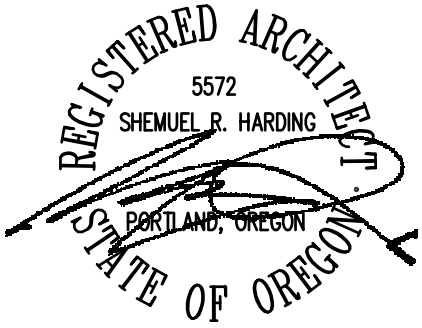

Project Manual

WOODBURN CITY HALL
BASEMENT REMODEL

Bid Project Manual

April 15, 2024

BID
PROJECT MANUAL

WOODBURN CITY HALL BASEMENT REMODEL

270 Montgomery St.
Woodburn, OR 97071
April 15, 2024

Owner
CITY OF WOODBURN
270 Montgomery St.
Woodburn, OR 97071

Contact: Jim Row
Jim.Row@ci.woodburn.or.us
(503) 982-5265

Architect
DECA ARCHITECTURE, INC.
935 SE Alder St.
Portland, OR 97214
(503)239-1987

Contact: Meredith Curran
curran@deca-inc.com

Mechanical Engineer (HVAC only)
KCL ENGINEERING
312 NW 10th Ave, Suite 100
Portland, OR 97209
tel: (503) 980-5696

Gustavo Vela-Moreno
gvela-moreno@kclengineering.com

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END OF SECTION

BID SOLICITATION

The Woodburn City Hall Basement Remodel consists of remodeling most of the existing basement spaces to create new offices, work areas and restrooms. Work includes new walls, doors, relites, ceilings, MEP infrastructure and finishes throughout the project area, which is approximately 4,100 sf. The existing HVAC system will be modified to relocate existing fan-coil units and other HVAC equipment, and provide new air distribution. Plumbing and electrical work will be completed on a bidder-designed basis. No exterior work is proposed.

The Work is to be performed while the building is occupied, and the project area must remain secure at all times. Construction activities may occur during business hours, but work is encouraged to perform work outside of business hours to the degree possible to minimize disruption.

The City of Woodburn Public Works will receive sealed bids in writing from qualified contractors until 2:00 pm local time, **Thursday, May 9, 2024** at City of Woodburn Public Works, 190 Garfield Street, Woodburn OR, 97071 for construction of the Woodburn City Hall Basement Remodel Project. Bids received after the time fixed for receiving bids will not be considered.

PRE-BID CONFERENCE: A non-mandatory pre-bid conference will be held at 10:00 am local time, Thursday, April 25, 2024 at the Woodburn City Hall, 270 Montgomery St., Woodburn OR 97071. Attendees are to meet in the Council Chambers meeting room. It is highly recommended that bidders attend.

BID DOCUMENTS FOR CONTRACTORS AND SUBCONTRACTORS: May be examined at the City of Woodburn Public Works Office, 190 Garfield St., Woodburn, OR on or after Monday, April 15, 2024. Electronic plan sets are available for viewing and downloading on the Engineering Division's website at: **http://www.ci.woodburn.or.us/?q=blog-categories/bids-and-rfps** and/or may have been downloaded by the following plan centers.

DJC Plan Center – Portland, OR
Contractor's Plan Center – Clackamas, OR
Salem Contractor's Exchange – Salem, OR

BID DOCUMENTS FOR PLAN CENTERS: Bid Sets are available electronically for viewing and downloading on the Engineering Division's website at: **http://www.ci.woodburn.or.us/?q=blog-categories/bids-and-rfps** or by contacting Pete Gauthier, City of Woodburn Public Works, 503-980-2429.

No bid shall be considered unless the bid contains a statement by the bidder, as part of his bid, that the provisions required by ORS 279C.800 through ORS 279C.870 (workers on public works to be paid not less than prevailing rate of wage) shall be included in his contract. The current wage rates applicable to this project are available at www.boli.state.or.us.

A bid deposit or bid bond is not required.

It shall be understood and mutually agreed by and between the Contractor and Owner that the date of beginning and time for completion of the project are essential conditions of the contract. The goal is to begin construction in June, 2024 and obtain substantial completion by the end of October. The bidder shall state the proposed number of construction days on the Bid Form.

No bidder may withdraw his bid after the hour set for the opening thereof, or thereafter, before award of the contract, unless award is delayed for a period exceeding thirty (30) days from the Bid Opening date. The Owner reserves the right to waive any irregularities in the bids, to reject any or all bids, and to accept only such bids as may be in the Owner's best interest.

INSTRUCTIONS TO BIDDERS

PART 1 GENERAL

1.1 SUMMARY

A. This construction will be carried out under one Public Improvement Construction Agreement covering the construction work on this project. The "City of Woodburn Public Improvement Construction Agreement" includes conditions for the performance of construction and may be referred to as the "General Conditions" throughout this Project Manual. This agreement includes all labor, materials, transportation, equipment and services necessary for and reasonably incidental to the completion of all work in connection with the project described in this Project Manual and the accompanying Drawings.

1.2 DEFINITIONS

A. Bid Documents include the Bid Solicitation, Instructions to Bidders, the Bid Form and the Contract Documents, including any addenda issued prior to receipt of bids. Addenda are written or graphic instruments issued prior to the execution of the Contract which modify or interpret the Bid Documents, including Drawings and Project Manual, by additions, deletions, clarifications or corrections. Addenda will become part of the Contract Documents when the Construction Contract is executed.

B. Project Notifications: Addenda, clarifications, etc. shall be posted on the Agency website and are the responsibility of the Contractor to download before submission of bids. Contractor shall sign and submit with offer, all Addenda associated (posted on website) with the project. Agency website is **http://www.ci.woodburn.or.us/?q=blog-categories/bids-and-rfps**

1.3 DESCRIPTION OF BID ITEMS

A. Basic Bid: The Woodburn City Hall Basement Remodel consists of remodeling most of the existing basement spaces to create new offices, work areas and restrooms. Work includes new walls, doors, relites, ceilings, MEP infrastructure and finishes throughout the project area, which is approximately 4,100 sf. The existing HVAC system will be modified to relocate existing fan-coil units and other equipment, and provide new air distribution. Plumbing and electrical work is to be completed on a bidder-designed basis. No exterior work is proposed.

1.4 HOURS OF LABOR

A. Section 279C.520, Oregon Revised Statutes, provides that in all cases where labor is employed by the state, county, school district, municipality, municipal corporation or subdivision, through a Contractor, no person shall be required or permitted to labor more than 10 hours in any one day, nor more than 40 hours in any one week, except in the case of necessity, emergency, or where the public policy absolutely requires it, in which event the person or persons so employed for excessive hours shall receive at least time and one-half pay for all overtime in excess of 10 hours per day or 40 hours in any one week, and for work performed on Saturdays and legal holidays. Other provisions of ORS 279C.520 may apply.

1.5 COMPLIANCE WITH LAWS

A. In addition to specific statutory provisions cited, the Contractor shall comply with all other applicable requirements of Chapter 279C – Public Contracting, Oregon Revised Statutes.

1.6 BIDDER'S REPRESENTATION

A. Each bidder by making his bid represents that he has read and understands the Bid Documents, and has familiarized himself with the locale, site and conditions under which his work is to be performed. The Contractor's signature on his bid indicates acceptance of the conditions at the site of the work upon which he is bidding. The Contractor will be held responsible for the completion of all necessary work in accordance with the Drawings and Project Manual.

B. Complete sets of Bid Documents shall be used in preparing bids. Neither the Owner nor the Architect assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bid Documents.

1.7 INTERPRETATION OF CONTRACT DOCUMENTS

A. If any person contemplating the submission of a bid for the proposed construction finds discrepancies in or omissions from, or is in doubt as to the true meaning of any part of the Drawings and Project Manual, or forms of Contract Documents, he shall request an interpretation thereof, at least seven days previous to the date on which bids are to be opened. Any interpretation or correction will be issued as an Addendum by the Architect. Only a written interpretation or correction by Addendum shall be binding.

1.8 APPROVAL OF MATERIALS

A. Each bidder represents that his bid is based upon the materials, services, and equipment described in the Bid Documents. No substitution will be considered unless written request is submitted in accordance with Division 1 Section "Product Requirements," to the Architect for review by 3:00 p.m. seven days prior to bid date.

1.9 SUBMISSION OF BID

A. All bids must be prepared on the forms provided, and submitted in accordance with the Instructions to Bidders. A bid is invalid if it has not been deposited at the designated location prior to the time and date for receipt of bids indicated in the Advertisement to Bid, or prior to any extension thereof issued to the bidders.

B. Unless otherwise provided in any supplement to these Instructions to Bidders, no bidder shall modify, withdraw, or cancel his bid or any part thereof for 30 days after the time designated for the receipt of bids in the Advertisement to Bid. Prior to the receipt of bids, Addenda will be mailed or delivered to each Contractor recorded by the Architect as having received the Bid Documents and will be available for inspection wherever the Bid Documents are kept available for that purpose. Enclose the bid with attachments in a sealed envelope with the following address and identification on the face:

[Bidder's Name]
[Bidder's Address]
Bid For: Woodburn City Hall Basement Remodel

1.10 TELEGRAPHIC MODIFICATION AND FACSIMILE TRANSMISSION

A. Any bidder may modify his bid by telegraphic communication at any time prior to the scheduled closing time for receipt of bids, provided such telegraphic communication is received by the Owner prior to the closing time, and provided further, the Owner is satisfied that a written confirmation of the telegraphic modification over the signature of the bidder was mailed prior to the closing time. The telegraphic communication should not reveal the bid price but should provide the addition or subtraction or other modification so that the final prices or terms will not be known by the Owner until the sealed bid is opened. If written confirmation is not received within 48 hours after closing time, no consideration will be given to the telegraphic modification.

B. Facsimile transmissions will be accepted only if handled through a third party and are received by the Owner in a sealed envelope and clearly marked BID as shown above, which includes a fax of all required documents. Electronically transmitted bids will not be accepted unless the original documents, together with all necessary signatures including any bond or other required documents, are received by the Owner within 48 hours after the actual scheduled opening.

1.11 METHOD OF AWARD

A. Award will be made to the responsible Offerer submitting the lowest total for a responsive base bid and alternates selected for award. The City reserves the right to award any or all alternates listed, and to reject all bids.

B. The Owner reserves the right to reject any or all bids as permitted by Oregon Statute or Administrative Rule and to consider the competency and responsibility of bidders and of their proposed subcontractors in making the award.

1.12 FORM OF AGREEMENT

A. The "City of Woodburn Public Improvement Construction Agreement" shall be used in executing this Contract.

B. The contract shall contain a provision that the Contractor shall pay and perform according to the conditions required by ORS 279C.800 to 279C.870, Prevailing Wage Rate.

1.13 PERFORMANCE BOND

A. The successful bidder shall promptly furnish a Performance Bond, which shall be an Oregon Public Works Contract Bond, in compliance with the requirements of Chapter 279C.380, Oregon Revised Statutes, in an amount equal to 100 percent of the cost of the work, such bond to be written by properly qualified surety authorized to do business in the State of Oregon.

1.14 PROHIBITIONS OF ALTERATIONS (BID FORM)

A. Except as otherwise provided herein, bids that are incomplete or are conditioned in any way, contain erasures, alterations, or items not called for in the bid, or are not in conformity with the

law, may be rejected by the Owner as informal. The Bid Form invites bids on definite Drawings and Project Manual. Only the amounts and information asked for in the Bid Form will be considered as the Bid. Each bidder shall bid upon the work exactly as specified and as provided in the Bid Form.

1.15 DISCLOSURE OF FIRST TIER SUBCONTRACTORS

A. Without regard to the amount of a Bidder's Bid, if the Agency's cost range for a public improvement Project in the "Invitation to Bid", or in other advertisement or solicitation documents, exceeds $100,000, the Bidder shall, within 2 working hours of the time Bids are due to be submitted, submit to the Agency, on a form provided by the Agency, a disclosure identifying any first-tier Subcontractors that will furnish labor or labor and Materials, and whose contract value is equal to or greater than:

1. 5% of the total Project Bid, but at least $15,000; or

2. $350,000, regardless of the percentage of the total Project Bid.

B. For each Subcontractor listed, Bidders shall state:

1. The name of the Subcontractor;

2. The dollar amount of the subcontract; and

3. The category of Work that the Subcontractor would be performing.

C. If no subcontracts subject to the above disclosure requirements are anticipated, a Bidder shall so indicate by entering "NONE" or by filling in the appropriate check box. For each Subcontractor listed, Bidders shall provide all requested information. An incomplete form will be cause for rejection of the Bid.

D. The Subcontractor Disclosure Form may be submitted by filling out the 00 45 50 First-tier Subcontractor Disclosure Form printed from the project manual, sealed in an opaque envelope, addressed and delivered to the same location as the Bid.

E. Subcontractor Disclosure Forms will be considered late if not received by the Agency within 2 working hours after the time designated for receiving Bids.

F. The Agency is not responsible for partial, failed, illegible or partially legible facsimile (FAX) transmissions or submittals, and such forms may be rejected as incomplete.

G. In the event that multiple Subcontractor Disclosure Forms are submitted, the last version received prior to the deadline will be considered to be the intended version.

H. Bids not in compliance with the requirements of this Subsection will be considered non-responsive.

1.16 SCHEDULE OF VALUES

A. Upon request by the Architect, the selected bidder shall within seven days thereafter, submit to the Architect a Schedule of Values of various parts of the work, including quantities and amount aggregating the total sum of the Contract. The selected bidder shall provide a level of detail acceptable to both Owner and Architect. With each application for payment, the Contractor shall furnish a detailed statement comprising various items which represent the total amount of work completed to the date upon which application for payment is made. No application for payment will be considered unless accompanied by such a statement.

1.17 BID IRREGULARITY GUIDELINES

A. Guidelines for handling bid irregularities developed and agreed upon by the Oregon AIA-AGC Joint Cooperative Committee.

B. Substantial Bid Irregularities Requiring Rejection of Bid:

1. Bids not submitted on specified form or altered in form by a bidder.

2. Unsigned bids.

3. Bids by non-prequalified entities where prequalification was specified.

4. Conditioning of a bid or bid items in a bid contrary to the specified requirements of bid items or Bid Documents.

5. Bids which have items omitted by the bidder. An exception: an indication of "NO BID" on an alternate should not disqualify a bid unless that alternate is pertinent in determining who will be low.

6. Post-bid monetary modification of bids due to provable mistakes of fact.

7. Post-bid refusal to submit to specified bidding requirements such as Wages, Non-Collusion, or Subcontractor Listing.

8. Altering a bid as to specified time of commencement or completion of work.

9. Bids not received prior to specified deadline.

10. List of first-tier subcontractors not received prior to specified deadline.

1.18 EQUAL EMPLOYMENT COMPLIANCE REQUIREMENT

A. By submitting this bid, the bidder certifies conformance with the applicable Federal Acts, Executive Orders, and Oregon Statutes and Regulations concerning Affirmative Action toward equal employment opportunities. All information and reports required by the Federal or Oregon governments having responsibility for the enforcement of such laws shall be supplied to the Owner upon request, for purposes of investigation to ascertain compliance with such acts, regulations, and orders.

1.19 WAGE ACTS

A. The provisions of ORS 279C.800 through 279C.870 are applicable to Work under this Contract. In accordance with ORS 279C.830, the minimum hourly rates of wage as determined by the Commissioner of the Bureau of Labor and Industry (BOLI) are hereby made a part of this Project Manual.

B. Wage acts that apply to this Project are available at:
https://www.oregon.gov/boli/Pages/index.aspx

and identified as "January 5, 2024 Prevailing Wage Rate Book", "April 5, 2024 Prevailing Wage Rate Amendments" and "April 5, 2024 Apprentice Rates".

