form will be sent to the contractor and upon its return a compact disk will be made available to be picked up at System Design Consultants, Inc office. One (1) copy of the base project construction document files will be made available to the contractor at no charge, each additional request will be provided at a cost of \$250 per request.
- B. All sub contractors requiring electrical plans will make their request for the construction documents through the electrical contractor.

**3.5 RECORD INFORMATION**

- A. Maintain one set of construction documents marked up (red-lined) on a daily basis as the work progresses, showing all changes, deviations, change orders, omissions, or other variations from the contract drawings.
- B. Record all conduits, stubups and equipment by dimensions from gridlines, below grade, above floor, etc. Show location of all access panels, rough-in for future, etc.
- C. Make record documents available to the Architect for review or printing during construction.
- D. On acceptance of the contractor record drawings by the Architect, the contractor will transfer the record information in "AutoCAD" format to the electronic "AutoCAD" drawing files. Refer to 26 00 00-3.4(A) for obtaining documents and applicable charges.
- E. Deliver record drawings files on compact disk to the Architect promptly upon completion of the project. Record information added to the "AutoCAD" drawing files is to have compatible format, linework and lettering as the original files. All new work done by the contractor on the original drawing files is to be on a single layer noted in the revised drawing file as "RECORD".

**3.6 PROTECTION OF WORK**

- A. Protect all electrical work and equipment installed under this Division against damage by other trades, weather conditions or any other causes. Equipment found damaged or in other than new condition will be rejected as defective.
- B. Switchgear, transformers, panels, light fixtures and all electrical equipment shall be kept covered or closed to exclude dust, dirt and splashes of plaster, cement or paint and shall be free of all such contamination before acceptance. Enclosures and trims shall be in new condition, free of rust, scratches and other finish defects. Properly refinish in a manner acceptable to the Architect, if damaged.



**ELECTRICAL GENERAL PROVISIONS**

**3.7 MAINTENANCE OF SERVICE**

- A. Electrical service shall be maintained to all functioning portions of the building throughout construction, except as noted below, during all normal working hours of the building occupants. Outages to occupied areas shall be kept to a minimum and be prearranged with the Architect or Owner's Representative. This Contractor will be liable for any damages resulting from unscheduled outages or for those not confined to the pre-arranged times.
- B. Signal and communication systems and equipment shall be kept in operation wherever these serve occupied or functional portions of the building. Outages of these facilities shall be treated the same as electrical power outages.
- C. Telephone services where required during the construction work will be maintained by the telephone company. This work shall be coordinated with the telephone company in such a manner that service, as required by the building occupants, can be readily installed and maintained.
- D. Include all costs for temporary facilities, overtime labor and necessary provisions to maintain electrical services in the initial bid proposal. Temporary wiring and facilities, if used, shall be removed and the site left clean before final acceptance.

**END OF SECTION**



**BASIC MATERIALS AND METHODS**

**PART 1 - GENERAL**

1.1 DESCRIPTION

- A. Conditions of the Contract and Section 26 00 00 apply to this Section.

1.2 COORDINATION OF WORK

- A. Conduct work in a manner to cooperate with all other trades for proper installation of all items of equipment. Consult the Drawings of all other trades or crafts to avoid conflicts with cabinets, counters, equipment, structural members, etc. In general, the architectural drawings govern but conflicts shall be resolved with the Architect prior to rough-in.
- B. Verify the physical dimension of each item of electrical equipment to fit the available space. Coordination of the equipment to fit into the available space and the access routes through the construction shall be the Contractor's responsibility.

1.3 ELECTRICAL DRAWINGS

- A. The Electrical Drawings accompanying these Specifications are design drawings and generally are diagrammatic indicating approximate locations of outlets and wiring. They do not show every offset, bend, junction box, etc., which may be required for installation to complete the system. Minor deviations in methods, circuiting and branch circuit distribution or arrangements to suit construction conditions are permissible.
- B. The intent of the branch circuiting and control shown shall not be changed nor homeruns combined without the approval of the Architect. Feeder runs shall not be combined or changed.
- C. Cross or hash marks on conduit runs indicate quantity of No. 12 copper branch circuit conductors, in addition to a grounding conductor, unless otherwise noted. Where such marks do not appear, provide minimum of two conductors with ground, minimum No. 12, size as required for loads and/or equipment being served. **Contractor is responsible to assure that the maximum voltage drop on any circuit does not exceed 5% at the load.** The contractor shall review panel schedule to verify wire/conduit size required.
- D. Conduit sizes shown or listed on the drawings are for reference only. It is the responsibility of the contractor to provide and install conduit sized per current NEC requirements.

**PART 2 - PRODUCTS**

2.1 MATERIALS

- A. Electrical products installed in this project shall be listed by a recognized testing laboratory or approved in writing by the local inspection authority as required by governing codes and ordinances.
- B. Materials shall be new, of the best quality. The materials shall be manufactured in accordance with NEMA, ANSI, UL or other applicable standards.

**BASIC MATERIALS AND METHODS**

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Provide a completely properly operating system for each item of equipment called for under this work. Installations shall be in accord with the equipment manufacturer's instructions, the best industry practices and the contract documents. Where a conflict in these guides appear, the Architect shall be requested to provide proper clarification before work is roughed in and his decision will be final. Work installed without such clarification shall be removed and corrected by the Contractor at no cost to the Owner.
- B. Make installation in a neat, finished and safe manner, according to the latest published NECA Standard of Installation under competent supervision.

**3.2 EXCAVATION AND BACKFILL**

- A. Perform all necessary excavation and backfill for the installation of electrical work in compliance with Section 02220.
- B. For direct burial cable or non-metallic conduit, a minimum 3-inch cover of sand or clean earth fill shall be placed all around the cable or conduit on a leveled trench bottom. Lay all steel conduit on a smooth level trench bottom, so that contact is made for its entire length. Water shall not be present in the trench when electrical conduit is being laid.
- C. Place backfill in layers not exceeding 8-inches deep and compact to 95% of maximum density at optimum moisture to preclude settlement.
  - 1. Interior: Bank sand or pea gravel.
  - 2. Exterior: Excavated material with final 8-inches clean soil.
- D. Following backfilling, grade all trenches to the level of surrounding soil. All excess soil shall be disposed of at the site as directed.
- E. Provide 6-inch wide vinyl tape marked "ELECTRICAL" in backfill, 12-inches below finished grade, above all conduit runs.
- F. Coordinate patching of all asphalt or concrete surfaces disturbed by this work with General Contractor.

**3.3 NOISE CONTROL**

- A. Outlet boxes at opposite sides of partitions shall not be placed back-to-back nor straight through boxes be employed, except where specifically permitted on the Drawings by note, to minimize transmission of noise between occupied spaces.
- B. Contactors, transformers, starters and similar noise producing devices shall not be placed on walls which are common to occupied spaces unless specifically called for on the Drawings. Where such devices must be mounted on walls, common to occupied spaces, they shall be shock mounted or isolated in such a manner as to effectively prevent the transmission of their inherent noise to the occupied space.
- C. Ballasts, contactors, starters, transformers and like equipment which are found to be noticeably noisier than other similar equipment on the project will be deemed defective and shall be replaced.

**BASIC MATERIALS AND METHODS**

**3.4 EQUIPMENT CONNECTIONS**

- A. Provide complete electrical connections for all items of equipment requiring such connections, including incidental wiring, materials, devices and labor necessary for a finished working installation.
- B. Verify the location and method for connecting to each item of equipment prior to roughing-in. Check the voltage and phase of each item of equipment before connecting.
- C. Make motor connections for the proper direction of rotation. Minimum size flex for mechanical equipment shall be 1/2-inch except at small control devices where 3/8-inch may be used. Exposed motor wiring shall be jacketed metallic flex with 6-inches minimum slack loop. Pump motors shall not be test run until liquid is in the system.
- D. Control devices and wiring relating to the HVAC systems will be furnished and installed under Division 15 except for provisions or items specifically shown on the Electrical Drawings or specified herein.
- E. Furnish all code required disconnects under this work, whether specifically shown or not.

**3.5 EQUIPMENT SUPPORT**

- A. Anchoring and bracing to the building structural elements in accord with all codes and regulations regarding seismic design conditions. The contractor is responsible to determine the means and methods of equipment installation and support. Seismic restraints for electrical and communication equipment shall bear the seal and signature of a structural engineer registered in the state of Oregon, and shall be submitted to the Architect prior to fabrication. Calculations are to be included for all connections to the structure, considering localized effects.
- B. Each fastening device and support for electrical equipment, fixtures, panels, outlets and cabinets shall be capable of supporting not less than four times the ultimate weight of the object or objects fastened or suspended from the building structure.
- C. Properly and adequately support fixtures installed under this work from the building structure. Supports shall provide proper alignment and leveling of fixtures. Flexible connections where permitted to exposed fixtures shall be neat and straight, without excess slack, attached to the support device.
- D. Support all junction boxes, pull boxes or other conduit terminating housings located above the suspended ceiling from the floor above, roof or penthouse floor structure to prevent sagging or swaying.
- E. Conduits:
  - 1. Support suspended conduits 1-inch and larger from the overhead structural system with metal ring or trapeze hangers with threaded steel rod having a safety factor of 4.
  - 2. Conduit installed in poured concrete shall be anchored to the reinforcing steel with No. 14 black iron wire.