END OF DOCUMENT

PRELIMINARY SCHEDULES

PART 1 GENERAL

1.1 CRITICAL DATES

A. Start construction work within seven days after receiving Notice to Proceed from the Owner, but not later than June 24, 2024.

B. Obtain Substantial Completion of the Project by October 31, 2024.

END OF DOCUMENT

TO: City of Woodburn Public Works

FROM: _____ (Name of Bidder)

1.1 BIDDER AGREEMENT

A. The Undersigned has:

1. Reviewed the Woodburn City Hall Basement Remodel Project Manual and Drawings.

2. Reviewed Addenda Numbers _____ inclusive.

3. Examined the site and conditions affecting the Work.

B. The Undersigned agrees:

1. To hold this Bid open for 30 days subject to provisions in Bidding Requirements Document "Instructions to Bidders."

2. That Bid Forms not indicating that Addenda were received prior to Bid Date may be rejected by the Owner.

3. That this Bid has been arrived at by the Bidder independently and has been submitted without collusion designed to limit independent bidding and competition.

C. If awarded a contract, the Undersigned agrees:

1. To enter into and execute a Contract on the basis of this Bid.

2. To deliver to the Owner a formal written Agreement subject to provisions in Bidding Requirements Document "Instructions to Bidders."

3. To commence the Work no later than seven days after the date of execution of the Contract or receipt of Notice to Proceed, whichever occurs first.

4. To complete the Work in accordance with the Contract Documents for the amount set forth in this Bid Form.

5. To complete the Work within the time period stipulated in Bidding Requirements Document "Preliminary Schedules."

6. To comply with Oregon Revised Statutes, ORS 279C.830 and pay workers not less than Prevailing Wage Rates as published by the Oregon Bureau of Labor and Industries.

7. That the Contract shall contain a provision that the contractor shall pay and perform according to the conditions required by ORS 279C.800 to 279C.870.

1.2 BID AMOUNTS

A. Basic Bid, Stipulated Sum: $_____

_____dollars.

B. Alternate Bids: The Basic Bid may be adjusted in accordance with Division 1 Section "Alternates," if applicable, in the amounts indicated below:

1. Alternate 1: Deduct $_____

_____dollars.

2. Alternate 2: Deduct $_____

_____dollars

3. Alternate 3: Deduct $_____

_____ dollars

4. Alternate 4: Deduct $_____

_____dollars

C. Number of days to complete construction: _____ days.

1.3 BIDDER'S SIGNATURE AND IDENTIFICATION

Please print or type all information requested below (except where signature is required):

Name of Proprietorship, Partnership, or Corporation	Signature of Proprietor, Partner, or Corporate Official
Street Address	Name of Signatory
Mailing Address	Date Signed
City, State, and Zip Code	If Corporation, Attest:
Phone Number	Secretary of Corporation
Employer ID Number	State of Incorporation
Construction Contractors Board Number	

END OF DOCUMENT

FIRST-TIER SUBCONTRACTOR DISCLOSURE FORM

PROJECT NAME: WOODBURN CITY HALL BASEMENT REMODEL

BID CLOSING DATE: Thursday, May 9, 2024. TIME: 2:00 pm local time

DISCLOSURE DEADLINE DATE: Thursday, May 9, 2024. TIME: 4:00 pm local time

This form must be submitted in a separate envelope within two (2) business hours of the advertised bid closing date and then no later than the DISCLOSURE DEADLINE stated above.

List below the Name, Dollar Value, Category of each subcontractor that will be furnishing labor or materials that are required to be disclosed. Enter "NONE" if there are no subcontractors that need to be disclosed. (If needed, attach additional sheets.)

NAME	DOLLAR VALUE	CATEGORY
1.	$	
2.	$	
3.	$	
4.	$	
5.	$	
6.	$	
7.	$	

Without regard to the amount of a Bidder's Bid, if the Agency's cost range for a public improvement Project in the "Invitation to Bid", or in other advertisement or solicitation documents, exceeds $100,000, the Bidder shall, within 2 working hours of the time Bids are due to be submitted, submit to the Agency, on a form provided by the Agency, a disclosure identifying any first-tier Subcontractors that will furnish labor or labor and Materials, and whose contract value is equal to or greater than:

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

a) 5% of the total Contract Price, but at least $15,000 (add all additive alternates and subtract all deductive alternates).

b) $350,000 regardless of the percentage of the total Contract Price.

FAILURE TO SUBMIT THIS FORM BY THE DISCLOSURE DEADLINE WILL RESULT IN A BID SUBMITTAL BECOMING NON-RESPONSIVE, AND SUCH BIDS SHALL NOT BE CONSIDERED FOR AWARD.

Form Submitted By (Bidder Company Name): _____

Contact Name: _____ Phone No.: (____) _____

DELIVER FORM TO: City of Woodburn Public Works.

FIRST-TIER SUBCONTRACTOR DISCLOSURE FORM

DOCUMENT SHALL NOT BE FAXED. It is the responsibility of bidders to separately submit this disclosure form and additional sheets, with the words "DISCLOSURE FORM", the Project Name clearly marked on the envelope, at location indicated above by the specified deadline.

END OF DOCUMENT

AGREEMENT FORM

PART 1 GENERAL

1.1 SUMMARY

A. The Agreement between the Owner and the Contractor for the Work of this Project will be the "City of Woodburn Public Improvement Construction Agreement" and is hereby incorporated as part of the Contract Documents.

B. An example of the Agreement is included.

END OF DOCUMENT

CITY OF WOODBURN

PUBLIC IMPROVEMENT CONSTRUCTION AGREEMENT

THIS PUBLIC IMPROVEMENT CONSTRUCTION AGREEMENT ("Agreement") is entered into between the City of Woodburn, an Oregon municipal corporation (the "City"), and [name], a [entity type] (“Contractor") (collectively the "Parties").

BACKGROUND

A. City selected Contractor to construct a public improvement project for the City by a competitive bid process. Contractor submitted the lowest bid as a qualified responsible bidder and will now perform the scope of work for the project as described in this Agreement.

B. This Agreement is for a public improvement project subject to State prevailing wage rates.

The Parties Agree as Follows:

AGREEMENT

1. Contract Documents. This Agreement shall consist of the following documents ("Contract Documents"), hereby incorporated by reference, and listed in descending order of precedence as follows:

(i) Authorized Change Orders;
(ii) This Agreement;
(iii) Exhibit A – Scope of Work;
(iv) Exhibit B – Fee Schedule;
(v) Approved Project Construction Drawings & Specifications;
(vi) City Bid Solicitation Document(s);
(vii) Contractor's Signed Bid & Proposal;
(viii) Bid Bond;
(ix) First-Tier Subcontractor Disclosure Form;
(x) Payment Bond;
(xi) Performance Bond; and
(xii) Contractor's Proof of Insurance.

The terms of this Agreement control over any inconsistent provision of any document other than a Change Order.

Contractor acknowledges that it has or has access to all the contract documents referred to in this Section and agrees to comply with all the Contract Documents.

2. Term. This Agreement becomes effective when signed by both Parties and Contractor has submitted the required certificates of insurance and performance and payment bonds. Unless earlier terminated or extended, this Agreement will remain in effect until completion of Work designated under Section 3 and described in Exhibit A, the improvements have been accepted by the City, and the warranty period has expired. Such expiration shall not extinguish or prejudice the City's right to enforce this Agreement with respect to: (i) any breach of a Contractor warranty; or (ii) any default or defect in Contractor performance that has not been cured.

3. Scope of Work. Contractor shall construct the [name of project] (the "Project"), including the full scope of work described in Exhibit A (the "Work"). Contractor shall perform the Work in accordance with the terms and conditions of this Agreement, including furnishing all materials, labor, water, tools, power, equipment, transportation, and other work needed to construct the Project. Work on the Project is to be completed [pursuant to the schedule included in Exhibit A and] no later than [date] ("Completion Date").

4. Duties of Contractor.

4.1. Contractor shall be responsible for the professional quality, technical accuracy and coordination of all Work furnished by Contractor under this Agreement. Contractor shall, without additional compensation, correct or revise any errors or deficiencies in its work.

4.2. Contractor represents that it is qualified to furnish the Work described in this Agreement. Contractor has familiarized itself with the nature and extend of the Contract Documents, Work, locality, and with all local conditions and any federal, state, and local laws, ordinances, rules, and regulations which, in any manner, may affect cost, progress, or performance of Work.

4.3. Contractor shall be responsible for employing or engaging all persons necessary to perform the Work.

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

4.5. The Contractor shall keep the premises and surrounding area fee from accumulation of debris and trash related to the Work. By the Completion Date,

Contractor shall have removed its tools, construction equipment, machinery, and surplus material(s), and shall have properly disposed of all waste materials.

4.6. It is understood that [name of individual in charge] will be designated by Contractor as the person serving as the main point of contact to the City under this Agreement and that this designated person shall not be replaced without City's approval.

5. Duties of City.

5.1. The City shall provide Contractor the pertinent information regarding City's requirements for the Project.

5.2. The City shall examine documents and construction plans submitted by Contractor and shall render decisions promptly to avoid unreasonable delay in the progress of Contractor's Work.

5.3. The City shall be responsible for the cost and will pay for all construction permit fees necessary for completion of the Project.

5.4. The City certifies that sufficient funds are available and authorized for expenditure to finance costs of this Agreement.

5.5. The contact person on the Project for City is designated as [name], [title]. The City shall provide written notice to Contractor if City changes its contact person.

6. Consideration & Payment. The City shall pay Contractor according to the schedule(s) and unit prices stated in Exhibit B, with the Project Sum totaling [$fill in total].

Contractor shall not submit billings for, and the City will not pay, any amount in excess of the compensation amount set forth above. If any compensation or fee amount is increased by an approved Change Order or Amendment, the Change Order or Amendment must be fully effective before Contractor performs any modified Scope of Work. No payment will be made for any Work performed before the beginning date or after the expiration date of this Agreement.

Contractor shall invoice the City monthly for work performed during the previously month-long period, based on a progress payment calculation outlined and included in Exhibit B. Invoices shall be directed to the City of Woodburn, Attn: [name/title?], 270 Montgomery Street, Woodburn, OR 97071. Invoices may also be emailed to: [fill in]. The City shall make a progress payment equal to the value of the completed Work, less amounts previously paid, less retainage of 5 percent within 30 days of receipt of the invoice.

7. Change Orders. A Change Order includes a written order to the Contractor signed by the City authorizing an addition, deletion, or revision in the Work, or an adjustment in the Compensation amount or the Completion Date after the effective date of this Agreement. At any time the need arises, the City may submit a Change Order to Contractor without invalidating the Agreement, so long as it is within the general scope of this Agreement and the Contract Documents.

For any adjustments to the Project Sum that are based on other than the unit prices method, the Contractor agrees to charge, and accept, as payment for overhead and profit, the following percentages of costs attributable to the change in the Work:

(i) Ten percent (10%) for Work by the Contractor not involving Subcontractors;
(ii) Five percent (5%) for Work by Subcontractors, calculated without subcontractor profit;
(iii) When both additions and credits are involved in any one change, the allowance for overhead and profit shall be figured on the basis of the net increase, if any; and
(iv) For additional Work ordered as described above that will be executed by Subcontractors, it is agreed that the Subcontractors will be permitted to charge ten percent (10%) for work not involving Sub-subcontractors and five percent (5%) for Work by Sub-subcontractors, calculated without Sub-subcontractor profit.

8. Final Acceptance of Project. The City shall inspect the Project within 15 days of receipt of written notice from Contractor that the Work is ready for final inspection and acceptance. The City shall either accept or reject Contractor's Work in writing. A rejection must state the reasons for the rejection and list the Work that must be done before the Project can be accepted. If a rejection is issued, Contractor shall complete all Work needed to be done and request another inspection. The process shall be continued until the City determines that the Project is complete and accepted. Within 30 days after written acceptance by the City and receipt of the Warranty Bond required by Section 15(iii), all remaining compensation, including the retainage, shall be paid to Contractor, provided that Contractor shall submit evidence satisfactory to the City that all payrolls, material bills, and other indebtedness connected with the Work have been paid; except that in case of disputed indebtedness or liens, the Contractor may submit in lieu of evidence of payment, a Surety Bond satisfactory to City guaranteeing payment of all such disputed amounts when adjudicated in cases where such payment has not already been guaranteed by Surety Bond.

9. Warranties. Contractor unconditionally warrants all work and materials under this Agreement, including additional work authorized under Change Orders, against any defects whatsoever, for one year from the date of acceptance by the City, except that manufacturers' warranties and extended manufacturer warranties as specified in the Contract Documents or otherwise is a standard manufacturer product warranty shall not be abridged. In addition to its

right to proceed on the warranty, the City may recover for breach of contract or negligence even if defects do not become evident during the warranty period.

Contractor shall perform all Work in accordance with all specifications, correcting any Work not in compliance with specifications, and for all repairs of damage to other improvements, natural and artificial structures, systems, equipment, and vegetation caused by, or resulting in whole or in part from occurrences beginning during the warranty period and are the result of defects in construction or materials installed under this Agreement. Contractor shall be responsible for all costs associated with site cleanup and remediation caused by, or resulting in whole or in part from, defects in its work or materials.

All Work done to comply with the warranty shall itself be warranted for one year beginning on the date of the City's notification of the corrections, repairs, replacements or changes.

10. Hazardous Materials. Contractor shall not cause or permit any "Hazardous Materials" (as defined herein) to be brought upon, kept or used in or on the job site except to the extent such Hazardous Materials are necessary for the execution of the Work or are required pursuant to the Contract Documents. Removal of such Hazardous Materials shall be undertaken within twenty-four (24) hours following City's demand for such removal. Such removal shall be undertaken by Contractor at its sole cost and expense, and shall be performed in accordance with all applicable laws. Any damage to the Work, the job site or any adjacent property resulting from the improper use, or any discharge or release of Hazardous Materials shall be remedied by Contractor at its sole cost and expense, and in compliance with all applicable laws. Contractor shall immediately notify City of any release or discharge of any Hazardous Materials on the job site. Contractor shall be responsible for making any and all disclosures required under applicable "Community Right-to-Know" laws. Contractor shall not clean or service any tools, equipment, vehicles, materials or other items in such a manner as to cause a violation of any laws or regulations relating to Hazardous Materials. All residue and waste materials resulting from any such cleaning or servicing shall be collected and moved from the job site in accordance with all applicable laws and regulations. Contractor shall immediately notify City of any citations, orders or warnings issued to or received by Contractor, or of which Contractor otherwise becomes aware, which relate to any Hazardous Materials on the job site.

Without limiting any other indemnification provisions pursuant to law or specified in the Contract, Contractor shall indemnify, defend (at Contractor's sole cost, with legal counsel approved by City) and hold City harmless from and against any and all such claims, demands, losses, damages, disbursements, liabilities, obligations, fines, penalties, costs and expenses in removing or remediating the effect of any Hazardous Materials on, under, from or about the job site, arising out of or relating to, directly or indirectly, Contractor's failure to comply with any of the requirements of this Subparagraph 10.3.3.1. As used herein, the term

"Hazardous Materials" means any hazardous or toxic substances, materials and wastes listed in the United States Department of Transportation Hazardous Materials Table (49 CFR 172.101) or listed by the Environmental Protection Agency as hazardous substances (40 CFR Part 302) and

any amendments thereto, and any substances, materials or wastes that are or become regulated under federal, state or local law. Hazardous Materials (or substances) shall also include, but not be limited to: regulated substances, petroleum products, pollutants, and any and all other environmental contamination as defined by, and in any and all federal, state and/or local laws, rules, regulations, ordinances or statues now existing or hereinafter enacted relating to air, soil, water, environmental or health and safety conditions.

11. Provisions Required by State Law.

11.1. Contractor shall:

(i) Make payment promptly, as due, to all persons supplying to the Contractor labor or material for the performance of the Work provided for in the Agreement;
(ii) Pay all contributions or amounts due the Industrial Accident Fund from the Contractor or Subcontractor incurred in the performance of the Agreement;
(iii) Not permit any lien or claim to be filed or prosecuted against City;
(iv) Pay to the Department of Revenue all sums withheld from employees under ORS 316.167;
(v) Demonstrate that an employee drug testing program is in place. City has the right to audit and/or monitor the program. On request by the City, Contractor shall furnish a copy of the employee drug testing program; and
(vi) Salvage or recycle construction and demolition debris, if feasible and cost-effective.

11.2. If Contractor fails, neglects or refuses to make prompt payment of any claim for labor or services furnished to the contractor or a subcontractor by any person in connection with the public improvement contract as the claim becomes due, the City may pay the claim to the person furnishing the labor or services and charge the amount of the payment against funds due or to become due the contractor by reason of the contract.

11.3. If Contractor or a First Tier Subcontractor fails, neglects or refuses to make payment to a person furnishing labor or materials in connection with this Agreement within 30 days after receipt of payment from the City (or in the case of a subcontractor, from Contractor), Contractor or first tier subcontractor shall owe the person the amount due plus interest charges commencing at the end of the 10 day period that payment is due under ORS 279C.580 (4) and ending upon final payment, unless payment is subject to a good faith dispute as defined in ORS 279C.580. The rate of interest charged to Contractor or first-tier subcontractor on the amount due shall equal three times the discount rate on 90-day commercial paper in effect at the Federal Reserve Bank in the Federal Reserve district that includes Oregon on the date that is 30 days after the date when payment was received from the contracting agency or from the contractor, but

the rate of interest may not exceed 30 percent. The amount of interest may not be waived.

11.4. If Contractor or a Subcontractor fails, neglects or refuses to make payment to a person furnishing labor or materials in connection with this Agreement, the person may file a complaint with the Construction Contractors Board, unless payment is subject to a good faith dispute as defined in ORS 279C.580.

11.5. The payment of a claim in the manner authorized in this section does not relieve the Contractor or the Contractor's surety from obligation with respect to any unpaid claims.

11.6. For work under this Contract, a person may not be employed for more than 10 hours in any one day, or 40 hours in any one week, except in cases of necessity, emergency or when the public policy absolutely requires it, and in those cases, the employee shall be paid at least time and a half pay:

(i) For all overtime in excess of 8 hours in any one day or 40 hours in any one week when the work week is five consecutive days, Monday through Friday; or
(ii) For all overtime in excess of 10 hours in any one day or 40 hours in any one week when the work week is four consecutive days, Monday through Friday; and
(iii) For all work performed on Saturday and on any legal holiday specified in ORS 279C.540.

Contractor is not required to pay overtime if the request for overtime pay is not filed within 30 days of completion of the Agreement if Contractor has posted and maintained in place a circular with the information contained in ORS 279C.545 as required by ORS 279C.545(1).

11.7. Contractors and Subcontractors must give notice in writing to employees who perform work under this Agreement, either at the time of hire or before commencement of Work under the Agreement, 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.

11.8. Contractor shall promptly, as due, make payment to any person, co-partnership, association or corporation furnishing medical, surgical and hospital care services or other needed care and attention, incident to sickness or injury, to the employees of Contractor, of all sums that Contractor agrees to pay for the services and all moneys and sums that the Contractor collected or deducted from the wages of employees under any law, Contract or Agreement for the purpose of providing or paying for the services.

11.9. All employers, including Contractor, that employ subject workers who work under this Contract in the State of Oregon shall comply with ORS 656.017 and provide the required Workers' Compensation coverage, unless exempt under ORS 656.126. Contractor shall ensure that each of its subcontractors comply with these requirements.

11.10. Contractor shall utilize where applicable, recycled materials if (a) The recycled product is available; (b) The recycled product meets applicable standards; (c) The recycled product can be substituted for a comparable non-recycled product; and (d) The recycled product's costs do not exceed the costs of non-recycled products by more than 5 percent.

11.11. Contractor shall include in each first-tier subcontract, including contracts with material suppliers, a clause that obligates Contractor to pay the firsttier subcontractor for satisfactory performance under its subcontract within 10 days out of the amounts paid to Contractor by City under this contract, and if payment is not made within 30 days after receipt of payment from City, to pay an interest penalty as specified in ORS 279C.515(2) to the first-tier subcontractor. The interest penalty does not apply if the only reason the delay in payment is due to a delay in payment by City to Contractor. Contractor shall include in each of Contractor's subcontracts, a provision requiring the first-tier subcontractor to include a similar payment and interest penalty clause and shall require Subcontractors to include similar clauses with each lower-tier subcontractor or supplier. Contractor shall also include in each first-tier subcontract a clause that requires Contractor to provide a standard form that the first-tier subcontractor may use as an application for payment and that requires Contractor to use the same form throughout the period of the contract, unless the contractor provides written notice of a change in the form, including a copy of the new form, at least 45 days before change.

11.12. By signing this Contract, Contractor certifies that all Subcontractors performing construction work shall be registered by the Construction Contractors Board or licensed by the State Landscape Contractors Board before the subcontractor starts Work on the Project.

11.13. City's performance under the Agreement is conditioned upon Contractor's compliance with the provisions of: (i) Title VI and VII of the Civil Rights Act of 1964; (ii) Section 503 and 504 of the Rehabilitation Act of 1973; (iii) the Americans with Disabilities Act of 1990 (Pub L No 101- 336); (iv) the Oregon Pay Equity Act (ORS 652.220); and (v) ORS Chapter 659, and all amendments of and regulations and administrative rules established pursuant to those laws, which are incorporated into the Agreement by reference.

11.14. By signing this Contract, Contractor certifies that it shall comply with Oregon tax laws.

12. Prevailing Wage. Contractor and subcontractors shall comply with all provisions required by ORS 279C.800 through ORS 279C.870 relating to the payment of prevailing wage rates for work performed. Contractor and subcontractors shall pay to workers in each trade or occupation the current, applicable State prevailing rate of wage as established by the Oregon State Bureau of Labor and Industries ("BOLI") http://www.boli.state.or.us/BOLI. Contractor and any Subcontractors shall post the prevailing wage rates and fringe benefits as required by ORS 279C.840. The City shall not make final payment under this Agreement unless prevailing wage rate certifications are received.

13. Indemnification. Contractor shall defend, indemnify, and hold the City, its officers, agents, employees and volunteers harmless against all liability, claims, losses, demands, suits, fees and judgments (collectively known as 'claims'). That may be based on, or arise out of damage or injury (including death) to persons or property caused by or resulting from any act or omission sustained in connection with the performance of this Agreement or by conditions created thereby or based upon violation of any statute, ordinance or regulation. This indemnification required shall not apply to claims caused by the sole negligence or willful misconduct of the City, its officers, agents, employees and volunteers. The Contractor agrees that it is not an agent of the City and is not entitled to indemnification and defense under ORS 30.285 and ORS 30.287.

14. Insurance. Contractor shall purchase and maintain at their own expense the following forms and types of insurance:

(i) **Commercial General Liability Insurance** with minimum coverage in effect of $1,000,000 per incident, claim or occurrence and $2,000,000 in aggregate. The policy shall include coverage for personal injury, bodily injury, advertising injury, property damage, premises, operations, products completed operations, and contractual damages. Contractor shall remain fully responsible and liable for any claims resulting from the negligence or intentional misconduct of contractor, its subcontractors, and their officials, agents and employees in performance of this contract, even if not covered by, or in excess of insurance limits.

(ii) **Commercial Automobile (Fleet) Liability Insurance** with minimum combined single limit of $1,000,000 covering all owned, non-owned, and hired vehicles. This coverage shall be written in combination with the Commercial General Liability Insurance with separate limits for Commercial Automobile Liability and Commercial General Liability.

(iii) **Workers' Compensation Insurance** as required by ORS Chapter 656. Contractor shall ensure that each subcontractor obtains workers compensation insurance. The Contractor shall ensure that its insurance carrier files a guaranty contract with the Oregon Workers Compensation Division before performing work.

Commercial General Liability coverage shall name, by certificate and endorsement the City, its officers, agents, employees and volunteers as additional insureds with respect to Contractor's work or services provided under this Agreement. Additionally, Contractor shall provide proof of coverage required by acceptable Certificate of Insurance and signed Endorsement from the carrier(s). The Certificate and Endorsement shall provide that there will be no cancellation, termination, material change or reduction in limits of the insurance coverage without a minimum 30-day written notice to the City. The Certificate and Endorsement shall also state the deductible or self-insured retention level.

15. Bonds. Contractor shall procure and deliver to the City, at their own expense, the following Bonds:

(i) **Performance Bond** and a separate **Payment Bond** in a form acceptable to the City. Each bond shall be equal to 100 percent of the Project Sum. The Performance Bond and the Payment Bond must be signed by the Surety's Attorney-in-Fact, and the Surety's seal must be affixed to each bond. Bonds shall not be canceled without the City's consent, nor shall the City release them prior to Project completion.

(ii) **A Public Works Bond**, filed with the Construction Contractor's Board, with a corporate surety authorized to do business in the State of Oregon in the amount of $30,000 prior to starting work on this Agreement unless otherwise exempt. Contractor is aware of the provisions of ORS 279C.600 and 279C.605 relating to notices of claim and payment of claims on Public Works Bonds.

(iii) **Warranty Bond** in the amount of the Project Sum to cover the warranty period after acceptance. The City's acceptance of the work shall not take effect until receipt of the warranty bond.

Contractor shall include in every Subcontract a provision requiring the Subcontractor to have a public works bond filed with the Construction Contractor's Board before starting work on the project, unless otherwise exempt.

16. Termination.

16.1. Parties' Right to Terminate for Convenience. This Agreement may be terminated at any time by mutual written consent of the Parties.

16.2. City's Right to Terminate for Cause. The City may terminate this Agreement in whole or in part, upon 10-days' notice to Contractor, or at such later date as the City may establish in such notice, upon the occurrence of any of the following events:

(i) Contractor commits a material breach or default of any covenant, warranty, or obligation under this Agreement, fails to perform the Work under this Contract within the time specified herein or any extension

thereof, and such breach, default or failure is not cured within the 10-day notice period after delivery of the City's notice, or such longer period as the City may specify in such notice;

(ii) Contractor disregards applicable laws and regulation, including failing to make prompt payment to Subcontractors;

(iii) Contractor makes an unauthorized assignment; or

(iv) Contractor has a receiver appointed because of the Contractor's insolvency or is adjudged bankrupt.

16.3. Contractor's Right to Terminate for Cause. Contractor may terminate this Agreement upon 10-days' notice to the City if the City fails to pay Contractor pursuant to the terms of this Agreement and the City fails to cure within the 10-day notice period after delivery of Contractor's notice, or such longer period of cure as Contractor may specify in such notice.

16.4. Remedies. In the event of termination pursuant to Sections 16.1 and 16.3, Contractor's sole remedy shall be a claim for the sum designated for accomplishing the Work multiplied by the percentage of Work completed and accepted by the City, less previous amounts paid and any claim(s) which City has against Contractor. If previous amounts paid to Contractor exceed the amount due to Contractor under this subsection, Contractor shall pay any excess to the City upon demand.

In the event of termination pursuant to Section 16.2, the City shall have any remedy available to it in law or equity. If it is determined for any reason that Contractor was not in default under Section 16.2, the rights and obligations of the parties shall be the same as if the Agreement was terminated pursuant to Section 16.1.

17. Independent Contractor; Responsibility for Taxes and Withholding.

17.1. Contractor shall perform all required Work as an independent contractor. Although the City reserves the right (i) to determine (and modify) the delivery schedule for the Work to be performed and (ii) to evaluate the quality of the completed performance, the City cannot and will not control the means or manner of Contractor's performance. Contractor is responsible for determining the appropriate means and manner of performing the Work. Contractor shall also provide, at its sole expense, all equipment and materials necessary to perform the Work described in this Agreement.

17.2. If Contractor is currently performing work for the State of Oregon or the federal government, Contractor by signature to this Agreement declares and certifies that: Contractor's Work to be performed under this Agreement creates no potential or actual conflict of interest as defined by ORS 244 and no rules or regulations of Contractor's employing agency (state or federal) would prohibit Contractor's Work under this Agreement. Contractor is not an "officer", "employee", or "agent" of the City, as those terms are used in ORS 30.265.

17.3. Contractor shall be responsible for all federal or state taxes applicable to compensation or payments paid to Contractor under this Agreement and, unless Contractor is subject to backup withholding, the City will not withhold from such compensation or payments any amount(s) to cover Contractor's federal or state tax obligations. Contractor is not eligible for any social security, unemployment insurance or workers' compensation benefits from compensation or payments paid to Contractor under this Agreement, except as a self-employed individual

18. No Third Party Beneficiaries. The City and Contractor are the only parties to this Agreement and are the only parties entitled to enforce its terms. Nothing in this Agreement gives, is intended to give, or shall be construed to give or provide any benefit or right, whether directly, indirectly or otherwise, to third persons unless such third persons are individually identified by name herein and expressly described as intended beneficiaries of the terms of this Agreement.

19. Subcontracts and Assignment; Successors and Assigns. City has selected Contractor based on its reputation and specialized expertise. Contractor shall not enter into any subcontracts for any of the Work required by this Agreement, or assign or transfer any of its interest in this Agreement without City's prior written consent.

The provisions of this Agreement shall be binding upon and shall inure to the benefit of the parties hereto, and their respective successors and permitted assigns, if any.

20. Force Majeure. Neither the City, nor Contractor shall be held responsible for delay or default caused by fire, riot, acts of God, or war where such cause was beyond the reasonable control of the City or Contractor, respectively. Contractor shall, however, make all reasonable efforts to remove or eliminate such a cause of delay or default and shall, upon the cessation of the cause, diligently pursue performance of its obligations under this Agreement.

21. Price Escalation – Materials & Supplies. In entering into this Agreement, the City and Contractor acknowledge that supply and material prices are subject to escalation at any time after the execution of this Agreement due to, without limitation, natural disasters, war, terrorism, domestic (both regional and national) and international market supply, demand or pressure, or other causes beyond the control of Contractor. The parties to this Agreement anticipate such escalations due to recent events affecting materials markets and anticipate that future events may cause further escalation; however, neither party can anticipate the magnitude of such escalation or the materials that may be affected.

The Contractor agrees to use reasonable efforts to obtain materials at the most competitive available prices and in such time so as to avoid delay to the Work. The Parties have further agreed that the Contractor shall be responsible for all the costs resulting from the escalation. The Parties agree that the Compensation shall only be adjusted by Change Order to compensate the Contractor for the escalated price of such materials. The Contractor shall

provide satisfactory documentation to the City to establish and demonstrate the difference between the Contractor's actual cost of any given material subject to escalation and the cost originally estimated by the Contractor. Prior to incurring additional costs for any material for which Contractor will seek a Change Order per Section 7 of this Agreement, the Contractor shall provide written notice to the City. Should any material or supply become commercially unavailable, the Contractor shall be entitled to an adjustment to the construction schedule through an extension of the Completion Date for the delay caused directly or indirectly by such commercial unavailability, unless the City promptly directs the use of an alternate material that is commercially available.

22. Notice. Except as otherwise expressly provided in this Agreement, any communications between the parties hereto or notices to be given hereunder will be given in writing by personal delivery, email, or mailing the same, postage prepaid, to Contractor or the City at the address or number set forth on the signature page of this Agreement. Any communication or notice so addressed and mailed will be deemed to be given five (5) days after mailing.

23. Severability. The Parties agree that if any term or provision of this Agreement 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 Agreement did not contain the particular term or provision held to be invalid.

24. Disclosure of Federal Tax ID Number. Contractor must provide Contractor's federal tax ID number. This number is requested pursuant to ORS 305.385, OAR 125-20-0030 and OAR 150-305-0010. Federal tax ID numbers provided pursuant to this authority will be used for the administration of state, federal and local tax laws.