**3.6 ALIGNMENT**

- A. Install panels, cabinets and equipment level and plumb, parallel with structural building lines. Switchgear panels and all electrical enclosures shall fit neatly without gaps, openings or distortion. Properly and neatly close all unused openings with approved devices.
- B. Fit surface panels, devices and outlets with neat, appropriate trims, plates or covers, without overhanging edges, protruding corners or raw edges, to leave a finished appearance.

**BASIC MATERIALS AND METHODS**

**3.7 CUTTING AND PATCHING**

- A. Include cutting, patching and restoration of finishes necessary for this work. Surfaces damaged by this work and spaces around conduits passing through floors and walls shall be neatly patched and finished to match the adjacent construction, including painting or other finishes. Clean up and remove all dirt and debris. This work shall all be performed to the satisfaction of the Architect. Refer to Section 01045.

**3.8 FIRESTOPPING PENETRATIONS IN FIRE-RATED WALL/FLOOR ASSEMBLIES**

- A. Contractors shall provide proper sizing when providing sleeves or core-drilled holes to accommodate their through penetrating items. All voids between sleeve or core-drilled hole and pipe passing through, shall be firestopped to meet the requirements of ASTM E-814, in accordance with Section 07270 - Firestopping.
- B. Provide properly sized expansion fittings for all conduits crossing over building expansion joints

**END OF SECTION**

**CONDUCTORS AND CONNECTORS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Work Included:
  - 1. Deliver conductors to the job site in cartons, protective covers or on reels.
  - 2. Conductors for special systems shall be as recommended by the equipment manufacturer except as noted.

**1.2 RELATED WORK**

- A. Section 26 00 00: General Provisions
- B. Section 26 05 00: Basic Materials and Methods.

**1.3 SUBMITTALS**

- A. Shop Drawings.
- B. Product Data

**PART 2 - PRODUCTS**

**2.1 CONDUCTORS - 600 V**

- A. Type:
  - 1. No. 12 AWG minimum size unless noted otherwise.
  - 2. No. 8 and larger, stranded, Class B.
- B. Stranding: Copper, concentric or compressed
- C. Insulation: THHN, THWN, XHHW unless noted or specified otherwise.
- D. Through wiring in fluorescent fixtures shall be rated for 90 degree C.
- E. Manufacturers: Southwire, G.E., Hatfield, Anaconda, Rome or approved equal.

**2.2 CORD DROPS AND PORTABLE CORDS**

- A. Copper type "S" or "SO" heavy duty, rubber insulated unless otherwise noted.

**2.3 CONNECTORS**

- A. Branch Circuit Conductor Splices: Live spring type, Scotch-Lok, Ideal Wing Nut or self-stripping type, 3M Series 560.
- B. Cable Splices: Compression tool applied sleeves, Kearney, Burndy or approved equal with 600V heat shrink insulation.
- C. Lugs: Conductors no. 6 and larger, except on molded case circuit breakers, two hole, long barrel pressure tool set Thomas & Betts No. 54,000 series, Burndy "Hydent", Anderson Electric VCEL, or approved equal.

**CONDUCTORS AND CONNECTORS**

**PART 3 - EXECUTION**

**3.1 CONDUCTORS**

- A. Pulling compounds may be used with the residue cleaned from the conductors and raceway entrances after the pull is made.
- B. Pulleys or blocks shall be used for alignment of the conductors when pulling. Pulling shall be in accordance with manufacturer's specifications regarding pulling tensions, bending radii of the cable and compounds.
- C. Conductors entering terminal or junction boxes mounted on hermetically sealed refrigeration compressor motors shall be copper.
- D. Make up and insulate wiring promptly after installation of conductors. Wire shall not be pulled in until all bushings are installed and raceways terminations are completed. Wire shall not be pulled into conduit embedded in concrete until after the concrete is poured and forms are stripped.
- E. Conductor sizes shown on the Drawings are for copper only.

**3.2 CONNECTORS**

- A. Control and special systems wires shall be terminated with a tool applied spade flared lug when terminating at a screw connection.
- B. All screw and bolt type connectors shall be made up tight and retightened after an eight-hour period.
- C. All tool-applied compression connectors shall be applied per manufacturer's recommendations and physically checked for tightness.

**3.3 COLOR CODING**

- A. Phase color code to be consistent at all feeder terminations, A-B-C left-to-right or A-B-C top-to-bottom.
- B. Switchlegs, travelers, etc. to be consistent with the phases to which connected or a color distinctive from that listed.
- C. Under 250 Volts Phase-to-Phase:
  - Phase A - Black                      Neutral – White
  - Phase B - Red                        Ground – Green
  - Phase C – Blue
- D. Over 250 Volts Phase-to-Phase:
  - Phase A - Brown                      Neutral - White with tracer
  - Phase B - Orange                     Ground – Green
  - Phase C - Yellow

**END OF SECTION**



**GROUNDING AND BONDING**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Work Included:
  - 1. Provide complete building grounding system.
  - 2. Provide ground bus bar at each telephone demarcation and data distribution location.

**1.2 RELATED WORK**

- A. Section 26 00 00: General Provisions,
- B. Section 26 05 00: Basic Materials and Methods,
- C. Section 26 05 19: Conductors and Connectors
- D. Section 26 27 26: Wiring Devices and Plates

**PART 2 - PRODUCTS**

**2.1 GROUND CONDUCTORS**

- A. Bare or green insulated copper.

**2.2 GROUND ROD CONNECTORS**

- A. Cast, set screw or bolted type.

**2.3 ELECTRODES**

- A. Copper clad steel minimum 3/4-inch diameter by 8 feet long.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Grounding system will consist of the following:
  - 1. Minimum of 20' bare no. 4 copper concrete-encase grounding conductor.
  - 2. Provide bond to building steel.
  - 3. Provide bond to cold water piping within 5' of building entry.
  - 4. Provide bond to minimum of 2 ground rods.
- B. Establish a ground for each separately derived system, e.g., transformers and generators, per NEC 250-30.
- C. All grounding conductors shall be sized in accord with the National Electrical Code.
- D. Grounding conductor connectors shall be made up tight and located for future servicing and to ensure low impedance.
- E. Ground the electrical system, the cold-water service, structural steel, and transformers to the building ground grid.
- F. All feeder and service raceways shall be grounded.

**GROUNDING AND BONDING**

- G. All plug-in receptacles shall be bonded to the boxes, raceways and grounding conductor.
- H. Provide equipment-grounding conductor in all branch circuit, feeder and service raceways.
- I. Provide insulated grounding conductor in all branch circuit wiring serving Classrooms, Administration offices and all data locations.
- J. Provide bonding jumper between ground and neutral bus at main service.

**END OF SECTION**

**CONDUITS, RACEWAYS, BOXES AND FITTINGS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Work Included:
  - 1. Provide raceways and conduits of specified types for all electrical systems wiring, except where clearly shown or specified otherwise. All fittings, boxes, hangers and appurtenances shall be included.
  - 2. Size raceways and conduits as indicated on the Drawings. Where no size is indicated, conduit may be the minimum code permitted size for the quantity of type THW conductors installed. Minimum size is 3/4".

**1.2 RELATED WORK**

- A. Section 26 00 00: General Provisions
- B. Section 26 05 00: Basic Materials and Methods

**1.3 SUBMITTALS**

- A. Shop Drawings.
- B. Product Data.
- C. Operational Instructions and Maintenance Data.

**PART 2 - PRODUCTS**

**2.1 METALLIC CONDUITS**

- A. GRC: Threaded rigid heavy wall galvanized steel.
- B. IMC: Threaded intermediate galvanized steel.
- C. EMT: Zinc coated steel electrical metallic tubing.
- D. ARC: Threaded rigid heavy wall aluminum.
- E. Flex: Flexible metal with polyvinyl chloride jacket, at speakers and no longer than 3'-0".
- F. Liquidtight flexible conduit: Zinc steel core with smooth gray abrasion-resistant, liquid-tight PVC cover with integral ground wire wound in steel core, at speakers and no longer than 3'-0".

**2.2 NON-METALLIC CONDUITS**

- A. Rigid non-metallic conduit: Type II PVC schedule 40, suitable for use with 90 degrees C rated wire. Conduit shall conform to UL Standard 651 and carry appropriate UL listing for above and below ground use.

**2.3 SURFACE RACEWAYS**

- A. Acceptable manufacturer(s): Wiremold, Panduit as noted on drawings, or approved equal.

**CONDUITS, RACEWAYS, BOXES AND FITTINGS**

- B. Type, size with quantity and spacing of outlets as shown on drawings. Provide with snap-on cover, connectors, fittings and incidental items required for a complete installation. Raceway shall be in continuous length as indicated on drawings.

**2.4 WIREWAYS**

- A. Troughs: Steel, painted, square in cross section, preformed knock-outs on standard spacing, hinged cover.
- B. Fittings: Tees, elbows, couplings as required for configuration shown on the Drawings.
- C. Supports: U-shaped, 1/4-inch by 1-1/2-inch steel strap, bent and prime painted.

**2.5 FITTINGS**

- A. GRC, IMC AND ARC:
  - 1. The conduit itself must be threaded, threaded couplings attached by any means are not allowed.
  - 2. Threaded locknuts.
  - 3. Threaded bushings: 1-1/4 inch and larger shall be of the insulated, grounding type as required under Section 26 05 26.
  - 4. Expansion fittings: O-Z/Gedney Electrical Mfg. Co. or approved equal type E expansion coupling with bonding jumper for up to four inches of movement.
- B. EMT:
  - 1. Connectors: Steel set screw or compression ring type for conduit termination, with insulated throat, suitable for conditions used.
  - 2. Couplings: Steel set screw or compression ring type, concrete tight.
- C. Weatherproof Connectors: Threaded pipe connections with waterproofing compound.