25. Governing Law; Venue; Consent to Jurisdiction. This Agreement shall be governed by and construed in accordance with the laws of the State of Oregon without regard to principles of conflicts of law. Any claim, action, suit or proceeding (collectively, "Claim") between the City and Contractor that arises from or relates to this Agreement shall be brought and conducted solely and exclusively within the Circuit Court of Marion County for the State of Oregon. Contractor hereby agrees to the in personam jurisdiction of such court and waives any claims of an inconvenient forum.

26. Confidentiality. Contractor, may, in the course of its duties have in its possession sensitive information relating to internal policy and procedure of the City. All such information is confidential and unless permitted by the City in writing, Contractor shall not disclose such information, directly or indirectly, to any party, its counsel or any representatives, or use it in any way, except as required to perform their duties as requested by the City.

27. Merger Clause; Waiver. This Agreement and the Contract Documents as incorporated constitute the entire agreement between the parties on the subject matter hereof. There are no understandings, agreements, or representations, oral or written, not specified herein

regarding this Agreement. No waiver, consent, modification or change of terms of this Agreement shall bind either party unless in writing and signed by both parties. Such waiver, consent, modification or change, if made, shall be effective only in the specific instance and for the specific purpose given. The failure of the City to enforce any provision of this Agreement shall not constitute a waiver by the City of that or any other provision.

[*Signature Page Follows*]

CONTRACTOR DATA, CERTIFICATION AND SIGNATURE
(please print or type)

Name (tax filing):	**Address**:
Email:	**Phone #:** **Facsimile #**:
Social Security #: **or** **Federal Tax ID #**:	**State Tax ID#**:
Citizenship, if applicable: Non-resident alien [ ] Yes [ ] No	
Business Designation (check one): [ ] Corporation [ ] Sole Proprietorship [ ] Limited Partnership [ ] Limited Liability Partnership [ ] Partnership [ ] Limited Liability Company	
Above payment information must be provided prior to Contract approval. This information will be provided to the Internal Revenue Service (IRS) under the name and taxpayer ID number submitted. Information not matching IRS records could subject Contractor to 31 percent backup withholding.	

Certification and Execution:

Contractor, by execution of this contract, hereby acknowledges that contractor has read this contract, understands it, and agrees to be bound by its terms and conditions.

The Contractor hereby certifies that: (a) the number shown on this form is Contractor's correct taxpayer ID; and (b) Contractor is not subject to backup withholding because (i) Contractor is exempt from backup withholding or (ii) Contractor has not been notified by the IRS that Contractor is subject to backup withholding as a result of failure to report all interest or dividends, or (iii) the IRS has notified Contractor that Contractor is no longer subject to backup withholding; (c) they authorized to act on behalf of Contractor, they have authority and knowledge regarding Contractor's payment of taxes, and to the best of their knowledge, Contractor is not in violation of any Oregon tax laws; (d) Contractor is an independent contractor as defined in ORS 670.600; and (e) the above Contractor data is true and accurate.

Signed by the Contractor:

[business name]

_____ _____

[name, title] Date

Accepted and Signed by the City:

City of Woodburn

_____ _____

Scott Derickson Date
City Administrator

City of Woodburn
270 Montgomery Street
Woodburn, OR 97071
Email: Scott.Derickson@ci.woodburn.or.us

EXHIBIT A

SCOPE OF WORK

EXHIBIT B

COMPENSATION SCHEDULE

Proposal Pricing

Progress Payment Calculation

The amount of each progress payment shall first include:

(i) That portion of the Project Sum properly allocable to completed Work;

(ii) That portion of the Project Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the City, suitably stored off the site at a location agreed upon in writing; and

The amount of each progress payment shall then be reduced by:

(i) The aggregate of any amounts previously paid by the City;

(ii) The amount, if any, for Work that remains uncorrected and for which the City has previously withheld payment;

(iii) Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay; For Work performed or defects discovered since the last payment application, any amount for which the City may withhold payment, or nullify a Certificate of Payment in whole or in part; and

(iv) Retainage withheld pursuant to the below specification.

For each progress payment made prior to Final Acceptance of the Project, the City may withhold 5% as retainage from the payment otherwise due.

PREVAILING WAGE RATES

PART 1 GENERAL

1.1 SUMMARY

A. This project is subject to the prevailing rate requirements of ORS 279C.800 to 279C.870. The current wage rates applicable to this project are available on the internet at: https://www.oregon.gov/boli/employers/Pages/prevailing-wage-rates.aspx and listed as "Prevailing Wage Rate Book" effective January 5, 2024 with associated Amendments dated April 5, 2024.

1.2 MINIMUM WAGE AND OVERTIME RATES FOR PUBLIC WORKS PROJECTS

A. General - The Contractor is responsible for investigating local labor conditions. The Agency does not imply that labor can be obtained at the minimum hourly wage rates specified in State or federal wage rate publications, and no increase in the Contract Amount will be made if wage rates paid are more than those listed.

B. State Prevailing Wage Requirements - The Contractor shall comply with the prevailing wage provisions of ORS 279C.800 through ORS 279C.870.

1. Minimum Wage Rates - The Bureau of Labor and Industries (BOLI) determines and publishes the existing State prevailing wage rates in the publication "Prevailing Wage Rates for Public Works Contracts in Oregon". The Contractor shall pay workers not less than the specified minimum hourly wage rate according to ORS 279C.838 and ORS 279C.840 and shall include this requirement in all subcontracts.

2. Payroll and Certified Statements - As required in ORS 279C.845, the Contractor and every subcontractor shall submit written certified statements to the Architect on the form prescribed by the Commissioner of BOLI in OAR 839 025 0010 certifying compliance with wage payment requirements and accurately setting out the Contractor's or subcontractor's weekly payroll records for each worker employed upon the project.

3. The Contractor and subcontractors shall preserve the certified statements for a period of six years from the date of completion of the Contract.

C. Additional Retainage:

1. Agency - As required in ORS 279C.845(7) the Agency will retain 25% of any amount earned by the Contractor on the project until the Contractor has filed the certified statements required in ORS 279C.845 and in FHWA Form 1273, if applicable. The Agency will pay to the Contractor the amount retained within 21 days after the Contractor files the required certified statements, regardless of whether a subcontractor has failed to file certified statements.

2. Contractor - As required in ORS 279C.845(8) the Contractor shall retain 25% of any amount earned by a first tier subcontractor on the project until the first tier subcontractor has filed with the Agency the certified statements required in ORS 279C.845 and in FHWA Form 1273, if applicable. Before paying any amount retained, the Contractor

shall verify that the first tier subcontractor has filed the certified statement. Within 21 days after the first tier subcontractor files the required certified statement the Contractor shall pay the first tier subcontractor any amount retained.

D. State Overtime Requirements - As a condition of the Contract, the Contractor shall comply with the pertinent provisions of ORS 279C.540.

1. Maximum Hours of Labor and Overtime Pay - According to ORS 279C.540, no person shall be employed to perform Work under this Contract for more than 10 hours in any one Day, or 40 hours in any one week, except in cases of necessity, emergency, or where public policy absolutely requires it. In such instances, the Contractor shall pay the employee at least time and a half pay:

   a. 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; or

   b. 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

   c. For all Work performed on Saturday and on any legal holiday specified in ORS 279C.540.

   d. For additional information on requirements for overtime and establishing a work schedule see OAR 839 025 0050 and OAR 839 025 0034.

2. Notice of Hours of Labor - The Contractor shall give written notice to employees of the number of hours per day and days per week the employees may be required to work. Provide the notice either at the time of hire or before commencement of work on this Contract, or by posting a notice in a location frequented by employees.

3. Exception - The maximum hours of labor and overtime requirements under ORS 279C.540 will not apply to the Contractor's Work under this Contract if the Contractor is a party to a collective bargaining agreement in effect with any labor organization. For a collective bargaining agreement to be in effect it shall be enforceable within the geographic area of the project, and its terms shall extend to workers who are working on the project (see OAR 839 025 0054).

4. State Time Limitation on Claim for Overtime - According to ORS 279C.545, any worker employed by the Contractor is foreclosed from the right to collect any overtime provided in ORS 279C.540 unless a claim for payment is filed with the Contractor within 90 days from the completion of the contract, provided the Contractor posted and maintained a circular as specified in this provision. Accordingly, the Contractor shall:

   a. Cause a circular, clearly printed in boldfaced 12 point type containing a copy of ORS 279C.545, to be posted in a prominent place alongside the door of the timekeeper's office or in a similar place which is readily available and freely visible to any or all workers employed to perform Work; and

b. Maintain such circular continuously posted from the inception to the completion of the Contract on which workers are or have been employed.

END OF DOCUMENT

SUMMARY

PART 1 GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Description:

1. The Woodburn City Hall Basement Remodel consists of remodeling most of the existing basement spaces to create new offices, work areas and restrooms. Work includes new walls, doors, relites, ceilings, MEP infrastructure and finishes throughout the project area, which is approximately 4,100 sf. The existing HVAC system will be modified to relocate existing fan-coil units and other equipment, and provide new air distribution. Plumbing and electrical work is to be completed on a bidder-designed basis. No exterior work is proposed.

2. The estimated cost range is $400,000 to $600,000.

B. Additional requirements of all parties to the Contract include the following Bidding and Contracting Requirements:

1. Subcontractor List.

2. Agreement Form.

3. Bonds.

4. Oregon BOLI wage rates.

1.2 CONTRACTS

A. Standard Contract Form: Construct the Work under the City of Woodburn Public Improvement Construction Agreement

1.3 WORK UNDER OTHER CONTRACTS

A. Work Prior to This Contract:

1. Owner may perform separate Work or will employ separate contractors for Work on the Project prior to start of this Contract.

B. Work During This Contract:

1. Owner will employ separate contractors for Work on the Project which will be executed during this Contract which is excluded from this Contract.

2. Provide access to site and coordinate Work according to General Conditions.

3. Work during this Contract by separate contractors includes:

a. Low voltage data system cabling and terminations.

b. Access control vendor will install access control devices.

C. Work After This Contract:

1. Owner will employ separate contractors for Work on the Project, which will be executed after this Contract, which is excluded from this Contract.

2. Work after this Contract by separate contractors includes window coverings and building signage.

1.4 SITE INVESTIGATION AND REPRESENTATION

A. The Contractor acknowledges that he has satisfied himself as to the nature and location of the Work; the general and local conditions, particularly those bearing upon storage of materials, availability of labor, water, electrical power, roads, or similar physical conditions at the site; and the conformation and conditions of the ground, the character of equipment and facilities needed preliminary to and during the execution of the Work, and all other matters which can in any way affect the Work or the cost thereof under this Contract.

B. The Contractor further acknowledges that he has satisfied himself as to the character, quality and quantity of surface materials to be encountered from inspecting the site, all exploratory Work done by the Owner, as well as from information presented by the Drawings and Project Manual made a part of this Contract. Any failure by the Contractor to acquaint himself with all the available information will not relieve him from responsibility for properly estimating the difficulty or cost of successfully performing the work.

1.5 CONSTRUCTION SCHEDULE AND USE OF SITE

A. Construction Schedule Procedures: Construct Work to accommodate Owner's and public's use of premises during the construction period. Coordinate construction schedule and site operations with Owner.

B. Construction Schedule: The Contractor shall schedule the Work through to completion, giving copies of the schedule to all subcontractors, to be sure that the construction is actually completed by the Project deadline.

C. Contractor's Use of Premises:

1. Contractor shall limit his use of premises for Work and storage to allow for Work by other contractors, Owner occupancy and public use. See drawings for direction on use of premises.

2. Coordinate use of premises under direction of Architect.

3. Move any stored products under Contractor's control which interfere with operations of the Owner or separate contractor.

4. Obtain and pay for the use of additional storage or work areas needed for construction.

5. Do not prohibit use of toilet facilities, corridors and required exits until the completion of one stage of construction provides alternative access.

6. Do not block fire truck access to the site. Designated fire lanes must remain open at all times unless other arrangements are made with the governing jurisdiction.

7. Dumping of construction waste on the site is prohibited, except for excess concrete and truck washout to be placed in areas to receive pavement.

1.6 TRAFFIC AND PARKING

A. Vehicle parking shall be limited, as indicated on drawings. Contractor's use of areas outside of the indicated limits shall be only by arrangements made with appropriate governing agencies by the Contractor. Contractor shall pay all costs and fees related to said arrangements.

1.7 PUBLIC SAFETY AND CONVENIENCE

A. Comply with all rules and regulations of the City, State and County authorities regarding the closing of public streets or highways to use of public traffic. No road shall be closed to the public except by express permission of the governing authority. Conduct the Work so as to assure the least possible obstruction to traffic and normal commercial pursuits.

B. Protect all obstructions within traveled roadways by approved signs, barricades and lights where necessary for the safety of the public. The convenience of the general public and residents adjacent to the project and the protection of persons and property are of prime importance and shall be provided for in an adequate and satisfactory manner.

C. Whenever the Contractor's operations create a hazardous condition, he shall furnish flagmen and guards as necessary to give adequate warning to the public of any dangerous conditions to be encountered. Equip flagmen and guards, while on duty and assigned to give warning to the public, with approved red wearing apparel and a red flag which shall be kept clean and in good repair.

1.8 CLEANING AND PROTECTION

A. Clean all spilled demolition debris and other material caused by the construction operations from all streets and roads at the conclusion of each day's operation.

B. Emergency Provisions: The Contractor shall furnish the Owner with 24-hour telephone numbers of all key personnel, including key personnel of subcontractors, for use in case of any emergencies.

C. Noise Control: The Contractor shall provide and maintain adequate and effective mufflers, sound barriers and controls for all construction equipment such as compressors, jackhammers, vehicles, impact tools, power saws and similar equipment so that the noise from this equipment can be controlled to maintain a degree of comfort to the building occupants. Cooperate with the Owner when construction Work requires the use of equipment that may generate objectionable noise.

1.9 CONTINUED OWNER OCCUPANCY

A. Owner will occupy the building during the entire period of construction for conducting normal operations. Cooperate with Owner in all construction operations to minimize conflict and to facilitate Owner usage. Contractor shall at all times conduct his operations to ensure the least inconvenience to the Owner. No smoking will be allowed in any areas of the building.

1. Contractor shall ensure that continuous power is supplied to occupied areas of the building and shall coordinate any disruptions with the City.

2. Egress from occupied areas shall be ensured at all times.

B. Provide adequate protection and barriers for normal building activities and protection of personnel from the construction area.

1.10 EXISTING WORK AND FACILITIES

A. Construct Work carefully without damage or destruction of remaining facilities. Replace or repair damage caused by the Work to structures, surfaces, fixtures and materials with new Work equivalent to the existing, fully complying with original workmanship, materials and the Specifications.

B. Existing Utilities:

1. Protect active utilities, evident by reasonable inspection of the Project, whether or not shown on the Drawings. Protect, relocate, or abandon utilities encountered in the Work which are not shown on the Drawings or evident by inspection of the Work as directed by the Architect. Maintain continuity of utilities services to occupied areas of building.

2. All necessary service interruptions of utilities shall be scheduled with the Owner. Minor interruptions shall require a minimum of 48 hours prior notification. The major shut down of any utility shall require a minimum of seven days prior notice.

C. On-Site Work Hours: Work shall be generally performed inside the existing building during normal business working hours of 8 a.m. to 5 p.m., Monday through Friday, except otherwise indicated. However, contractor may coordinate with owner to arrange early or late access to the site.

1. Weekend Hours: Negotiate with Owner.

2. Early Morning Hours: Negotiate with Owner.

3. Hours for Utility Shutdowns: Negotiate with Owner

4. Hours for Core Drilling: Negotiate with Owner.

D. Dust Curtains and Barriers: Use all precautions to confine dust to the work area by use of curtains, doors and other means.