**2.6 METALLIC BOXES**

- A. Flush and Concealed Outlet Boxes: Galvanized stamped steel with screw ears, knock-out plugs, mounting holes, fixture studs if required, RACO or approved equal.
- B. Surface Outlet Boxes: Galvanized stamped steel same as above for use on ceilings; cast steel or aluminum with threaded hubs for use on walls.
- C. Large Boxes: Boxes exceeding 4-11/16 inches square when required shall be welded steel construction with screw cover and painted, steel gauge as required by physical size, Hoffman, Circle AW or approved equal.

**2.7 NON-METALLIC BOXES**

- A. PVC, molded enclosures, threaded hubs.

**2.8 OTHERS**

- A. Any conduits, fittings, etc. specifically not mentioned above are not approved for use.

**CONDUITS, RACEWAYS, BOXES AND FITTINGS**

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Conceal all conduits in finished spaces and elsewhere so far as practicable. Concealed conduits shall run in a direct line with long sweep bends and offsets. GRC and IMC embedded in concrete below grade or in damp locations shall be made water-tight by painting the entire male thread with Rustoleum metal primer, or equal, before assembly.
- B. Route exposed conduit parallel or at right angles to structural building lines, and neatly offset into boxes. Conduits attached directly to building surfaces shall closely follow the surfaces. Conduit fittings shall be used to "saddle" under beams. ALL EXPOSED CONDUIT MUST HAVE ARCHITECT APPROVAL PRIOR TO INSTALLTION.
- C. Conduits, whether exposed or concealed, shall be securely supported and fastened at intervals of nominally every 8 feet and within 18 inches of each outlet, ell, fitting, panel, etc.
- D. Keep conduit and raceways closed with suitable plugs or caps during construction to prevent entrance of dirt, moisture, concrete or foreign objects. Raceways shall be clean and dry before installation of wire and at the time of acceptance.
- E. Pack spaces around conduits with oakum and seal to prevent entrance of moisture where conduits are installed in sleeves or block-outs penetrating moisture barriers.
- F. Where conduits penetrate fire rated concrete walls or floors, provide non-combustible caulking or putty 3M-fire barrier material of thickness required to equal or exceed the fire rating of wall or floor.

**3.2 CONDUIT**

- A. Install GRC or IMC galvanized steel conduits for wiring underground, in-cast-concrete construction, in damp locations, in hazardous areas and where subject to mechanical injury, with threaded fittings made up tight.
- B. EMT may be employed in all other dry protected locations.
- C. ARC may be used wherever EMT is acceptable, with no restriction on size.
- D. Flex is required where flexibility is necessary as at motors, transformers and recessed lighting fixtures, etc. Flex shall be jacketed type, except where concealed in dry locations and spaces such as ceiling cavities.
- E. PVC may be used underground, under interior slabs or where noted on the Drawings. Make connections with waterproof solvent cement. Provide GRC at 60 degree and larger bends and where penetrating slabs or elling up above grade in exterior locations. PVC conduit shall not be installed less than 30" under roadways or areas subject to heavy traffic. Provide a ground wire sized per code in all PVC conduits. Conductor quantities indicated in conduits do not include ground wires unless otherwise noted.
- F. Conduit stubbed from a concrete slab or wall to serve an outlet under a table or to supply a machine shall have a rigid conduit coupling flush with the surface of the slab. Provide plug where conduit is to be used in future.
- G. Conduits in above-grade slabs shall be located in the middle of the slab. The maximum size, spacing, and location of conduits in post-tensioned slabs shall be subject to approval by the structural engineer. Conduits larger than one inch shall not be run in slabs. .

**CONDUITS, RACEWAYS, BOXES AND FITTINGS**

**3.3 RACEWAYS**

- A. Surface metal raceway with snap-in cover may be used in finished spaces only as specified, or shown on Drawings.
- B. Surface metal wireways may be installed at locations to serve motor starters or other control devices where required by a multitude of wiring interconnections or physical layout.
- C. Expansion Joints:
  - 1. All conduits crossing expansion joints where cast in concrete shall be provided with expansion-deflection fittings, equivalent to OZ/Gedney AXDX, installed per manufacturers recommendations.
  - 2. All conduits three inches and larger where not cast in concrete shall be rigidly secured to the building structure on opposite sides of a building expansion joint with an expansion-deflection fitting across the joint, equivalent to OZ/Gedney AXDX, installed per manufacturer's recommendations.
  - 3. All conduits less than three inches where not cast in concrete shall be provided with junction boxes securely fastened on both sides of the expansion joint, connected together with 15 inches of slack (a minimum of 15 inches longer than the straight line length) flexible conduit with copper green ground bonding jumper. In lieu of this flexible conduit, an expansion-deflection fitting, as indicated for conduits three inch and larger, may be installed.
- D. Seismic Joints
  - 1. No conduits cast in concrete shall be allowed to cross a seismic joint.
  - 2. All conduits shall be provided with junction boxes securely fastened on both sides of the expansion joint, connected together with 15 inches of slack (a minimum of 15 inches longer than the straight line length) flexible conduit with copper green ground bonding jumper. Prior to installation, verify with Architect that the 15 inches is adequate for the designed movement, and if not, increase this length as required.

**3.4 SURFACE RACEWAYS**

- A. The raceway system shall provide a complete enclosure that protects the wires installed therein against damage.
- B. There shall not be any openings that exceed 1/16 inch (1.59 mm) in width on surfaces that are accessible following installation of the system.

**3.5 FITTINGS**

- A. Metallic raceways and conduits shall be assembled continuous and secured to boxes, panels, etc., with appropriate fittings to maintain electrical continuity. All conduit joints shall be cut square, reamed smooth with all fittings drawn up tight.

**3.6 BOXES**

- A. Outlet boxes shall be of code required size to accommodate all wires, fittings and devices. Provide multi-gang boxes as required to accept devices installed with no more than one device per gang. Equip all metallic boxes with grounding provisions.
- B. Flush wall switch and receptacle outlets used with conduit systems shall be 4 inches square, 1-1/2 inches or more deep, with one or two-gang plaster ring mounted vertically. Where three or more devices are at one location, use one piece multiple gang tile box or gang box with suitable device ring.

**CONDUITS, RACEWAYS, BOXES AND FITTINGS**

- C. Wall bracket and ceiling surface mounted lighting fixture outlets shall be 4-inch octagon, 1-1/2-inches deep with 3/8-inch fixture stud where required. Wall bracket outlets to have single gang opening where required to accommodate fixture canopy. Provide larger boxes or extension rings where quantity of wires installed requires more cubic capacity.
- D. Boxes for the special systems shall be suitable for the equipment installed. Coordinate size and type with the system supplier.
- E. Provide pull boxes where shown, or in conduit runs greater than 100 feet, or where required to limit the number of bends in any conduit to not more than three 90 degree bends or equivalent. Use galvanized boxes of code-required size with removable covers installed so that covers will be accessible after work is completed. Do not locate pull boxes or junction boxes in finished areas unless specifically shown or special permission is obtained from Architect.
- F. Boxes shall be flush with finished surfaces or not more than 1/8-inch below surface and be level and plumb. Long screws with spacers or shims for mounting devices will not be acceptable. No combustible material shall be exposed to wiring at outlets.

**END OF SECTION**





**ELECTRICAL IDENTIFICATION**

**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Clearly and properly identify the complete electrical system to indicate the loads served or the function of each item of equipment connected under this work.

**PART 2 - PRODUCTS**

**2.1 LABELS**

- A. Panels: Typed or pre-printed white permanent materials labels with adhesive backing, Specified Products, Inc. or equal.
- B. Equipment: Dymo-Tape, plastic tape with adhesive backing, field printed with proper tool.

**PART 3 - EXECUTION**

**3.1 BRANCH CIRCUIT PANELBOARDS**

- A. Indicate panel number with laminated plastic labels. Indicate voltage phase and feeder source, feeder wire size, and feeder breaker or fuse size with white permanent labels on the inside of the panel door.
- B. Provide machine-printed panel directories with protective, clear transparent covers, accurately accounting for every breaker installed, including spares. Schedules shall use the actual room designations assigned by name or number near completion of the work and not the space designation on the Construction Drawings. Update all existing panel schedules that are modified by this scope of work.

**3.2 EQUIPMENT**

- A. Label all disconnect switches, motor starters, relays, contactors, time switches indicating voltage, amperage, circuit number and equipment served with white permanent labels.
- B. Label all transformers and busways with black and yellow 4-1/2 inch high pre-printed adhesive backed materials.

**3.3 SYSTEMS**

- A. Complex control circuits may utilize any combination of colors with each conductor identified throughout, using wraparound numbers or letters. Use the number or letters shown where the Drawings or operation and maintenance data indicate wiring identification.
- B. Label the fire alarm and communication equipment zones, controls, indicators, etc. with machine printed labels or indicators appropriate for the equipment installed, as supplied or recommended by the equipment manufacturer.

**END OF SECTION**



**NETWORK LIGHTING CONTROLS (NLTG)**

**PART 1 – GENERAL**

**1.1 SUMMARY**

- A. The lighting control system specified in this section shall provide time-based, sensor-based (both occupancy and daylight), and manual lighting control.
- B. The system shall be capable of turning lighting loads on/off as well as dimming lights (if lighting load is capable of being dimmed)
- C. All system devices shall be networked together enabling digital communication and shall be individually addressable.
- D. The system architecture shall be capable of enabling stand-alone groups (rooms) of devices to function in some default capacity even if network connectivity to the greater system is lost.
- E. The system architecture shall facilitate remote operation via a computer connection.
- F. The system shall not require any centrally hardwired switching equipment.

**1.2 SUBMITTALS**

- A. Product Datasheets (general device descriptions, dimensions, wiring details, nomenclature)
- B. Riser Diagrams – typical per room type (detailed drawings showing device interconnectivity of devices)
- C. Other Diagrams – as needed for special operation or interaction with other system(s)
- D. Example Contractor Startup/Commissioning Worksheet – must be completed prior to factory start-up
- E. Hardware and Software Operation Manuals
- F. Other operational descriptions as needed

**1.3 QUALITY ASSURANCE**

- A. All steps in sensor manufacturing process shall occur in the USA; including population of all electronic components on circuit boards, soldering, programming, wiring, and housing.
- B. All components and the manufacturing facility where product was manufactured must be ROHS compliant.
- C. In high humidity or cold environments, the sensors shall be conformably coated and rated for condensing humidity and -40 degree Fahrenheit (and Celsius) operation.
- D. All applicable products must be UL / CUL Listed or other acceptable national testing organization.

**1.4 COORDINATION**

- A. Coordinate lighting control components to form an integrated interconnection of compatible components.
- B. Coordinate lighting controls with BAS (if necessary) either through IP based intercommunication of system or hardwired auxiliary relay outputs.

**NETWORK LIGHTING CONTROLS (NLTG)**

- C. The installing contractor shall be responsible for a complete and functional system in accordance with all applicable local and national codes.

**1.5 WARRANTY**

- A. All devices in lighting control system shall have a 5 year warranty.

**PART 2 – PRODUCTS**

**2.1 MANUFACTURERS**

- A. This specification is based on the nLight® Network Control System from Sensor Switch, an Acuity Brands Company (800-727-7483, [www.sensorswitch.com](http://www.sensorswitch.com)).

**2.2 SYSTEM REQUIREMENTS**

- A. System shall have an architecture that is based upon three main concepts; 1) intelligent lighting control devices 2) standalone lighting control zones 3) network backbone for remote or time based operation.
- B. Intelligent lighting control devices shall consist of one or more basic lighting control components; occupancy sensors, photocell sensors, relays, dimming outputs, manual switch stations, and manual dimming stations. Combining one or more of these components into a single device enclosure should be permissible so as to minimize overall device count of system.
- C. Intelligent lighting control devices shall communicate digitally, require ~3 mA of current to function (Graphic WallPod excluded), and possess at least two RJ-45 connectors.
- D. Lighting control zones shall consist of one or more intelligent lighting control components, be capable of stand-alone operation, and be capable of being connected to a higher level network backbone.
- E. Devices within a lighting control zone shall be connected with CAT-5 low voltage cabling, in a daisy-chain fashion, and in any order.
- F. Lighting control zone shall be capable of automatically configuring itself for default operation without any start-up labor required.
- G. Individual lighting zones must continue to provide a user defined default level of lighting control in the event of a system communication failure with the backbone network or the management software becoming unavailable.
- H. Power for devices within a lighting control zone shall come from either resident devices already present for switching (relay device) or dimming purposes, or from the network backbone. Standalone “bus power supplies” shall not be required in all cases.
- I. All switching and dimming for a specific lighting zone shall take place within the devices located in the zone itself (i.e. not in a remotely located devices such as panels) to facilitate system robustness and minimize wiring requirements. Specific applications that require centralized or remote switching shall be capable of being accommodated.
- J. System shall have a primary wall mounted network control “gateway” device that is capable of accessing and controlling connected system devices and linking into an Ethernet LAN.
- K. System shall use “bridge” devices that route communication and distribute power for up to 8 lighting zones together for purposes of decreasing system wiring requirements.

**NETWORK LIGHTING CONTROLS (NLTG)**

- L. System shall have a web-based software management program that enables remote system control, status monitoring, and creation of lighting control profiles.
- M. Individual lighting zones shall be capable of being segmented into several channels of occupancy, photocell, and switch functionality for more advanced configurations and sequences of operation.
- N. System shall be capable of operating a lighting control zone according to several sequences of operation. Note operating modes should be utilized only in manners consistent with local energy codes.
  - 1. Auto-On / Auto-Off (via occupancy sensors)
  - 2. Manual-On / Auto-Off
  - 3. Auto-to-Override On
  - 4. Manual-to-Override On
  - 5. Auto On/Predictive Off
  - 6. Multi-Level On (multiple lighting levels per manual button press)
- O. A taskbar style desktop application shall be available for personal lighting control.
- P. An application that runs on “smart” handheld devices (such as an Apple® iPhone®) shall be available for personal lighting control.
- Q. Control software shall enable logging of system performance data and presenting useful information in a web-based graphical format and downloadable to .CSV files.
- R. Control software shall enable integration with a BMS via BACnet IP.
- S. System shall provide the option of having pre-terminated plenum rated CAT-5 cabling supplied with hardware.

2.3 INDIVIDUAL DEVICE SPECIFICATIONS

- A. Control Module (Gateway)
  - 1. Module shall be a wall mounted user accessible device that is capable of communicating and controlling downstream system control devices and linking into an Ethernet.
  - 2. Devices shall be powered by low voltage, fit within a two gang switch box (or mounting ring), and have a backlit LCD panel.
  - 3. User control shall be made available via finger-touch buttons with no moving parts. Buttons shall be capable of being locked for security.
  - 4. Device shall have three RJ-45 ports for connection to other backbone devices (bridges) or directly to a lighting control zones devices.
  - 5. Device shall automatically detect all devices downstream of it.
  - 6. Device shall have a standard and astronomical internal time clock.
  - 7. Device shall have one RJ-45 10/100 BaseT Ethernet connection.
  - 8. Each control gateway device shall be capable of linking 400 devices to the management software.
  - 9. Device shall be capable of using a dedicated or DHCP assigned IP address.
  - 10. Network Control Gateway device shall be the following Sensor Switch model number: nGWY
- B. Networked System Occupancy Sensors
  - 1. Occupancy sensors system shall sense the presence of human activity within the desired space and fully control the on/off function of the lights.
  - 2. Sensors shall utilize passive infrared (PIR) technology, which detects occupant motion, to initially turn lights on from an off state; thus preventing false on conditions. Ultrasonic or Microwave based sensing technologies shall not be accepted.

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3. For applications where a second method of sensing is necessary to adequately detect maintained occupancy (such as in rooms with obstructions), a sensor with an additional “dual” technology shall be used.
4. Dual technology sensors shall have one of its two technologies not require motion to detect occupancy. Acceptable dual technology includes PIR/Microphonics (also known as Passive Dual Technology or PDT) which both looks for occupant motion and listens for sounds indicating occupants. Sensors where both technologies detect motion (PIR/Ultrasonic) shall not be acceptable.
5. All sensing technologies shall be acoustically passive meaning they do not transmit sounds waves of any frequency (for example in the Ultrasonic range), as these technologies have the potential for interference with other electronic devices within the space (such as electronic white board readers). Acceptable detection technologies include Passive Infrared (PIR), and/or Microphonics technology. Ultrasonic or Microwave based sensing technologies shall not be accepted.
6. Sensors shall be available with zero, one, or two integrated Class 1 switching relays, and up to one 0-10 VDC dimming output. Sensors shall be capable of switching 120 / 277 / 347 VAC. Load ratings shall be 800 W @ 120 VAC, 1200 W @ 277 VAC, 1500 W @ 347 VAC, and ¼ HP motor. Relays shall be dry contacts.
7. Sensors shall be available with one or two occupancy “poles”, each of which provides a programmable time delay.
8. Sensors shall be available in multiple lens options which are customized for specific applications.
9. Communication and Class 2 low voltage power shall be delivered to each device via standard CAT-5 low voltage cabling with RJ-45 connectors.
10. All sensors shall have two RJ-45 ports.
11. All sensors shall have the ability to detect when it is not receiving valid communication (via CAT-5 connections) and blink its LED in a pattern to visually indicate of a potential wiring issue
12. Every sensor parameter shall be available and configurable remotely from the software and locally via the device push-button.
13. Sensors shall be able to function together with other sensors in order to provide expanded coverage areas by simply daisy-chain wiring together the units with CAT-5 cabling.
14. Sensors shall be equipped with an automatic override for 100 hour burn-in of lamps. This feature must be available at any time for lamp replacements.
15. Wall switch sensors shall recess into single-gang switch box and fit a standard GFI opening.
16. Wall switch sensors must meet NEC grounding requirements by providing a dedicated ground connection and grounding to mounting strap. Line and load wire connections shall be interchangeable. Sensor shall not allow current to pass to the load when sensor is in the unoccupied (Off) condition.
17. Wall switch sensors shall have optional features for photocell/daylight override, vandal resistant lens, and low temperature/high humidity operation.
18. Wall switch sensors shall be available in four standard colors (Ivory, White, Light Almond, Gray)
19. Wall switch sensors shall be the following Sensor Switch model numbers, with device color and optional features as specified:
  - a. nWSD (PIR, 1 Relay)
  - b. nWSD PDT (Dual Technology, 1 Relay)
  - c. nWSD 2P (PIR, 2 Relays)
  - d. nWSD PDT 2P (Dual Technology, 2 Relays)
  - e. nWSD NL (PIR w/ Night Light, 1 Relay)
  - f. nWSD PDT NL (Dual Technology w/ Night Light, 1 Relay)
  - g. nWSD LV (PIR, No Relay)