1.11 SPECIFICATION FORMAT

A. These Specifications are of the abbreviated, simplified or streamlined type and include incomplete sentences. Omission of words or phrases such as "the Contractor shall," "in conformity therewith," "shall be," "as noted on the Drawings," "as detailed on the Drawings," "according to the plans," "a," "an," "the," and "all" are intentional. Omitted words or phrases shall be supplied by inference in the same manner as they are when a "note" occurs on the Drawings. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular, where applicable as the context of the Contract Documents indicates.

B. The Contractor shall provide all items, articles, materials, operations or methods listed, mentioned or scheduled either on the Drawings or specified herein, or both, including all labor, materials, equipment and incidentals necessary and required for their completion.

C. Whenever the words "reviewed," "approved," "satisfactory," "directed," "submitted," "inspected," or similar words or phrases are used, it shall be assumed that the word "Architect" follows the verb as the object of the clause, such as "approved by the Architect."

D. All references to standard specifications or manufacturer's installation directions shall mean the latest edition thereof.

END OF SECTION

ALTERNATES

PART 1 GENERAL

1.1 SUMMARY

A. Owner Selected Adjustments:

1. The Work required and Lump Sum Contract price shall be modified by the Alternates selected by the Owner and incorporated into the Agreement Form.

B. Related Documents:

1. Bid Form: Comply with successful Bidder's lump sum price for each Alternate.

2. Agreement Form: Refer to Owner-selected Alternates as listed in the signed Agreement Form.

1.2 CONTRACT ADJUSTMENTS

A. Work Adjustments:

1. Adjust Work required by the Contract for each Alternate accepted by Owner.

2. Include changes in material, equipment, and fabrication.

3. Include changes in erection, installation, and finishing.

4. Adjust work to achieve the desired result as indicated on Drawings and specified in the related technical Sections for each Alternate selected by the Owner.

B. Contract Sum Adjustments: Owner will adjust the Contract Lump Sum as indicated in the successful bidder's Bid Form, which the Owner incorporates into the signed Agreement Form.

C. Bidder's Requirements:

1. Review Contract Documents for the Scope of Work required by each Alternate.

2. State in the Bid Form in the space provided the addition to or deduction from the Basic Bid for each Alternate listed in this Section.

D. Contractor's Requirements:

1. Alternate Work is outlined in this Section and is specified in detail in the technical Sections referenced in this Section.

2. Minor adjustments to exposed finish surfaces, or concealed Work by the incorporation of the selected Alternates may or may not be indicated on Drawings or be specified in the referenced Specifications.

3. Include adjustments in Work as required to achieve the intended result, consistent with requirements in the Contract Documents.

4. Coordinate Work modified by the incorporation of the Alternates.

E. Owner's Rights:

1. The Owner reserves the right to accept or reject any one or all of the Alternates.

2. The Owner reserves the right to reinstate Alternate Bids at any time within 30 days after Contract Award.

1.3 DESCRIPTION OF ALTERNATES

A. Alternate Number 1: Change room Toilet 028 to be a Respite room by deleting the water closet, wall mounted lavatory, grab bars and toilet accessories, vanity light L-4 and wall tile from Toilet 028. Move the casework, sink and toilet accessories from Respite 029 to north wall of room Toilet 028. Delete door 029. Delete wall between Respite 029 and Bins 030.

B. Alternate Number 2: Delete upper and lower casework located in southwest corner of Open Office 007.

C. Alternate Number 3: Delete upper casework at southeast corner of Open Office 007, adjacent to refrigerator.

D. Alternate Number 4: Delete lower casework at southeast corner of Open Office 007, adjacent to refrigerator.

END OF SECTION

PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.

B. Related Sections include the following:

1. Division 1 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.

2. Division 1 Section "Submittal Procedures" for administrative requirements governing preparation and submittal of Contractor's Construction Schedule and Submittals Schedule.

1.2 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.3 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.

1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:

a. Application for Payment forms with Continuation Sheets.

b. Submittals Schedule.

c. Contractor's Construction Schedule.

2. Submit the Schedule of Values to Architect at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.

3. Subschedules: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values correlated with each phase of payment.

B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section.

1. Identification: Include the following Project identification on the Schedule of Values:

a. Project name and location.

b. Name of Architect.

c. Architect's project number.

d. Contractor's name and address.

e. Date of submittal.

2. Submit draft of AIA Document G703 Continuation Sheets or equivalent.

3. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:

a. Related Specification Section.

b. Description of the Work.

c. Name of subcontractor.

d. Name of manufacturer or fabricator.

e. Name of supplier.

f. Change Orders (numbers) that affect value.

g. Dollar value.

h. Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.

4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate. Round amounts to nearest whole dollar; total shall equal the Contract Sum.

5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site. If specified, include evidence of insurance or bonded warehousing.

6. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.

7. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

8. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.

9. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.4 APPLICATIONS FOR PAYMENT

A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.

B. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

C. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement.

D. Payment Application Forms: Use AIA Document G702 and AIA Document G703 Continuation Sheets as form for Applications for Payment or equivalent.

E. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.

1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.

2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

F. Transmittal: Submit 3 signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.

2. Schedule of Values.

3. Contractor's Construction Schedule (preliminary if not final).

4. Products list.

5. Schedule of unit prices (if applicable)

6. Submittals Schedule (preliminary if not final).

7. List of Contractor's staff assignments.

8. List of Contractor's principal consultants.

9. Copies of building permits.

10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.

11. Initial progress report.

12. Report of preconstruction conference.

13. Certificates of insurance and insurance policies.

14. Performance and payment bonds.

15. Data needed to acquire Owner's insurance.

16. Initial settlement survey and damage report if required.

H. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.

2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

I. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.

2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.

3. Updated final statement, accounting for final changes to the Contract Sum.

4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."

5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."

6. AIA Document G707, "Consent of Surety to Final Payment."

7. Evidence that claims have been settled.

8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.

9. Final, liquidated damages settlement statement.

END OF SECTION

PROJECT MANAGEMENT AND COORDINATION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Project Coordination.
2. Administrative and Support Personnel.
3. Pre-Construction Conference.
4. Progress meetings.
5. Administrative Submittals:
    a. Shutdown Requests.
    b. Request for Information (RFI).
6. Layout of Work.
7. Cleaning and Protection.

B. Related Sections include the following:

1. Division 1 Section "Submittal Procedures" for preparing and submitting Contractor's Construction Schedule.
2. Division 1 Section "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
3. Division 1 Section "Closeout Procedures" for coordinating closeout of the Contract.

1.2 PROJECT COORDINATION

A. Coordinate scheduling, submittals, and Work of various Sections of Specifications to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

B. Verify that utility requirement characteristics of operating equipment are compatible with building utilities. Coordinate work of various Sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

C. Coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

D. In finished areas, except as otherwise indicated, conceal pipes, ducts, and wiring within construction. Coordinate locations of fixtures and outlets with finish elements.

E. Coordinate completion and clean up of Work of separate Sections in preparation for Substantial Completion.

F. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

1.3 ADMINISTRATIVE AND SUPPORT PERSONNEL

A. In addition to General Superintendent and other administrative and support personnel required for performance of Work, provide Project Coordinator experienced in administration and supervision of building construction, including mechanical and electrical work. Project Coordinator is required to act as general coordinator of interfaces between units of Work.

B. Owner reserves right to review qualifications and experience of general superintendent and project coordinator and to accept or reject Contractor's proposal for staff members filling these positions.

C. Contractor shall submit to Owner and Architect, within five days of Notice to Proceed, proposed listing of all principal staff members and their assignments, consultants and subcontractors. List shall include business hour phone numbers and addresses as well as emergency phone numbers for off-hour contact on 24-hour basis in event of emergency.

1.4 PRECONSTRUCTION CONFERENCE

A. Owner and Architect will arrange, prior to commencement of Work, Preconstruction Conference to cover following agenda:

1. Introduction.

2. Explain:

a. Execution of Owner-Contractor agreement.

b. Submission of executed bonds and certificates of insurance.

c. Distribution of Contract Documents.

d. List of subcontractors, products and Schedule of Values.

e. Responsibility of each participant.

f. Inspection procedures.

g. Progress Schedules.

h. Progress Payment procedures.

i. Submittals and Approvals.

j. Routing of correspondence.

k. Change Order procedures.

l. Final Inspection procedures.

3. Review:

a. Product identification/temporary signs.

b. System for daily collection, recycling, and disposal of waste materials from site.

c. Special coordination problems.

d. Use of Owner's property.

e. Work hour restrictions.

f. Ingress and egress to site, traffic and parking rules.

g. Demolition procedures.

h. Special restrictions, i.e., noise-abatement, etc.

i. Special requirements such as BOLI wage rates.

j. Certifications.

k. Safety, fire and security.

l. Insurance responsibilities.

m. Hazardous materials.

4. Confirm:

a. Critical layout situations.

b. Existing conditions of Site and adjacent areas.

c. Sources of temporary utilities.

d. Points of connection to existing facilities.

5. Determine:

a. Contractor's plan of operations.

b. Line of authority in Contractor's organization.

c. Off-hour contacts in case of emergency.

d. Safety and security arrangement contemplated by Contractor(s).

e. Address and telephone numbers of Architect, Contractor and subcontractors.

6. Commissioning: Commissioning will include a scoping meeting where all members of the design and construction team to be involved in the commissioning process meet and agree on the scope of work, tasks, schedules, deliverables, and responsibilities for implementation of the Commissioning Plan.

1.5 PROGRESS MEETINGS

A. Contractor shall attend coordination meetings arranged by Owner at regularly scheduled times. Additional specific meetings may also be held for other purposes. Contractor and other persons involved in coordination and planning for Work, such as prime Subcontractors, shall attend as appropriate. Meetings, which will also be attended by Architect, Owner and other appropriate persons, shall be conducted utilizing following agenda:

1. Comments or revisions to previous meeting notes.

2. Construction schedule review.

3. Submittals status.

4. Proposal Request status.

5. RFI status.

6. Other quotations.

7. Design/Construction issues, old and new.

8. Information.

9. Site Observations.

B. Meeting just prior to last meeting of the month:

1. Provide draft payment applications for review at the meeting.

2. Provide all back up for any COR/Change Order to appear on current month’s application.

3. Correction, revisions or pre-approval of these documents will be made at this meeting, so the final documents will be provided at the last meeting for execution and signing by all necessary parties.

C. Contractor, who will be responsible for documentation of meetings, will distribute copies of Progress Meeting notes to attendees and appropriate parties, so they are received no later than two business days prior to next regularly scheduled meeting.

1.6 ADMINISTRATIVE SUBMITTALS

A. Shutdown Requests:

1. All necessary service interruptions of utilities of any type or magnitude shall be scheduled in advance with Owner. Major utility shutdowns are required to be scheduled between hours of 5:30 p.m and 6:00 a.m. Scheduling of shutdown shall be through submittal of Shutdown Request at least seven days prior to scheduled shutdown. Minor utility service interruptions shall be scheduled with minimum of two days prior notice through submittal of Shutdown Request.

2. Major shutdown is generally regarded as interruption of any single or group of services or utilities serving entire building, wing, floor, or group of spaces where occupants' normal operation would be affected by loss of service or utilities lost as result of shutdown.

3. Minor shutdown may be regarded as interruption of single or group of service or utilities to area not occupied at time of shutdown, or when services or utilities would pose no inconvenience to occupant activities, systems or equipment, or when affected utilities are restricted to areas occupied by Contractor engaged in ongoing work.

B. Request for Information (RFI): Design Clarifications/Interpretations:

1. General: When Contractor requires a clarification or information regarding Work, this shall be initiated by submittal of Request for Information. RFI is designed to deal with on-site concerns that, for whatever reason, are not adequately clarified in Contract Documents, and can not be easily resolved at the Site with assistance of the Owner's representative.

2. Contractor shall submit all RFI's. No RFI's will be accepted from sub-contractors, suppliers, or others, unless first submitted to Contractor.

3. Contractor shall thoroughly review, date and sign all submitted RFI's. Contractor shall thoroughly review RFI's with respect to Contract Documents prior to submitting RFI's to Architect, and notify affected parties of any potential cost or schedule impact.

4. Architect will receive only properly prepared and submitted RFI's. Architect will stamp for date received, review with Documents and Owner for decision, and process within 10 working days.

5. Form: RFI form is to be submitted to Architect, with top section filled out by Contractor. Include required response date to establish when Project may be adversely impacted. This date may be no less than 7 calendar days from initiation date. Incomplete forms may be returned by Architect, resulting in delay in processing. Use additional forms, diagrams or marked-up drawings where necessary. Method of transmittal to Architect should reflect urgency of response.

6. The RFI process is not intended for Contractor questions when answers are contained in the Contract Documents. RFI's whose answers are evident in the Contract Documents will be rejected and returned by the Architect without further action required.

1.7 LAYOUT OF WORK

A. Verify conditions of project site. Purpose of survey is to record existing conditions prior to construction for comparison with Contract Documents. Report all conflicts to Architect. Architect will provide revisions to Contract Documents or issue instruction to deal with conflicts. Contractor shall be responsible for remedying conflicts which could have been prevented by timely review of existing conditions. All remedies, which vary from Contract Documents shall be approved by Architect and Owner.

B. Be responsible for properly laying out Work, and for all lines and measurements for all Work executed under Contract Documents. Verify dimensions shown on Shop Drawings and report errors or inaccuracies in writing to Architect before commencing work.

C. Be responsible for coordination and installation of all architectural, mechanical and electrical work. Owner will not entertain requests for delays, time expansion or additional costs due to lack of coordination of Work by Contractor.

D. Mechanical and electrical trades shall be responsible for layout of duct work, piping and conduit based on reference lines shown on Drawings.

1. Because of their small scale, Mechanical, Plumbing, Electrical Drawings are diagrammatic and do not show all offsets, fittings and accessories which may be required.

2. Investigate structural and finish conditions affecting Work and arrange Work accordingly.

3. Provide fittings and accessories as required to fit job conditions.

E. Prepare detail layout drawings to a larger scale than Contract Documents in areas where Work is of sufficient complexity to warrant additional detailing. This shall apply to all Mechanical and Electrical Rooms, wiring at switchboards and motor control centers, panelboard cabinets in electrical closets, and sprinkler piping layouts. Prepare drawings on tracings of same size as Contract Drawings and submit with each set of Owner's Record Drawings. Submit layout drawings for approval before commencing shop fabrication or field erection, only when so directed by Architect.

F. Slots, chases and openings through floors, walls, ceilings and roofs as specified in new construction shall be provided by various trades. Trade requiring them shall insure that they are installed and properly located, and shall be responsible for any cutting and patching caused by their omission or improper location.

G. Anchor bolts, sleeves, inserts and supports that are required shall be furnished and installed under same Section of Specifications as respective items to be anchored, with locations as directed by trade requiring them.

H. Sprinkler Heads and Other Devices: Automatic sprinklers shall be installed generally throughout all areas. Check locations selected for all sprinkler heads and check Architectural reflected ceiling plans to prevent conflicts between trades. In cases where electric outlet or light fixture and sprinkler head occupy same position, Architect will decide which shall be shifted. Exposed sprinkler piping in finished areas will not be allowed unless it is evident that the Contract Documents intended the piping to be exposed.

I. Provide clearance and headroom. Utilize spaces efficiently so that adequate accessibility is

retained for future maintenance, repairs, modifications and additions.

J. Relocate installed work which does not provide adequate accessibility.

K. Changes required in Work of Contractor, caused by Contractor's neglect to coordinate Work with others, shall be made at Contractor's own expense.

L. Do all necessary Work to receive or join with Work of all trades.

M. Coordinate Work to provide adequate clearances for installation and maintenance of equipment.

N. Installation and Arrangement: Install Work to permit removal of parts requiring periodic replacement or maintenance.

1. Arrange pipes, ducts, raceways and equipment to permit ready access to valves, cocks, traps, starters, motors, and control components.

2. Arrange raceways, wiring and equipment to permit ready access to switches, motors and control components. Doors and access panels shall be kept clear.

3. Right-of-Way: Lines which pitch shall have right-of-way over conduit and EMT raceways. Lines whose elevations cannot be changed shall have right-of-way over conduit and EMT raceways whose elevations can be changed.

4. Offsets, and changes in direction of pipes, ducts and raceways shall be made as required to maintain proper headroom and clearances whether or not indicated on Drawings. Provide all traps, vents, fittings, junction boxes, connectors, etc., as required to effect these offsets and change in direction.

O. Drawings and Specifications are arranged for convenience only and do not necessarily determine which trades perform various portions of Work.

P. Transmit to trades doing Work of other Divisions all information required for Work to be provided under their respective Sections (such as foundations, electric wiring, access door locations, etc.) in ample time for their installation.

Q. Consult with trades doing Work of other Divisions so that:

1. Required related Work and information is received from them in ample time for installation.

2. Whenever possible motors, motor controls, pumps, valves, etc., are of same manufacturer.

R. Do not install valves, filters, or other devices that require periodic maintenance in locations difficult to access.

1.8 CLEANING AND PROTECTION

A. During handling and installation of Work at Project Site, clean and protect Work progress and adjoining Work on basis of continuous maintenance. Apply protective covering for stored or

installed Work where it is required for proper protection from damage or deterioration, up until Substantial Completion if necessary.

END OF SECTION

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. Make submittals required by the Contract Documents and revise and resubmit as necessary to establish compliance with the specified requirements.

B. Related Sections:

1. Documents affecting Work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of this Project Manual.

2. Individual requirements for submittals may also be described in pertinent Sections of this Project Manual.

3. The process for securing approval of proposed substitutions is described in Division 1 Section "Product Requirements."

C. Work Not Included:

1. Unrequired submittals will not be reviewed by the Architect.

2. The Contractor may require his subcontractors to provide drawings, setting diagrams, and similar information to help coordinate the Work, but such data shall remain between the Contractor and his subcontractors and will not be reviewed by the Architect unless specifically called for within the Contract Documents.

1.2 QUALITY ASSURANCE

A. Coordination of Submittals:

1. Prior to each submittal, carefully review and coordinate all aspects of each item being submitted.

2. Verify that each item and the submittal for it conform in all respects with the specified requirements.

3. The Contractor's signature on each submittal certifies that this coordination has been performed.

1.3 SUBMITTAL PROCEDURES

A. General: Use of Contract Documents in electronic media format will be permitted upon receipt of signed and dated "Agreement Between Contractor and Architect Concerning Use of Electronic Media" (form included in Division 0).

B. Electronic Submittals: All submittal documentation and procedures detailed in this specification section that lend themselves to transfer by digital electronic media shall be submitted in an electornic format as approved by the Architect.

PART 2 PRODUCTS

2.1 PROGRESS SCHEDULE

A. Prepare and maintain a construction progress and payment schedule of form approved by the Architect. The schedule shall include timing of material testing and special inspections, material ordering, shop drawing submittals, plus monthly billing projection.

1. Submit progress schedule electronically in format acceptable to the Owner.

B. Update and submit full size prints of this form with each subsequent application for payment showing the percent of complete of each subdivision of the Work, actual monthly payment request, and actual percentage complete curve.

C. Prior to start of construction, prepare a phased construction schedule, in cooperation with the Owner, to allow the building services and functions to schedule and prepare for necessary utility interruptions and shutdown during the progress of the construction.

2.2 SHOP DRAWINGS

A. Scale and Measurements: Make shop drawings accurately to a scale sufficiently large to show all pertinent aspects of the items. Include drawings showing shop assembly, field measurements, connections, details, dimensions, finishes, and fasteners.

1. Submit shop drawings electronically in format acceptable to the Owner.

2. Review comments of the Architect will be submitted electronically on electronically submitted shop drawings.

2.3 PRODUCT DATA

A. When product data is specified in a technical Section, submit manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations, and other descriptive data on manufactured products and systems.

B. Where contents of submitted literature from manufacturers includes data not pertinent to the submittal, clearly show which portion of the contents is being submitted for review.

C. Submit a maximum of three copies which will be returned, plus three copies which will be retained by the Architect.

1. Submit product data electronically in format acceptable to the Owner.

2.4 SAMPLES

A. When product samples are specified in a technical Section, submit product samples of size specified and of sufficient size to clearly illustrate characteristics of product or system.

B. Provide samples identical to the precise article to be provided. Identify as described under "Identification of Submittals" below.

C. Number of Samples Required:

1. Unless otherwise specified, submit samples in the quantity which is required to be returned, plus one which will be retained by the Architect.

2. By prearrangement in specific cases, a single sample may be submitted for review and, when approved, be installed in the Work at a location agreed upon by the Architect.

2.5 COLORS AND PATTERNS

A. Unless the precise color and pattern is specifically called out in the Contract Documents, and whenever a choice of color or pattern is available in the specified products, submit accurate color and pattern charts to the Architect for selection.

2.6 MANUFACTURER'S INSTRUCTIONS

A. When specified in individual Specification Sections, submit manufacturer's printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, in quantities specified for Product Data.

B. Identify conflict between manufacturer's instructions and Contract Documents.

2.7 MANUFACTURER'S CERTIFICATES

A. When specified in individual Specification Sections, submit manufacturer's certificate to Architect for review, in quantities specified for Product Data.

B. Indicate that material or product conforms to or exceeds specified requirements. Submit supporting reference date, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.

PART 3 EXECUTION

3.1 IDENTIFICATION OF SUBMITTALS

A. Consecutively number all submittals and label with the Specification Section number.

1. When material is resubmitted for any reason, transmit under a new letter of transmittal and with a new submittal number.

2. On resubmittals, cite the original submittal number for reference and clearly mark the document as "resubmitted."

B. Accompany each submittal with a letter of transmittal showing all information required for identification and checking.

C. On at least the first page of each submittal, and elsewhere as required for positive identification, show the submittal number in which the item was included.

D. Submittal Log:

1. Prior to first application for payment, provide an electronic spreadsheet log listing all submittals required. Electronic spreadsheet program shall be acceptable to Owner.

2. Maintain an accurate submittal log for the duration of the Work, showing the current status of all submittals at all times.

3. Make the submittal log available to the Architect for the Architect's review upon request.

3.2 GROUPING OF SUBMITTALS

A. Unless otherwise specified, make submittals in groups containing all associated items to ensure that information is available for checking each item when it is received.

1. Partial submittals may be rejected as not complying with the provisions of the Contract.

2. The Contractor may be held liable for delays caused by incomplete submittals.

3.3 TIMING OF SUBMITTALS

A. Make submittals far enough in advance of scheduled dates for fabrication and installation to provide time required for reviews, for securing necessary approvals, for possible revisions and resubmittals, and for placing orders and securing delivery.

B. In scheduling, allow at least ten working days for review by the Architect following the Architect's receipt of the submittal. For submittals that require review by the Architect and the Architect's consultants, allow an additional ten working days for each consultant.

END OF SECTION

BIDDER-DESIGNED SYSTEMS REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Procedures for portions of Work under this Contract that are Bidder-Designed.

B. Contractor's responsibility is to coordinate and assume or assign to subcontractors complete responsibility for design, preparation of Contract Documents, calculations, submittals, permits, code appeals, fabrication, transportation and installation.

1. Contractor to submit and coordinate Bidder-Designed system documents to Governing Jurisdiction for separate permit.

2. Contractor responsible to complete Bidder-Designed system Summary Sheet.

3. Bidder-Designed components of Work are defined as complete, operational systems, provided and installed for their intended use.

C. Design Professional is Project Architect or Engineer of Record.

1. Review of Bidder-Designed system Submittals by Architect or Engineer of Record shall be for design intent only and shall not lessen nor shift responsibility from Contractor or assigned subcontractor, to Owner nor Design Professional.

2. Owner is not responsible to pay for any delays, additional products, additional hours of work or overtime, restocking or rework required due to failure by Contractor or Subcontractor to coordinate their work with work of other trades on Project or to provide Bidder-Designed portion or component in a timely manner to meet Project Schedule.

D. Contractor shall be responsible for and pay cost of all required design, submittals, permits and fees and coordination for Work of this Section.

E. Related Sections:

1. Division 1 Section “Project Management and Coordination.”

2. Division 1 Section “Submittal Procedures.”

3. Division 1 Section “Closeout Procedures.”

1.2 BIDDER-DESIGNED COMPONENTS OF WORK

A. Bidder-Designed Components include, but not limited to:

1. Fire sprinkler and suppression systems

2. Plumbing systems

3. Electrical power and lighting systems

4. Fire and smoke alarm systems

1.3 DESCRIPTIONS

A. Refer to systems descriptions in Part 1, General and Part 2, Products in each technical specification Section listed for references to Bidder-Designed Work.

1.4 QUALITY ASSURANCE

A. Refer to Quality Assurance described in Part 1 - General in individual Sections with Bidder-Designed Work.

B. Quality assurance described in Specification Sections shall be minimum acceptable standards for this project. Should quality assurance not be defined within specific Specifications, printed industry standards for "normal" quality practices shall govern.

1.5 REFERENCES

A. Refer to References in Part 1 - General, in individual Sections with Bidder-Designed Work. Comply with the provisions of Division 1 Section “References.”

1.6 SUBMITTALS

A. Refer to Submittals in Part 1 - General, in individual Sections with Bidder-Designed Work.

1.7 Bidder-Designed system Submittals shall contain:

A. Complete criteria.

B. Design assumptions.

C. Details.

D. Calculations.

E. Stamped by Design-Build Engineer licensed in State of Oregon.

F. Instructions for fabrication, assembly, installation and interface with other trades.

1.8 SPECIFIC REQUIREMENTS AND DEFINITIONS

A. Submit list of proposed Bidder-Designed system Subcontractor(s) and/or Engineer(s) not more than fifteen days after signing Notice to Proceed.

B. Submit Bidder-Designed system Summary Sheet to governing authorities if required.

C. Bidder-Designed Elements indicated in Contract Documents are for design intent only.

D. Intent is that Bidder-Designer Entity is responsible to design, provide, coordinate and install Bidder-Designed Component.

1. Required Submittals to governing jurisdictions, permits, Code appeals, etc. are Contractor's responsibility.

E. Bidder-Designed Elements that attach to structural frame or are supplemental to structural frame shall be designed for anticipated loads outlined in the Contract Documents and required by the International Building Code as modified by the Oregon Structural Specialty Code.

F. Coordinate Bidder-Designed Elements with appropriate subcontractors.

G. Clearly identify load reactions at interface between Bidder-Designed Elements and structural frame for review by Structural Engineer of Record.

END OF SECTION

REFERENCES

PART 1 GENERAL

1.1 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."

D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

H. "Provide": Furnish and install, complete and ready for the intended use.

I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.2 INDUSTRY STANDARDS

A. Applicability of Standards: Except to the extent more explicit of more stringent requirements are written directly into the contract documents or are required by governing regulations, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents. Such standards are made a part of the Contract Documents by reference. In case of a conflict between the referenced standard and the project specifications, the project specifications shall govern.

B. Referenced Standards: Industry standards which are referenced in the contract documents have precedence over non-referenced standards which are, nevertheless, seen to be intended by their producers for application to work similar to that required for this project.

C. Non-Referenced Standards: Industry standards which are not specifically referenced in the contract documents for applicability to the work, including standards produced by those associations and agencies listed in this section (but not referenced elsewhere), are applicable as a

general measurement of whether the performed work complies with recognized standards of the construction industry.

D. Publication Dates: In each instance, comply with the standard or trade association publications which was in effect at the date of the contract documents, except where specifically indicated to comply with a publication of another date. References in the specifications have generally omitted the date indicator which frequently accompanies the identification number for the standards and publications indicated. Submit requests for approval of standards or publications of a different date. Substantial changes in the work which result from approval of standards or publications of a different date shall be processed as change orders in conjunction with such approval, at no change in price.

E. Copies of Standards: In connection with the requirements (specified elsewhere in the contract documents) that each entity performing the work be expert in the portion of work being performed, each such entity is hereby also required to be familiar with recognized industry standards applicable to that portion of work. In general, copies of applicable standards have not been bound with the contract documents. Where copies of standards are needed for proper performance of the work, the Contractor is required to obtain such copies directly from the publication source. Although certain copies needed for enforcement of the requirements may be specified as required submittals, the Owners Representative reserves the right to require the Contractor to submit copies of additional applicable standards as needed for enforcement of the requirements.

1.3 ABBREVIATIONS AND ACRONYMS

A. Abbreviations and Acronyms for Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the organizations responsible for the standards and regulations in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

ADA	Dept. of Justice ADA Regulations Dept. of Justice 2010 ADA Standards for Accessible Design Accessibility Guidelines for Buildings and Facilities Available from U. S. Access Board www.access-board.gov	(800) 872-2253
CFR	Code of Federal Regulations Available from Government Printing Office www.gpoaccess.gov/cfr/index.html	(866) 512-1800 (202) 512-1800
FED-STD	Federal Standard (See FS)	
FS	Federal Specification	(215) 697-6257
	Available from General Services Administration www.gsa.gov	(202) 619-8925
	Available from National Institute of Building Sciences	(202) 289-7800

	www.nibs.org	
FTMS	Federal Test Method Standard (See FS)	
UFAS	Uniform Federal Accessibility Standards Available from Access Board www.access-board.gov	(800) 872-2253 (202) 272-0080

1.4 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Thomson Gale's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S."