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- h. nWSD PDT LV (Dual Technology w/ Night Light, No Relay)  
Network system shall also have ceiling, fixture, recessed, & corner mounted sensors available.
20. Sensors shall have optional features for photocell/daylight override, dimming control, and low temperature/high humidity operation.
21. Sensors with dimming can control 0 to 10 VDC dimmable ballasts by sinking up to 20 mA of Class 2 current (typically 40 or more ballasts).
22. Sensors shall be the following Sensor Switch model numbers, with device options as specified:

Model # Series	Occupancy Poles	# of Relays	Lens Type	Detection Technology
nCM(B) 9	1	-	Standard	PIR
nCM(B) 9 2P	2	-	Standard	PIR
nCMR(B) 9	1	1	Standard	PIR
nCMR(B) 9 2P	2	2	Standard	PIR
nCM(B) PDT 9	1	-	Standard	Dual
nCM(B) PDT 9 2P	2	-	Standard	Dual
nCMR(B) PDT 9	1	1	Standard	Dual
nCMR(B) PDT 9 2P	2	2	Standard	Dual
nCM(B) 10	1	-	Extended	PIR
nCM(B) 10 2P	2	-	Extended	PIR
nCMR(B) 10	1	1	Extended	PIR
nCMR(B) 10 2P	2	2	Extended	PIR
nCM(B) PDT 10	1	-	Extended	Dual
nCM(B) PDT 10 2P	2	-	Extended	Dual
nCMR(B) PDT 10	1	1	Extended	Dual
nCMR(B) PDT 10 2P	2	2	Extended	Dual
nWV 16	1	-	Wide View	PIR
nWV PDT 16	1	-	Wide View	Dual
nHW13	1	-	Hallway	PIR
nCM(B) 6	1	-	High Bay	PIR
nCMR(B) 6	1	1	High Bay	PIR
nCMR(B) 6 2P	2	2	High Bay	PIR
nCMR(B) 6 480	1	2	High Bay	PIR

o  
te: Recessed mount versions of the above ceiling(fixture) mount versions also shall be available (e.g. nCMR(B) 9 => nRMR 9)

- C. Networked System Daylight (Photocell and or Dimming) Sensors
1. Photocell shall provide for an on/off set-point, and a deadband to prevent the artificial light from cycling. Delay shall be incorporated into the photocell to prevent rapid response to passing clouds.
  2. Photocell and dimming sensor's set-point and deadband shall be automatically calibrated through the sensor's microprocessor by initiating an "Automatic Set-point Programming" procedure. Min and max dim settings as well as set-point may be manually entered.
  3. Deadband setting shall be verified and modified by the sensor automatically every time the lights cycle to accommodate physical changes in the space (i.e., furniture layouts, lamp depreciation, or lamp outages).
  4. Dimming sensors shall control 0 to 10 VDC dimmable ballasts by sinking up to 20 mA of class 2 current (typically 40 or more ballasts).

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5. Photocell and dimming sensors shall be equipped with an automatic override for 100 hour burn-in of lamps. This feature must be available at any time for lamp replacements. (Note: This function should be performed prior to any dimming of the lamps including the "auto set-point" setting.)
6. Combination units that have all features of on/off photocell and dimming sensors shall also be available.
7. A dual zone option shall be available for On/Off Photocell, Automatic Dimming Control Photocell, or Combination units. The second zone shall be capable of being controlled as an "offset" from the primary zone.
8. Line voltage versions of the above described photocell and combination photocell/dimming sensors shall be capable of switching both 120 VAC, 277 VAC, and 347 VAC. Load ratings shall be 800 W @ 120 VAC, 1200 W @ 277 VAC, 1500 W @ 347 VAC, and ¼ HP motor load. Relays shall be dry contacts.
9. Sensor shall be the following Sensor Switch model numbers, with device options as specified:
  - a. nCM(B) PC (on/off)
  - b. nCM(B) ADC (dimming)
  - c. nCM(B) PC ADC (on/off, 0-10 VDC dimming)
  - d. nCMR(B) PC (on/off, single relay)
  - e. nCMR(B) PC ADC (on/off, 0-10 VDC dimming, single relay)

Note: Recessed mount versions of the above ceiling(fixture) mount versions also shall be available (e.g. nCMR(B) PC => nRMR PC)

**D. Networked System Power (Relay) Packs**

1. Power Pack shall incorporate one or more Class 1 relays and contribute low voltage power to the rest of the system. Secondary Packs shall incorporate the relay(s), shall have an optional 2<sup>nd</sup> relay, 0-10 VDC dimming output, or line voltage dimming output, but shall not be required to contribute system power. Power Supplies shall provide system power only, but are not required to switch line voltage circuit. Auxiliary Relay Packs shall switch low voltage circuits only.
2. Power Packs shall accept 120 or 277 VAC (or optionally 347 VAC), be plenum rated, and provide Class 2 power to the system.
3. All devices shall have two RJ-45 ports.
4. Every Power Pack parameter shall be available and configurable remotely from the software and locally via the device push-button.
5. Power Pack shall securely mount to junction location through a threaded ½ inch chase nipple. Plastic clips into junction box shall not be accepted. All Class 1 wiring shall pass through chase nipple into adjacent junction box without any exposure of wire leads. Note: UL Listing under Energy Management or Industrial Control Equipment automatically meets this requirement, whereas Appliance Control Listing does not meet this safety requirement.
6. When required by local code, Power Pack must install inside standard electrical enclosure and provide UL recognized support to junction box. All Class 1 wiring is to pass through chase nipple into adjacent junction box without any exposure of wire leads.
7. Power (Secondary) Packs shall be available that provide up to 16 Amp switching of all load types, and be rated for 400,000 cycles.
8. Specific Secondary Packs shall be available that provide up to 5 Amps of switching as well as 0-10 VDC dimming of fluorescent ballasts.
9. Specific Secondary Packs shall be available that provide up to 5 Amps of switching and can dim 120 VAC incandescent lighting loads or 120/277 VAC line voltage dimmable fluorescent ballasts (2-wire and 3-wire versions).
10. Specific Secondary Packs shall be available that provide up to 5 Amps of switching of dual phase (208/240/480 VAC) lighting loads.
11. Specific Secondary Packs shall be available that require a manual switch signal (via a networked Wall Station) in order to close its relay.



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12. Power (Relay) Packs and Supplies shall be the following Sensor Switch model numbers:
  - a. nPP16 (Power Pack w/ 16A relay)
  - b. nSP16 (Secondary Pack w/ 16A relay)
  - c. nSP16 SA (Secondary Pack w/ 16A relay, Manual On)
  - d. nSP5 2P (Secondary Pack w/ two 5A relays)
  - e. nSP5 D (Secondary Pack w/ 5A relay and 0-10VDC dimming output)
  - f. nSP5 PCD 2W (Secondary Pack w/ 5A relay and incandescent dimming or 2-wire line voltage fluorescent dimming output)
  - g. nSP5 PCD 3W (Secondary Pack w/ 5A relay and 3-wire line voltage fluorescent dimming output)
  - h. nSP5 480 (Secondary Pack w/ 5A relay for switching 208/240/480 VAC loads)
  - i. nPS 80 (Power Supply)
  - j. nAR 40 (Low voltage auxiliary relay pack)
- E. Networked System Wall Switches & Dimmers
  1. Devices shall recess into single-gang switch box and fit a standard GFI opening.
  2. Devices shall be available with zero or one integrated Class 1 switching relay.
  3. Communication and low voltage power shall be delivered to each device via standard CAT-5 low voltage cabling with RJ-45 connectors.
  4. All sensors shall have two RJ-45 ports.
  5. All devices shall provide toggle switch control. Dimming control and low temperature/high humidity operation are available options.
  6. Devices shall be available in four colors (Ivory, White, Light Almond, Gray).
  7. Device color and finish plates will match section 26 27 26
  8. Devices with dimming control outputs can control 0 to 10 VDC dimmable ballasts by sinking up to 20 mA of current (typically 40 or more ballasts).
  9. Devices with capacitive touch buttons shall provide audible user feedback with different sounds for on/off, raise/lower, start-up, and communication offline.
  10. Devices with mechanical push-buttons shall provide tactile and LED user feedback.
  11. Devices with mechanical push-buttons shall be made available with custom button labeling
  12. Devices with a single on button shall be capable of selecting all possible lighting combinations for a bi-level lighting zone such that the user confusion as to which of two buttons (as is present in multi-button scenarios) controls which load is eliminated.
  13. Wall switches & dimmers shall be the following Sensor Switch model numbers, with device options as specified:
    - a. nPOD (single on/off, capacitive touch, audible user feedback)
    - b. nPOD 2P (dual on/off, capacitive touch, audible user feedback)
    - c. nPODR (single on/off, one relay, capacitive touch, audible user feedback)
    - d. nPODM (single on/off, push-buttons, LED user feedback)
    - e. nPODM 2P (dual on/off, push-buttons, LED user feedback)
    - f. nPODM DX (single on/off, single dimming raise/lower, push-buttons, LED user feedback)
    - g. nPODM 2P DX (dual on/off, dual dimming raise/lower, push-buttons, LED user feedback)
    - h. nPODM 4P (quad on/off, push-buttons, LED user feedback)

2.4 LIGHTING CONTROL PROFILES

- A. Changes to the operation of the system shall be capable of being made in real-time or scheduled via lighting control profiles. These profiles are outlines of settings that direct how a collection of devices function for a defined time period.