B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

AA	Aluminum Association, Inc. (The) www.aluminum.org	(703) 358-2960
AAMA	American Architectural Manufacturers Association www.aamanet.org	(847) 303-5664
ACI	ACI International (American Concrete Institute) www.aci-int.org	(248) 848-3700
AF&PA	American Forest & Paper Association www.afandpa.org	(800) 878-8878 (202) 463-2700
AGA	American Gas Association www.aga.org	(202) 824-7000
AGC	Associated General Contractors of America (The) www.agc.org	(703) 548-3118
AHA	American Hardboard Association (Now part of CPA)	
AIA	American Institute of Architects (The) www.aia.org	(800) 242-3837 (202) 626-7300

REFERENCES

AISC	American Institute of Steel Construction www.aisc.org	(800) 644-2400 (312) 670-2400
AISI	American Iron and Steel Institute www.steel.org	(202) 452-7100
AITC	American Institute of Timber Construction www.aitc-glulam.org	(303) 792-9559
ALSC	American Lumber Standard Committee, Incorporated www.alsc.org	(301) 972-1700
ANSI	American National Standards Institute www.ansi.org	(202) 293-8020
APA	APA - The Engineered Wood Association www.apawood.org	(253) 565-6600
ARMA	Asphalt Roofing Manufacturers Association www.asphaltroofing.org	(202) 207-0917
ASCE	American Society of Civil Engineers www.asce.org	(800) 548-2723 (703) 295-6300
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers www.ashrae.org	(800) 527-4723 (404) 636-8400
ASME	ASME International (The American Society of Mechanical Engineers International) www.asme.org	(800) 843-2763 (973) 882-1170
ASSE	American Society of Sanitary Engineering www.asse-plumbing.org	(440) 835-3040
ASTM	ASTM International (American Society for Testing and Materials International) www.astm.org	(610) 832-9585
AWCI	AWCI International (Association of the Wall and Ceiling Industry International) www.awci.org	(703) 534-8300
AWI	Architectural Woodwork Institute www.awinet.org	(800) 449-8811 (571) 323-3636
AWPA	American Wood-Preservers' Association www.awpa.com	(334) 874-9800

REFERENCES

AWS	American Welding Society www.aws.org	(800) 443-9353 (305) 443-9353
BHMA	Builders Hardware Manufacturers Association www.buildershardware.com	(212) 297-2122
BIA	Brick Industry Association (The) www.bia.org	(703) 620-0010
BICSI	BICSI www.bicsi.org	(800) 242-7405 (813) 979-1991
CCC	Carpet Cushion Council www.carpetcushion.org	(203) 637-1312
CDA	Copper Development Association www.copper.org	(800) 232-3282 (212) 251-7200
CISCA	Ceilings & Interior Systems Construction Association www.cisca.org	(630) 584-1919
CISPI	Cast Iron Soil Pipe Institute www.cispi.org	(423) 892-0137
CRI	Carpet & Rug Institute (The) www.carpet-rug.com	(800) 882-8846 (706) 278-3176
CRSI	Concrete Reinforcing Steel Institute www.crsi.org	(847) 517-1200
CSA	CSA International (Formerly: IAS - International Approval Services) www.csa-international.org	(866) 797-4272 (416) 747-4000
CSI	Construction Specifications Institute (The) www.csinet.org	(800) 689-2900 (703) 684-0300
CTI	Cooling Technology Institute (Formerly: Cooling Tower Institute) www.cti.org	(281) 583-4087
DHI	Door and Hardware Institute www.dhi.org	(703) 222-2010
FMG	FM Global (Formerly: FM - Factory Mutual System) www.fmglobal.com	(401) 275-3000
FMRC	Factory Mutual Research (Now FMG)	

GA	Gypsum Association www.gypsum.org	(202) 289-5440
GANA	Glass Association of North America www.glasswebsite.com	(785) 271-0208
GRI	(Now GSI)	
GS	Green Seal www.greenseal.org	(202) 872-6400
GSI	Geosynthetic Institute www.geosynthetic-institute.org	(610) 522-8440
HI	Hydraulic Institute www.pumps.org	(888) 786-7744 (973) 267-9700
HI	Hydronics Institute www.gamanet.org	(908) 464-8200
HMMA	Hollow Metal Manufacturers Association (Part of NAAMM)	
ICEA	Insulated Cable Engineers Association, Inc. www.icea.net	(770) 830-0369
ICRI	International Concrete Repair Institute, Inc. www.icri.org	(847) 827-0830
IEEE	Institute of Electrical and Electronics Engineers, Inc. (The) www.ieee.org	(212) 419-7900
IESNA	Illuminating Engineering Society of North America www.iesna.org	(212) 248-5000
IGCC	Insulating Glass Certification Council www.igcc.org	(315) 646-2234
IGMA	Insulating Glass Manufacturers Alliance www.igmaonline.org	(613) 233-1510
ISO	International Organization for Standardization www.iso.ch	41 22 749 01 11
	Available from ANSI www.ansi.org	(202) 293-8020
KCMA	Kitchen Cabinet Manufacturers Association www.kcma.org	(703) 264-1690

LMA	Laminating Materials Association (Now part of CPA)	
LPI	Lightning Protection Institute www.lightning.org	(800) 488-6864 (804) 314-8955
MFMA	Maple Flooring Manufacturers Association, Inc. www.maplefloor.org	(847) 480-9138
MFMA	Metal Framing Manufacturers Association www.metalframingmfg.org	(312) 644-6610
MH	Material Handling (Now MHIA)	
MHIA	Material Handling Industry of America www.mhia.org	(800) 345-1815 (704) 676-1190
MIA	Marble Institute of America www.marble-institute.com	(440) 250-9222
MPI	Master Painters Institute www.paintinfo.com	(888) 674-8937
MSS	Manufacturers Standardization Society of The Valve and Fittings Industry Inc. www.mss-hq.com	(703) 281-6613
NAAMM	National Association of Architectural Metal Manufacturers www.naamm.org	(312) 332-0405
NACE	NACE International (National Association of Corrosion Engineers International) www.nace.org	(800) 797-6623 (281) 228-6200
NAIMA	North American Insulation Manufacturers Association www.naima.org	(703) 684-0084
NBGQA	National Building Granite Quarries Association, Inc. www.nbgqa.com	(800) 557-2848
NCMA	National Concrete Masonry Association www.ncma.org	(703) 713-1900
NCPI	National Clay Pipe Institute www.ncpi.org	(262) 248-9094
NCTA	National Cable & Telecommunications Association www.ncta.com	(202) 775-3550

REFERENCES

NECA	National Electrical Contractors Association www.necanet.org	(301) 657-3110
NeLMA	Northeastern Lumber Manufacturers' Association www.nelma.org	(207) 829-6901
NEMA	National Electrical Manufacturers Association www.nema.org	(703) 841-3200
NETA	InterNational Electrical Testing Association www.netaworld.org	(888) 300-6382 (303) 697-8441
NFPA	NFPA (National Fire Protection Association) www.nfpa.org	(800) 344-3555 (617) 770-3000
NFRC	National Fenestration Rating Council www.nfrc.org	(301) 589-1776
NGA	National Glass Association www.glass.org	(866) 342-5642 (703) 442-4890
NHLA	National Hardwood Lumber Association www.natlhardwood.org	(800) 933-0318 (901) 377-1818
NLGA	National Lumber Grades Authority www.nlga.org	(604) 524-2393
NOFMA	NOFMA: The Wood Flooring Manufacturers Association (Formerly: National Oak Flooring Manufacturers Association) www.nofma.org	(901) 526-5016
NRCA	National Roofing Contractors Association www.nrca.net	(800) 323-9545 (847) 299-9070
NRMCA	National Ready Mixed Concrete Association www.nrmca.org	(888) 846-7622 (301) 587-1400
NSF	NSF International (National Sanitation Foundation International) www.nsf.org	(800) 673-6275 (734) 769-8010
NSSGA	National Stone, Sand & Gravel Association www.nssga.org	(800) 342-1415 (703) 525-8788
NWCB	NW Wall and Ceiling Bureau www.nwcb.org	(206) 524-4243

REFERENCES

NWWDA	National Wood Window and Door Association (Now WDMA)	
PDCA	Painting & Decorating Contractors of America www.pdca.com	(800) 332-7322 (314) 514-7322
PDI	Plumbing & Drainage Institute www.pdionline.org	(800) 589-8956 (978) 557-0720
PGI	PVC Geomembrane Institute http://pgi-tp.ce.uiuc.edu	(217) 333-3929
RCSC	Research Council on Structural Connections www.boltcouncil.org	(800) 644-2400 (312) 670-2400
RFCI	Resilient Floor Covering Institute www.rfci.com	(301) 340-8580
RIS	Redwood Inspection Service www.calredwood.org	(888) 225-7339 (415) 382-0662
SDI	Steel Door Institute www.steeldoor.org	(440) 899-0010
SGCC	Safety Glazing Certification Council www.sgcc.org	(315) 646-2234
SIA	Security Industry Association www.siaonline.org	(703) 683-2075
SIGMA	Sealed Insulating Glass Manufacturers Association (Now IGMA)	
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association www.smacna.org	(703) 803-2980
SPIB	Southern Pine Inspection Bureau (The) www.spib.org	(850) 434-2611
SSINA	Specialty Steel Industry of North America www.ssina.com	(800) 982-0355 (202) 342-8630
SSPC	SSPC: The Society for Protective Coatings www.sspc.org	(877) 281-7772 (412) 281-2331
SWRI	Sealant, Waterproofing, & Restoration Institute www.swrionline.org	(816) 472-7974
TCA	Tile Council of America, Inc.	(864) 646-8453

	www.tileusa.com	
TIA/EIA	Telecommunications Industry Association/Electronic Industries Alliance www.tiaonline.org	(703) 907-7700
TMS	The Masonry Society www.masonrysociety.org	(303) 939-9700
TPI	Truss Plate Institute, Inc. www.tpinst.org	(703) 683-1010
UL	Underwriters Laboratories Inc. www.ul.com	(877) 854-3577 (847) 272-8800
UNI	Uni-Bell PVC Pipe Association www.uni-bell.org	(972) 243-3902
USGBC	U.S. Green Building Council www.usgbc.org	(202) 828-7422
WCLIB	West Coast Lumber Inspection Bureau www.wclib.org	(800) 283-1486 (503) 639-0651
WDMA	Window & Door Manufacturers Association (Formerly: NWWDA - National Wood Window and Door Association) www.wdma.com	(800) 223-2301 (847) 299-5200
WMMPA	Wood Moulding & Millwork Producers Association www.wmmpa.com	(800) 550-7889 (530) 661-9591
WSRCA	Western States Roofing Contractors Association www.wsrca.com	(800) 725-0333 (650) 570-5441
WWPA	Western Wood Products Association www.wwpa.org	(503) 224-3930

C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

BOCA	BOCA International, Inc. (See ICC)	
IAPMO	International Association of Plumbing and Mechanical Officials www.iapmo.org	(909) 472-4100
ICBO	International Conference of Building Officials (See ICC)	

ICBO ES	ICBO Evaluation Service, Inc. (See ICC-ES)	
ICC	International Code Council www.iccsafe.org	(888) 422-7233 (703) 931-4533
ICC-ES	ICC Evaluation Service, Inc. www.icc-es.org	(800) 423-6587 (562) 699-0543

D. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

CPSC	Consumer Product Safety Commission www.cpsc.gov	(800) 638-2772 (301) 504-7923
DOE	Department of Energy www.energy.gov	(202) 586-9220
EPA	Environmental Protection Agency www.epa.gov	(202) 272-0167
NIST	National Institute of Standards and Technology www.nist.gov	(301) 975-6478
OSHA	Occupational Safety & Health Administration www.osha.gov	(800) 321-6742 (202) 693-1999
PBS	Public Building Service (See GSA)	
PHS	Office of Public Health and Science www.osophs.dhhs.gov/ophs	(202) 690-7694
SD	State Department www.state.gov	(202) 647-4000

END OF SECTION

QUALITY CONTROL

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Building code inspections.
2. Building code special inspections.
3. Extra tests and inspections.
4. Concrete floor alkalinity and moisture testing.
5. Field samples.

1.2 DEFINITIONS

A. Approved Agency:

1. Independent: Objective, compentent and independent from the Contractor responsible for the work being inspected, including disclosure of possible conflicts of interest so that objectivity can be confirmed.
2. Special Inspector Qualifications: Meet the requirements of the current Oregon Structural Specialty Code, section 1704.

1.3 REQUIREMENTS

A. Specific special inspection requirements are found in the specification Sections.

B. Approved Agency Qualifications:

1. Meet “Recommended Requirements for Approved Agency Qualification,” published by American Council of Independent Laboratories.
2. Acceptable to Owner, Architect, Structural Engineer, and local building authorities.

1.4 ENGINEERING, TESTING, AND INSPECTIONS REQUIRED BY BUILDING CODE

A. Work by Owner for Special Inspections:

1. Owner shall employ an Approved Agency to conduct Special Inspections that are required by the governing building code jurisdiction.
2. Owner shall pay for all inspection and testing services that indicate that construction is in conformance with Contract Documents.

B. Work by Contractor for Inspections and for Special Inspections:

1. Notify Architect and Approved Agency 24 hours prior to need for testing, inspection, and sampling. Approved Agency services shall be scheduled during normal business hours.

2. Cooperate with field testing personnel, provide access to work.

3. Facilitate testing and continuous inspection.

4. Notify building officials when Building Code required tests and inspections are ready for testing and inspecting.

5. Pay for tests and inspections where Work does not meet Contract Document requirements, including subsequent tests and inspections until such Work meets Contract Document requirements.

6. Pay for overtime charges when Approved Agency services are performed outside of normal business hours.

C. Work by Approved Agency:

1. Specified and Building Code Required Tests and Inspections:

a. Perform tests and inspections as required by Contract Documents and local Building Code. Special Inspections include, but are not limited to:

(1) Refer to Structural Notes on the Drawings.

b. Test and inspect materials, mixes, and systems to determine compliance with requirements of Contract Documents.

c. Provide sampling equipment and personnel, deliver samples to the testing laboratory and record field measurements as required by Contract Documents.

d. Comply with requirements of IBC, Special Inspections.

e. Provide tests and inspections required by Local Building Officials.

f. Owner will pay for tests and inspections where Work conforms to the Contract Document requirements.

2. Extra Tests and Inspections:

a. When directed by the Architect or otherwise required, provide extra tests and inspections to verify material compliance with requirements of Contract Documents.

b. Owner will pay for extra tests and inspections where Work conforms to the Contract Document requirements.

c. Contractor will pay for extra tests and inspections where Work fails to comply with Contract Document requirements.

3. Limits of Approved Agency Duties: Approved Agency is not authorized to modify Contract Documents, approve or accept Work, nor perform duties of Contractor.

4. Test and Inspection Reports:

a. Indicate on Each Test and Inspection Report:

(1) Project name and date of report.

(2) Approved Agency name, address, telephone number, and name of laboratory inspector.

(3) Date and time of sampling, testing, and inspecting.

(4) Ambient temperature and weather conditions at the site and curing conditions of samples.

(5) Product identification and referenced Specification Section.

(6) Location of sample, test, or inspection in the Project.

(7) Type of inspection or test.

(8) Results of sample, test, or inspection and evaluation of compliance with requirements in Contract Documents.

b. Distribution of Reports: Distribute one copy of each test and inspection report to the Architect, Owner, local building official, and provide two copies to the Contractor.

1.5 NON-CODE REQUIRED TESTING

A. Work by Owner for non-code testing.

1. Owner shall employ an Approved Agency to conduct concrete floor moisture testing.

2. Owner shall pay for all testing services that indicate that construction is in conformance with Contract Documents.

B. Work by Contractor for non-code testing.

1. Notify Architect and Approved Agency 24 hours prior to need for testing. Approved Agency services shall be scheduled during normal business hours.

2. Cooperate with field testing personnel, provide access to work.

3. Provide environmental conditions for concrete floor moisture testing as required by the flooring manufacturer's test procedure.

4. Pay for tests where Work does not meet Contract Document requirements, including subsequent tests until such Work meets Contract Document requirements.

5. Pay for overtime charges when Approved Agency services are performed outside of normal business hours.

C. Work by Approved Agency:

1. Perform concrete floor moisture testing in accordance with flooring manufacturer's requirements.

2. Provide testing equipment and personnel to record field measurements.

3. Extra Tests and Inspections:

a. When directed by the Architect or otherwise required, provide extra tests to verify material compliance with flooring manufacturer's warranty requirements.

b. Owner will pay for extra tests and inspections where Work conforms to the flooring manufacturer's warranty requirements.

c. Contractor will pay for extra tests and inspections where Work fails to comply with flooring manufacturer's warranty requirements.

4. Test Reports:

a. Indicate on each test report:

(1) Project name and date of report.

(2) Approved Agency name, address, telephone number, and name of laboratory inspector.

(3) Date and time of testing.

(4) Location of moisture test.

(5) Results of test and evaluation of compliance with requirements in Contract Documents.

b. Distribution of Reports: Distribute one copy of each test report to the Architect, Owner and provide two copies to the Contractor.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 REPAIR AND PROTECTION

A. General: Upon completion of inspection, testing, sample taking and similar services, repair damaged construction.

B. Repair and protection is Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing, or similar services.

3.2 EVALUATION OF TESTS AND INSPECTIONS

A. Satisfactory completion of work will be judged on results of laboratory and site tests and inspections.

B. If results of tests and inspections indicate work is below requirements of Contract Documents, that portion of work is subject to condemnation.

C. Contractor to remove and replace work so condemned at Contractor's expense until such work meets requirements of Contract Documents.

END OF SECTION

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SUMMARY

A. Provide temporary job site facilities and services as required for use on, but not limited to, items listed in this Section.