**NETWORK LIGHTING CONTROLS (NLTG)**

- B. Lighting control profiles shall be capable of being created and applied to a single device, zone of devices, or customized group of zones.
- C. All relays and dimming outputs shall be capable of being scheduled to track or ignore information regarding occupancy, daylight, and local user switches via lighting control profiles.
- D. Every device parameter (e.g. sensor time delay and photocell set-point) shall be configurable via a lighting control profile.
- E. All lighting control profiles shall be stored on the network control gateway device and on the software's host server.
- F. Lighting control profiles shall be capable of being scheduled to run according to the following calendar options: start date/hour/minute, end date/hour/minute, and sunrise/sunset +/- timed offsets.
- G. Sunrise/sunset times shall be automatically derived from location information using an astronomical clock.
- H. Daylight savings time adjustments shall be capable of being performed automatically, if desired.
- I. Lighting control profile schedules shall be capable of being given the following recurrence settings: daily, weekday, weekend, weekly, monthly, and yearly.
- J. Software shall provide a graphical tool for easily viewing scheduled lighting control profiles.

**2.5 MANAGEMENT SOFTWARE**

- A. Every device parameter (e.g. sensor time delay and photocell set-point) shall be available and configurable remotely from the software
- B. The following status monitoring information shall be made available from the software for all devices for which it is applicable: current occupancy status, current PIR Status, current Microphonics Status, remaining occupancy time delay(s), current photocell reading, current photocell inhibiting state, photocell transitions time remaining, current dim level, device temperature, and device relay state(s).
- C. The following device identification information shall be made available from the software: model number, model description, serial number, manufacturing date code, custom label(s), and parent network device.
- D. A printable network inventory report shall be available via the software.
- E. A printable report detailing all system profiles shall be available via the software.
- F. Software shall require all users to login with a User Name and Password.
- G. Software shall provide at least three permission levels for users.
- H. All sensitive stored information and privileged communication by the software shall be encrypted.
- I. All device firmware and system software updates must be available for automatic download and installation via the internet.
- J. Software shall be capable of managing systems interconnected via a WAN (wide area network)

**NETWORK LIGHTING CONTROLS (NLTG)**

**2.6 BMS COMPATIBILITY**

- A. System shall provide a BACnet IP gateway as a downloadable software plug-in to its management software. No additional hardware shall be required.
- B. BACnet IP gateway software shall communicate information gathered by networked system to other building management systems.
- C. BACnet IP gateway software shall translate and forward lighting relay and other select control commands from BMS system to networked control devices.

**2.7 SYSTEM ENERGY ANALYSIS & REPORTING SOFTWARE**

- A. System shall be capable of reporting lighting system events and performance data back to the management software for display and analysis.
- B. Intuitive graphical screens shall be displayed in order to facilitate simple viewing of system energy performance.
- C. An "Energy Scorecard" shall be display that shows calculated energy savings in dollars, KWHr, or CO<sub>2</sub>.
- D. Software shall calculate the allocation of energy savings to different control measures (occupancy sensors, photocells, manual switching, etc).
- E. Energy savings data shall be calculated for the system as a whole or for individual zones.
- F. A time scaled graph showing all relay transitions shall be presented.
- G. A time scaled graph showing a zones occupancy time delay shall be presented
- H. A time scaled graph showing the total light level shall be presented.
- I. User shall be able to customize the baseline run-time hours for a space.
- J. User shall be able to customize up to four time-of-day billing rates and schedules.
- K. Data shall be made available via a .CSV file

**2.8 START-UP & SUPPORT FEATURES**

- A. To facilitate start-up, all devices daisy-chained together (using CAT-5) shall automatically be grouped together into a functional lighting control zone.
- B. All lighting control zones shall be able to function according to default settings once adequate power is applied and before any system software is installed.
- C. Once software is installed, system shall be able to auto-discover all system devices without requiring any commissioning.
- D. All system devices shall be capable of being given user defined names.
- E. All devices within the network shall be able to have their firmware reprogrammed remotely and without being physically uninstalled for purposes of upgrading functionality at a later date.
  - 1. All sensor devices shall have the ability to detect improper communication wiring and blink its LED in a specific cadence as to alert installation/startup personnel.

**NETWORK LIGHTING CONTROLS (NLTG)**

**PART 3 – EXECUTION**

**3.1 EQUIPMENT INSTALLATION**

- A. Mount relay control cabinets adjacent to respective panelboard. Cabinet shall be surface mounted, per plans. Wiring between relay cabinet and panelboards to be per local codes and acceptable industry standards. Under no circumstances will any extra be authorized for payment to the EC or GC due to the EC's lack of knowledge or understanding of any and all prevailing codes or specified manufacturer's installation requirements. Neatly lace and rack wiring in cabinets. During construction process, protect all interior components of each relay panel and each digital switch from dust and debris. Any damage done to electronic components due to non-protection shall be the sole responsibility of the installing contractor.
- B. Switches: Provide outlet boxes, single or multi-gang, as shown on the plans for the switches. Mount switches as per plans. Supply faceplates per plans and specifications. EC is specifically responsible to supply and install the required low voltage cable, Category 5, 4 twisted pair, with RJ45 connectors and snagless boots (commonly referred to as Cat 5 patch cable) between all switches and panels. Field-test all Cat 5 patch cable with a recognized cable tester. All low voltage wire to be run in conduit, per local codes.
- C. Wiring
  - 1. Do not mix low voltage and high voltage conductors in the same conduit. No exceptions.
  - 2. Ensure low voltage conduits or control wires do not run parallel to current carrying conduits.
  - 3. Place manufacturer supplied "terminators" at each end of the system bus per manufacturer's instructions.
  - 4. Neatly lace and rack wiring in cabinets.
  - 5. All items on the bus shall be connected in sequence (daisy chained). Star and spur topologies are not acceptable, see riser.
  - 6. The specified lighting control system shall be installed by the electrical contractor who shall make all necessary wiring connections to external devices and equipment, to include photocell. EC to wire per manufacturer instructions.

**3.2 INSTALLATION AND SET-UP**

- A. Verify that conduit for line voltage wires enters panel in line voltage areas and conduit for low-voltage control wires enters panel on low-voltage areas. Refer to manufacturer's plans and approved shop drawings for location of line and low-voltage areas. It is the responsibility of the contractor to verify with lighting control manufacturer all catalog information and specific product acceptability.
- B. For approved line voltage type micro relay panel switches connected to matrixed inputs of the micro relay panel, furnish #18 AWG solid conductors. For all other digital switches provide wiring required by system manufacturer.
- C. Contractor to test all low voltage cable for integrity and proper operation prior to turn over. Verify with system manufacturer all wiring and testing requirements.
- D. Before Substantial Completion, arrange and provide a one-day Owner instruction period to designated Owner personnel. Set-up, commissioning of the lighting control system, and Owner instruction includes:
  - 1. Confirmation of entire system operation and communication to each device.
  - 2. Confirmation of operation of individual relays, switches, occupancy sensors and daylight sensors
  - 3. Confirmation of system Programming, photocell settings, override settings, etc.

**NETWORK LIGHTING CONTROLS (NLTG)**

4. Provide training to cover installation, maintenance, troubleshooting, programming, and repair and operation of the lighting control system.
- E. Panels shall be located so that they are readily accessible and not exposed to physical damage.
- F. Panel locations shall be furnished with sufficient working space around panels to comply with the National Electric Electrical Code.
- G. Panels shall be securely fastened to the mounting surface by at least 4 points.
- H. Unused openings in the cabinet shall be effectively closed.
- I. Cabinets shall be grounded as specified in the National Electrical Code.
- J. Lugs shall be suitable and listed for installation with the conductor being connected.
- K. Conductor lengths shall be maintained to a minimum within the wiring gutter space. Conductors shall be long enough to reach the terminal location in a manner that avoids strain on the connecting lugs.
- L. Maintain the required bending radius of conductors inside cabinets.
- M. Clean cabinets of foreign material such as cement, plaster and paint.
- N. Distribute and arrange conductors neatly in the wiring gutters.
- O. Follow the manufacturer's torque values to tighten lugs.
- P. Before energizing the panelboard, the following steps shall be taken:
  1. Retighten connections to the manufacturer's torque specifications. Verify that required connections have been furnished.
  2. Remove shipping blocks from component devices and the panel interior.
  3. Remove debris from panelboard interior.
- Q. Follow manufacturers' instructions for installation and all low voltage wiring.
- R. Service and Operation Manuals:
  1. Submit operation and service manuals. Complete manuals shall be bound in flexible binders and data shall be typewritten or drafted.
  2. Manuals shall include instructions necessary for proper operation and servicing of system and shall include complete wiring circuit diagrams of system, wiring destination schedules for circuits and replacement part numbers. Manuals shall include as-built cable Project site plot plans and floor plans indicating cables, both underground and in each building with conduit, and as-built coding used on cables. Programming forms of systems shall be submitted with complete information.
- S. Comply with energy code lighting control system "Acceptance Requirements". Acceptance tests are used to verify that lighting controls were installed and calibrated correctly. These tests may require that a responsible party certify that controls are installed and calibrated properly. This is the installing contractor's responsibility. Verify requirements with building authority.

**NETWORK LIGHTING CONTROLS (NLTG)**

**3.3 DOCUMENTATION**

- A. Provide a point-to-point wiring diagram for the entire lighting control system. Diagram must indicate exact mounting location of each system device. This accurate “as built” shall indicate the loads controlled and the identification number for that relay, placement of switches and location of photocell. Original to be given to owner, copies placed adjacent to panel.

**3.4 SERVICE AND SUPPORT**

- A. Start Up: EC shall contact factory technician at least 7 days before turnover of project.
- B. Provide a factory technician for on-site training of the owners’ representatives and maintenance personnel. Coordinate timing with General Contractor. Provide 1 day of factory on-site training.

**3.5 CLEANING**

- A. Division 1 - Execution Requirements: Final cleaning.
- B. Clean occupancy sensors lens as recommended by manufacturer.
- C. Clean all switch faceplates.

**END OF SECTION**

**SWITCHBOARDS AND PANELBOARDS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Work Included: Provide branch panels as shown.

**1.2 RELATED WORK**

- A. Section 26 00 00: General Provisions
- B. Section 26 05 00: Basic Materials and Methods
- C. Section 26 20 00: Electrical Distribution System
- D. Section 26 28 00: Circuit Protective Devices

**1.3 SUBMITTALS**

- A. Shop Drawings.
- B. Product Data.
- C. Operation Instruction and Maintenance Data.

**PART 2 - PRODUCTS**

**2.1 BRANCH PANELBOARDS**

- A. Branch circuit panels shall be bolt-in circuit breaker type with aluminum or copper bussing. Panels shall be fitted with flush lift latches and locks keyed alike. Deliver all panel keys to the Owner at completion of the project.
- B. Panelboard bussing and breakers shall be rated to withstand available fault current.
- C. Provide full size ground bus in all panelboards.
- D. Lugs: Conductors no. 6 and larger, except on molded case circuit breakers, two hole, long barrel pressure tool set Thomas & Betts No. 54,000 series, Burndy "Hydent", Anderson Electric VCEL, or approved.
- E. Wiring gutters shall be a minimum of 4 inches wide except where feeder conductors enter where a minimum of 6 inches clear shall be provided. Feeder conductors to enter directly in line with lug terminals wherever practicable. Provide separate feeder lugs and studs for each feeder conductor.
- F. Branch circuit breakers shall be identified with individual circuit numbers adjacent to each breaker with a typewritten card to identify the load controlled by that breaker. Circuit breakers shall be nominally one inch on centers to allow for easy operation of the handles. Arrange breakers in the panels as scheduled on the Drawings. Where no schedule is listed, arrange with the one-pole breakers at the top of the panel, followed by the two-pole and three-pole breakers with blank spaces at the bottom.
- G. Surface panels shall have metal face trims with no sharp edges or corners. Finish surface panel tubs to match face trim. Access panel on front may be screw type for access to interior.
- H. Flush panels shall have flush doors with concealed hinges and mounting clamps equal to ITE Decor trim.

**SWITCHBOARDS AND PANELBOARDS**

- I. Acceptable manufacturers: Siemens or Square D.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Install panelboards plumb and level, located as shown on the Drawings.
- B. Arrange loads from served by the panel to balance the load currents as equally as possible between the phases.

**3.2 SPARE CONDUITS**

- A. Install a spare 3/4-inch conduit from flush panels for each three single pole breakers or spaces provided, minimum three conduits per panel. Terminate conduits above an accessible ceiling or as directed.

**END OF SECTION**



**WIRING DEVICES AND PLATES**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Work Included: Provide wiring devices and plates or blank plates only for all outlet boxes shown.

**1.2 RELATED WORK**

- A. Section 26 00 00: General Provisions
- B. Section 26 05 00: Basic Materials and Methods

**1.3 SUBMITTALS**

- A. Shop Drawings.
- B. Product Data.
- C. Operation Instructions and Maintenance Data.
- D. Warranty.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

- A. Wiring devices shall be specification grade with special devices as noted on the Drawings. Should the Drawings indicate a device other than those listed herein without reference to catalog number, such device shall be of same grade and manufacture as specified below. Furnish a matching cap for all special purpose devices that do not have the common 120 volt NEMA 5-20R configuration.
- B. Comparable grade devices to those listed as manufactured by Leviton and Pass & Seymour, are approved equal. All lighting switches and duplex receptacles installed shall be by the same manufacturer and have identical appearance characteristics, unless noted otherwise.

**2.2 WALL SWITCHES**

- A. Line voltage switches, 20 ampere, 120 volt, quiet type, Hubbell 1221 series, white exposed finish.
- B. Switch with pilot, lighted clear toggle, Hubbell 1221-PL, or approved equal.
- C. Keyed security switches: Pass & Seymour 20AC1-KL, or approved equal

**2.3 RECEPTACLES**

- A. Duplex, 20 ampere, 3-wire, 2-pole grounding, NEMA 5-20R, Hubbell 5352 series, white exposed finish.
- B. Ground Fault Circuit Interrupting (GFCI/GFI): 20 ampere, 3-wire, 2-pole grounding, NEMA 5-20R, white exposed finish, Hubbell GF5352 series or approved equal.
- C. Tamperproof Duplex, 20 ampere, 3-wire, 2-pole grounding, NEMA 5-20R, Hubbell HBL8300SGGY series, white exposed finish, or approved equal.
- D. Special purpose receptacles as noted on Drawings.

**WIRING DEVICES AND PLATES**

**2.4 PLATES AND COVERS**

- A. Flush Finish Plates: .040-inch thick, type 302, stainless steel, brush finish, Hubbell, Leviton or Pass & Seymour approved equal.
- B. Surface Covers: Galvanized or cadmium plated steel, 1/2-inch raised industrial type with openings appropriate for device installed.
- C. Weatherproof:
  - 1. Damp locations: Hubbell HBL5205WO or approved equal cover mounted horizontally with hinges up.
  - 2. Wet locations: Hubbell WP26M, Thomas & Betts Red-Dot series CKNM or approved equal.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Devices and finish plates to be installed plumb with building lines.
- B. Finish plates and devices not to be installed until final painting is complete. Scratched or splattered finish plates and devices will not be accepted.
- C. Wall-mounted receptacles shall be installed vertically at centerline height shown on the Drawings.
- D. Receptacles shall be tested for line to neutral, line to ground and neutral to ground faults. Correct any defective wiring.
- E. All special plugs provided with the receptacles shall be given to the Owner in their cartons and a letter stating the date and the Owner's representative that received the materials.

**END OF SECTION**

**CIRCUIT PROTECTIVE DEVICES**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Work Included:
  - 1. Provide overcurrent protective devices of the proper characteristics for the load served.
  - 2. Coordinate fuse size and circuit breaker combinations for selective tripping with minimum interruption of service.
  - 3. Provide fuses as indicated on the drawings, sized per NEC and appropriate for the load served as required for a fully operational system.
  - 4. All fuses shall be furnished of the same manufacturer.
  - 5. All circuit breakers shall be furnished of the same manufacture as the distribution panel and branch panelboards.
  - 6. All fuses shall be installed by the electrical contractor at job-site and only when equipment is to be energized. Fuses shall not be installed during shipment.

**1.2 RELATED WORK**

- A. Section 26 00 00: General Provisions,
- B. Section 26 05 00: Basic Materials and Methods,

**1.3 SUBMITTALS**

- A. Shop Drawings.
- B. Product Data.
- C. Operation and Maintenance data.

**PART 2 - PRODUCTS**

**2.1 FUSES**

- A. Provide 100,000 AIC, Current Limiting, UL, Time Delay Fuses.
- B. For Feeders 601 amps to 6000 amps: Class L, KRP-C()SP Time Delay.
- C. For Feeders 600 amps and less:
  - 1. Class RK-1, LPS-RK()SP for 600 Volt, Dual Element.
  - 2. Class RK-1, LPN-RK()SP for 250 Volt, Dual Element.
  - 3. Class J, LPJ()SP for 600 Volt & below, Dual Element.
- D. For Motor Circuits 600 Volts and Below: Class RK-1 and Class J Sized @ 125% FLC of Motor.
- E. Manufacturer: Bussmann System 300 Low-Peak, Littelfuse.

**2.2 CIRCUIT BREAKERS**

- A. Circuit breakers shall be molded case, thermal magnetic type. Breakers shall have short circuit capacity rating to withstand the maximum short circuit duty which can be expected at the breaker location in the electrical system. Breakers mounted in branch panelboards shall be of the bolt-in type.

**CIRCUIT PROTECTIVE DEVICES**

- B. Minimum short circuit rating for any circuit breaker: 10,000 A.I.C. for 120V and 208V breakers, 22,000 A.I.C. for 277V and 480V breakers. Coordinate AIC rating with fault study and power company.
- C. Provide circuit breaker lock-on handle guards to prevent accidental shut-off of equipment for breakers supplying time clocks, refrigeration, fire alarm, unswitched egress lighting and like systems.

**2.3 SPARE FUSES AND SPARE FUSE CABINET**

- A. Provide 10% spare fuses, but not less than (3) of any one size and type.
- B. Provide Bussmann spare fuse cabinet(s) #SFC as required for spare fuses. Install cabinet in electrical room.

**2.4 SUBSTITUTION APPROVALS**

- A. If the electrical contractor wishes to furnish materials other than those specified, a written request, along with a complete short circuit and selective coordination study, shall be submitted to the engineer for evaluation at least 10 days prior to bid date. If the engineer's evaluation indicates acceptance, a written addendum will be issued listing the other acceptable manufacturer.

**PART 3 - EXECUTION**

**3.1 FUSES**

- A. Install fuses for motor protection to best protect the motor without nuisance tripping.
- B. Provide one complete set of spare fuses of each amperage used on this project. Store spare fuses in a metal, hinged door cabinet located adjacent to the Main Distribution Panel. Label cabinet.
- C. Provide pullers for fuses, stored with fuses in cabinet.

**END OF SECTION**

**ENCLOSED SWITCHES AND CIRCUIT BREAKERS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Work Included:
  - 1. Provide manual or magnetic motor starters of the proper characteristics for equipment as listed on the Drawings or not provided by Division 23, i.e. overhead door operators.
  - 2. Provide switches of proper characteristics as disconnecting means.

**1.2 QUALITY CONTROL**

- A. All motor starters and disconnects shall be of the same manufacture as service equipment or load centers.

**1.3 RELATED WORK**

- A. Section 26 00 00: General Provisions
- B. Section 26 05 00: Basic Materials and Methods
- C. Section 26 28 00: Circuit Protective Devices

**1.4 SUBMITTALS**

- A. Shop Drawings.
- B. Product Data.
- C. Operation Instruction and Maintenance Data.

**PART 2 - PRODUCTS**

**2.1 MOTOR STARTERS**

- A. Manual starters, toggle type, quick-make, quick-break with thermal overload protection and suitable enclosures.
- B. Enclosures shall be NEMA 1 for indoor use and NEMA 3R where installed exposed to the weather or designated by the subscript "WP".
- C. Magnetic starters, full voltage across the line non-reversing type, 120 volt coils, overload relays in each leg, H-O-A selector switches, red running pilot lights, auxiliary contacts, 120V control transformers and suitable enclosures. The starters shall be combination type with fusible switches where shown adjacent to the disconnect switch.

**2.2 DISCONNECTS**

- A. Safety and disconnect switches shall be NEMA type HD (heavy duty), quick-make, quick-break, dual rated with electrical characteristics as required by the system voltage and the load served. Switches shall be equipped with a defeatable cover interlock.
- B. Enclosures shall be NEMA 1 for indoor use and NEMA 3R where installed exposed to the weather or designated by the subscript "WP".
- C. Disconnects shall be fusible or non-fusible as designated on Drawings and/or required by code.

**ENCLOSED SWITCHES AND CIRCUIT BREAKERS**

**PART 3 - EXECUTION**

**3.1 CLEARANCES**

- A. Maintain all code required clearances under this work.

**3.2 MOTOR STARTERS**

- A. Provide the motor starting equipment as shown on the Drawings and coordinate all motor "overload" starter relays.
- B. Install the starters at the respective equipment unless shown otherwise.

**3.3 DISCONNECT SWITCHES**

- A. Provide all code required disconnect switches under this work whether specifically shown or not.
- B. Disconnect switches required when equipment is not in sight of the branch circuit panel or starter may be horsepower rated, toggle type in suitable enclosure, mounted at or on the equipment.

**END OF SECTION**

**LIGHTING FIXTURES AND LAMPS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Work Included:
  - 1. Provide all lighting outlets indicated on the Drawings with a fixture of type designated and appropriate for the location. Outlet symbols on the Drawings without a type designation shall have a fixture the same as those used in similar or like locations.
  - 2. Where a fixture type designation has been omitted and cannot be determined by the Contractor, request a clarification from the Architect and provide a suitable fixture type as directed at no additional cost.
  - 3. Coordinate installation of lighting fixtures with the ceiling installation and all other trades to provide a total system that is neat and orderly in appearance.
  - 4. Verify ceiling types with architectural specifications and drawings.
  - 5. Provide luminaires complete with lamps, ballasts, reflectors, diffusers, lenses, shielding, hangers, accessories and fittings.
  - 6. Store and handle so as not to subject materials to corrosion or mechanical damage from environment and/or construction.

**1.2 RELATED WORK**

- A. Section 26 00 00: General Provisions
- B. Section 26 05 00: Basic Materials and Methods
- C. Section 26 05 33: Conduits, Raceways, Boxes and Fittings

**1.3 QUALITY ASSURANCE**

- A. Luminaires shall be U.L. listed and be manufactured in accordance with appropriate U.L. and ANSI standards and shall bear U.L. label appropriate for intended use.
- B. The lighting designated for this project was based on fixture types and manufacturers as specified. If substitution of other than those specified is proposed for an alternate, provide the data and the operating fixtures both as specified and alleged equal. The Architect/Engineer reserves the right to request full photometric analysis of area affected by the proposed substitution prior to acceptance or denial.
- C. Equality shall be determined by comparisons of actual fixtures and the following fixture characteristics.
  - 1. Performance:
    - a. Distribution
    - b. Utilization
    - c. Average brightness/maximum brightness
    - d. Spacing to mounting height ratio
    - e. Comfort probability
    - f. Energy life-cycle analysis.
  - 2. Construction:
    - a. Engineering
    - b. Workmanship
    - c. Rigidity
    - d. Permanence of materials and finishes; Durability
  - 3. Installation Ease:
    - a. Captive parts and captive hardware
    - b. Provision for leveling

**LIGHTING FIXTURES AND LAMPS**

- c. Through-wiring ease
- 4. Maintenance:
  - a. Relamping ease
  - b. Replacement of ballast and lamp sockets
- 5. Appearance:
  - a. Light tightness
  - b. Neat, trim styling
  - c. Aesthetic architectural value
- 6. Availability:
  - a. Lead time
- 7. Sustainable Design Performance Indicators:
  - a. Environmental performance in manufacturing
  - b. Manufacturing sustainability policies
  - c. ISO 14001 certification or equivalent environmental management systems.
  - d. ISO 9001 certification for quality assurance
  - e. Annual environmental performance or sustainability reports.
  - f. Environmentally responsible materials and resources.
  - g. Regional availability of materials and resources.
  - h. Regional production and manufacturing.

**1.4 SUBMITTALS**

- A. Shop Drawings.
- B. Product Data.
- C. Operation Instruction and Maintenance Data.

**PART 2 - PRODUCTS**

**2.1 LIGHTING LUMINAIRE SCHEDULE**

- A. See Drawings.

**PART 3 - GENERAL**

**3.1 INSTALLATION**

- A. Fixtures shall be left clean at the time of acceptance of the work with every lamp in operation. If fixtures are deemed dirty by the Architect at completion of the project, the Contractor shall clean them at no additional cost to the Owner.
- B. Fixtures shall be carefully aligned, leveled in straight lines, and located as shown on the architectural reflected ceiling plan. The final decision as to adequacy of support and alignment, shall be given by the Architect. The fixtures shall be supported by separate means from the building structure per applicable seismic requirements and not from the ceiling system, ductwork, piping or other systems.
- C. Fixtures shall be aimed or installed to provide the lighting pattern for which the fixture is designed.

**END OF SECTION**



**PATHWAYS FOR COMMUNICATIONS SYSTEMS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Work included: Provide a concealed raceway system, including but not limited to raceways, outlet boxes, pull boxes, backboards sleeves, power outlets as shown and specified for the following limited power or communication systems. Provide raceway from each outlet shown for the following systems to an accessible location above a removable ceiling. See Telecom Drawings for additional electrical requirements. System will include the following:
  - 1. Telecom

**1.2 RELATED WORK**

- A. Section 26 00 00: General Provisions
- B. Section 26 05 00: Basic Materials and Methods
- C. Section 26 05 33: Conduits, Raceways, Boxes and Fittings

**1.3 SUBMITTALS**

- A. Product Data.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. OUTLET BOXES: Bowes, Raco.

**2.2 MATERIALS**

- A. Minimum raceway size shall be 1" unless otherwise noted. Raceways shall be EMT unless otherwise noted and shall be installed with a minimum of bends. Bends where used, shall have 12" minimum radius. Raceways exceeding 100 feet or having more than two right angle bends shall have a pullbox in an accessible location approximately in the center of the run.
- B. All free raceway ends shall have plastic bushings.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Outlets and finish plates to be installed plumb with building lines.
- B. Provide pull string in all raceways.
- C. Finish plates will not to be installed until final painting is complete. Scratched or splattered finish plates and devices will not be accepted.
- D. Wall mounted outlets shall be installed vertically at centerline height shown on the Drawings.
- E. Provide blank cover plates for all outlets not utilized, coordinate with system installer.

**PATHWAYS FOR COMMUNICATIONS SYSTEMS**

**3.2 OUTLETS**

- A. Single Telecom Outlet: Provide minimum of 1-inch conduit or size as shown on drawings for single data/telephone outlets. Provide with pull string, 4 square junction box, single gang mud ring and plate as required, plates to match receptacle plates in style and quality. Provide insulated bushing at end of conduits and route all raceways to an accessible ceiling space.
- B. Dual and Quad Telecom Outlet: Provide minimum of 1 1/4-inch conduit or size as shown on drawings for combination data and telephone outlets. Provide with pull string, 4 square junction box, single gang mud ring and plate as required, plates to match receptacle plates in style and quality. Provide insulated bushing at end of conduits and route all raceways to an accessible ceiling.

**END OF SECTION**