B. Supervise and coordinate temporary facilities normally furnished and maintained as part of subcontractor's work.

1.2 REFERENCES

A. National Fire Protection Association (NFPA).

B. Occupational Safety and Health Act (OSHA).

1.3 SITE ACCESS

A. Owner shall furnish key cards to Contractor to access building, coordinate with Owner to obtain.

1.4 CONTRACTOR'S CONSTRUCTION OFFICE

A. Contractor to furnish portable or mobile office facilities as required for completion of work.

1.5 SANITARY FACILITIES

A. Contractor may utilize toilets and lavatories at south end of building, provided they are kept clean and tidy.

1.6 TEMPORARY FACILITIES

A. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

1.7 UTILITIES

A. General: All shut-off locations are to be documented for emergency purposes prior to pre-construction meeting.

B. Lighting:

1. Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

2. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

C. Telephone Service:

1. Provide phone service in the Construction Office including fax and electronic communication service through internet access.

2. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.

D. Water Service: Use of Owner's existing water service facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

E. Electric Power Service: Use of Owner's existing electric power service will be permitted, as long as equipment is maintained in a condition acceptable to Owner.

F. Heat and Ventilation:

1. Ensure that existing system provides adequate heat and ventilation for work. If not, alert Owner and Architect.

2. Avoid disruption to heat and ventilation in non-work spaces, including gaps in service and odors, dust or other impacts to Owner’s working environment. Schedule any disruptions to Owner 3 days prior to disruption.

3. Provide temporary heating and/or ventilation facilities if warranted by work.

1.8 ENCLOSURES

A. Provide temporary doors on doorways and other openings to secure the premises from unauthorized entry. Coordinate with Owner access requirements. Install temporary enclosures where required to maintain adequate conditions for the installation of Work.

B. Cover and protect all glazing subject to impact from breakage and replace any broken glass with new during the contract time.

C. Security Enclosure and Lockup: Install substantial temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.

D. Ensure continued egress through and around areas of work by Owner’s staff.

1.9 FINISHES PROTECTION

A. Provide protection for finish surfaces as required to preserve them in "new" condition until Substantial Completion.

B. Restore permanent facilities used during construction to their specified and/or original condition.

1.10 CONSTRUCTION SAFETY

A. Ensure that all scaffolding, staging, temporary floors, runways, and similar devices furnished for the installation of any Work be built and maintained to safely support required loads.

B. Ensure that all cranes, hoists, and other lifting equipment necessary for the erection of materials have operators trained and experienced in the equipment being used, and are properly equipped with guys, bracing, and safety devices as required by applicable codes.

C. Comply with all applicable local safety codes and specifically the Occupational Safety and Health Act (OSHA) for the construction industry.

D. Unless written approval is obtained from governing jurisdiction, construction must not obstruct private or public streets, driveways, pedestrian walkways, ADA routes, fire lanes, egress of occupied buildings, etc.

1.11 FIRE PREVENTION AND PROTECTION

A. Perform all Work in a fire-safe manner and supply and maintain adequate first-aid and fire-fighting equipment capable of extinguishing incipient fires. Comply with applicable local and state fire prevention regulations and, where the regulations do not cover, with applicable parts of the National Fire Prevention Standards for "Safeguarding Building Construction Operations," (NFPA 241).

END OF SECTION

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes delivering, handling, storing, and protecting products. Product selection and manufacturer's instructions. Product options and substitutions and sample substitution request form.

1.2 DELIVERY, STORAGE, AND HANDLING

A. Acceptance at Site:

1. Arrange deliveries of products in accordance with construction schedules, and deliver products in undamaged condition, in manufacturer's original packaging, with identifying labels.

2. Immediately after delivery, inspect shipments to ensure compliance with requirements of Contract Documents and ensure products are protected and undamaged.

B. Storage and Protection:

1. Materials shall be so stored as to ensure the preservation of their quality and fitness for the work. Maintain temperature and humidity within the ranges required by manufacturer's instructions. When considered necessary, they shall be placed on wooden platforms or other hard, clean surfaces, and not on the ground. Cover products which are subject to deterioration with vapor retarding coverings and provide adequate ventilation. Stored materials shall be located so as to facilitate prompt inspection. Private property shall not be used for storage purposes without the written permission of the Owner.

2. Protecting Products After Installation: Provide substantial temporary coverings as necessary to protect installed products from damage resulting from traffic and construction operations. Remove temporary coverings when no longer needed.

C. Handling:

1. Provide equipment and personnel to handle products and materials by methods which will prevent damage to products and materials.

2. Design, fabricate, assemble, and erect products, systems, and equipment in accordance with the best engineering and shop practices.

PART 2 PRODUCTS

2.1 PRODUCT SELECTION

A. Comply with specified industry standards. If no standards are specified, comply with the product's industry standards as a minimum requirement. Provide materials in size, type, and quality indicated and specified, unless variations are accepted by Architect in writing.

B. Specifying a manufacturer and manufactured product shall not constitute a waiver of any requirements of the Contract Documents, and products furnished by the listed manufacturer shall conform to such requirements.

C. No materials or products containing asbestos are to be used in the construction of this Project. If any material or product specified in this Project Manual is known to contain asbestos, it shall be brought to the attention of the Architect before ordering or fabricating the material or product.

2.2 PRODUCT OPTIONS

A. For products specified only by reference standard, select any product meeting that standard.

B. For products specified by naming one or more products or manufacturers, Contractor must submit a request for substitution for any product or manufacturer not specifically named.

2.3 PRODUCT SUBSTITUTION PROCEDURES

A. Submit substitution requests on the CSI Substitution Request form bound in this Project Manual. If the Substitution Request form is reproduced, the terms and conditions of the Substitution Request bound in this Project Manual shall apply to the request.

B. Each substitution request shall include a complete description of the proposed substitute, the name of the material, service, or equipment for which it is to be substituted, drawings, cuts, performance and test data, samples illustrating color, texture and pattern, and any other data or information required to make a valid comparison. Product catalogs containing multiple products shall be marked to indicate which products and product options are being submitted for substitution. Substitution requests submitted with unmarked catalogs will not be reviewed. To have the results of a substitution request mailed to the author, include two copies of the substitution request form and a stamped, self-addressed envelope.

C. Consideration of Substitution Requests Prior to Bid Date: Submit Substitution Requests in accordance with Bidding Requirement Document "Instructions to Bidders." If, in the Architect's opinion, the proposed product is acceptable in lieu of the one or more specified, the Architect will include it in a written addendum which will be issued to bidders. Acceptance of a Substitution Request does not relieve the requestor from meeting the requirements, procedures, and warranties as set forth in this specification. Only those manufacturers, materials, services, and equipment approved in these Specifications or by Addendum will be acceptable for use on this construction project.

D. Consideration of Substitution Requests After Contract Award:

1. Requests for substitution of specified products after the construction Contract is signed, will be considered only in accordance with paragraphs 2.4.A. and 2.4.B., above. If, in the Architect's opinion, the proposed product is acceptable in lieu of the one or more specified, the Architect will issue a Supplemental Instruction, when Contract Sum or Contract Time is not affected, or a Construction Change Directive or Change Order, when Contract Sum or Contract Time is affected.

2. Substitution requests occasioned by the Contractor's failure to order specified material in a timely manner shall not be considered and delays in construction caused by such an event shall not be waived.

3. One or more of the following five conditions must also be documented:

   a. The substitution must be required for compliance with final interpretation of code requirements or insurance regulations.

   b. The substitution must be due to the unavailability of the specified products, through no fault of the Contractor.

   c. The substitution may be requested when subsequent information discloses the inability of the specified products to perform properly or to fit in the designated space.

   d. The substitution may be due to the manufacturer's or fabricator's refusal to certify or guarantee performance of the specified product as required.

   e. The substitution may be requested when it is clearly seen, in the judgment of the Architect, that a substitution, would be substantially to the Owner's best interests in terms of cost or time.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine areas and conditions under which material, equipment, and systems are to be fabricated, assembled, erected, installed, and applied. Correct existing conditions detrimental to proper and timely completion of work. Do not proceed until unsatisfactory conditions have been corrected. Start of work will be interpreted as acceptance of existing surfaces and conditions within any particular work area.

3.2 INSTALLATION

A. Manufacturer's Instructions:

1. Perform work in accordance with manufacturer's printed fabrication, installation, and application instructions.

2. Obtain and distribute copies of manufacturer's printed fabrication, installation, and application instructions to parties involved in the construction, including two copies to Architect, and one copy at the site.

3. Handle, store, fabricate, erect, install, connect, apply, clean, condition, and adjust products, materials, systems, and equipment in accordance with manufacturer's printed instructions and in conformity with specified requirements.

4. Review and resolve conflicts between manufacturer's instructions and Contract Documents with Architect prior to fabrication, installation, and application of products, systems, and equipment.

B. Installation Procedure:

1. Require installer of each major unit of Work to inspect substrate to receive Work and conditions under which Work is to be performed. Installer shall report unsatisfactory conditions promptly in writing to Contractor. Remedy condition to installer's satisfaction immediately.

2. Inspect each item of material or equipment prior to installation. Reject damaged or defective items.

3. Provide attachment and connection devices and methods for securing Work. Secure Work true to line and level, and within recognized industry tolerances. Allow for expansion and building movement. Provide uniform joint width in exposed Work and arrange to provide best visual effect. Refer questionable visual effect choices to Architect.

4. Recheck measurements and dimensions of Work as integral step of starting each installation.

5. Schedule installation of each unit of Work to result in best overall compatibility to coordination of entire project. Isolate each unit of Work from incompatible work as necessary to prevent deterioration or damage. Coordinate enclosure of Work with required inspections and tests to minimize uncovering of Work for that purpose.

6. Where mounting heights are not indicated, use industry recognized standard heights for that unit of Work. Refer questionable issues to Architect for final direction.

END OF SECTION

SUBSTITUTION REQUEST

The Construction Specifications Institute
Northwest Region

TO: _____

PROJECT: _____

SPECIFIED ITEM:

Section No.	Page	Paragraph	Description
_____	_____	_____	_____

PROPOSED SUBSTITUTION: _____

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

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

Undersigned certifies that the 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 are available locally or are readily obtainable for proposed substitution.

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

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

Submitted by

_____
Name (Print)

_____
Signature

_____
Firm Name

_____
Address

_____
City, State, Zip

_____
Date

_____
Telephone Fax

_____
General Contractor (if after award of Contract)

For use by A/E:

____ Approved ____ Approved as Noted

____ Not Approved ____ Received Too Late

_____
By

_____
Date

_____
Remarks

Attachments

1999 Edition

EXECUTION

PART 1 – GENERAL

1.1 SUMMARY

A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:

1. General installation of products.

2. Progress cleaning.

3. Starting and adjusting.

4. Protection of installed construction.

5. Correction of the Work.

B. Related Sections include the following:

1. Division 1 Section "Project Management and Coordination" for procedures for coordinating construction activities.

2. Division 1 Section "Cutting and Patching" for procedural requirements for cutting and patching necessary for the installation or performance of other components of the Work.

3. Division 1 Section "Closeout Procedures" for final cleaning.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.

B. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

2. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.

3. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.

EXECUTION

4. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

C. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

3.3 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.

2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.

3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.

4. Maintain minimum headroom clearance of 8-feet in spaces without a suspended ceiling.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

G. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.

2. Allow for building movement, including thermal expansion and contraction.

3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.4 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.

2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F.

3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.

2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.5 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 1 Section "Quality Requirements."

3.6 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

1. Protect installed work from damage by construction operations.

2. Provide special protection where specified in individual specification sections.

3. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

4. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

5. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

6. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

7. Remove protective coverings when no longer needed; reuse or recycle plastic coverings if possible.

B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.7 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 1 Section "Cutting and Patching."

1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

B. Restore permanent facilities used during construction to their specified condition.

C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION

CUTTING AND PATCHING

PART 1 GENERAL

1.1 SUMMARY

A. Provide all labor and materials necessary to execute cutting and patching of defective Work and areas of remodel where new construction joins existing finishes.

B. Match each patch material with kind, grade, size and quality identical to patched material.

1.2 CUTTING AND PATCHING DEFECTIVE WORK AND EXISTING FINISHES

A. Execute cutting, fitting, and patching of work required to remove and replace defective Work and 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.

C. 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 will comply with specified tolerances and finishes.

D. Cut lines that will be visible in completed work shall be straight and square to adjacent surfaces. Verify with Architect prior to cutting.

E. Repair surfaces adjacent to cut areas to match the adjacent finish.

F. Refinish exposed surfaces to natural breaks in the existing finished surfaces.

1.3 CUTTING AND PATCHING FOR SYSTEMS AND EQUIPMENT

A. Cut, fit, and patch building members to install equipment, systems, and sleeves.

B. Fill openings cut oversized to install equipment, systems, and sleeves until finished surface is tight against the penetrating material installed in the opening.

C. Do not penetrate spray-on fireproofing on steel members.

END OF SECTION

CLOSEOUT PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes special procedures and Work described as part of project closeout, and a description of closeout submittals such as record drawings, operation manuals, and warranties.

B. Electronic Submittals: All submittal documentation and procedures detailed in this specification section shall be submitted in an electornic format.

C. Items to be Completed or Corrected: Contractor inspects the Work and prepares a list of deficiencies for submittal to the Architect.

1.2 SYSTEM DESCRIPTION

A. When the Contractor considers the Work substantially complete, he shall submit to the Architect a written notice that the Work (or designated portion thereof) is substantially complete, together with a list of minor work to be completed or corrected. Within a reasonable time after receipt of this notice, the Architect will make an inspection to determine the actual status of completion.

B. Should the Architect determine that the work is in fact not substantially complete, he will promptly notify the Contractor in writing, giving the reasons. The Contractor shall remedy the deficiencies in the Work, and send a second written notice of Substantial Completion to the Architect.

D. When the Architect concurs that the Work is substantially complete, he will:

1. Notify the Owner of, and accompany the Owner on, an inspection of the Project.

2. Prepare a Certificate of Substantial Completion on AIA Form G704, accompanied by Contractor's list of items to be completed or corrected, as verified and amended by the Architect and the Owner.

3. Submit the Certificate to the Contractor and the Owner for their written acceptance of the responsibilities assigned to them in the Certificate.

E. The Contractor will be allowed no longer than 30 calendar days from the date of Substantial Completion to request that the Architect make his final inspection for acceptance as final completion.

F. When the Contractor considers the Work complete, he shall submit a letter to the Architect stating that the Contract Documents have been reviewed, and that the Work has been inspected for compliance with Contract Documents.

1. Submission implies that the Contractor has, to the best of his knowledge, completed the Work in accordance with the Contract Documents, including "punch list" items, that equipment and systems have been tested in the presence of the Owner and are operational, and that the Work is completed and ready for final inspection and for certificate of occupancy by the local code enforcement agency.

2. The Architect will make an inspection to verify the status of completion with reasonable promptness after receipt of the Contractor's letter.

G. If the Architect considers the Work incomplete or defective, he will promptly notify the Contractor in writing, listing the incomplete or defective Work, and send a copy to the Owner. The Contractor shall then take immediate steps to remedy the stated deficiencies, and send second written notice indicating that the Work is complete, whereupon the Work will be reinspected. When the Project is determined to be acceptable under the Contract Documents, the Contractor may proceed with closeout submittals.

1.3 SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit copies of Record Drawings as follows:

a. Initial Submittal: Submit one set of marked-up Record Prints. Architect will initial and date each print and mark whether general scope of changes, additional information recorded, and quality of drafting are acceptable. Architect will return prints for organizing into sets, printing, binding, and final submittal.

b. Final Submittal: Submit one set of marked-up Record Prints, and one digital copy in PDF format.

B. Record Specifications: Submit one hard copy of Project's Specifications, including addenda and contract modifications, and one digital copy in PDF format

C. Record Product Data: Submit one copy of each Product Data submittal, including but not limited to paint colors, brands and types; manufacturer's names, styles and colors of all finish products.

1. Final Submittal: Submit one set of marked-up Record Product Data, and one digital copy in PDF format.

2. Where Record Product Data is required as part of operation and maintenance manuals, submit marked-up Product Data as an insert in manual instead of submittal as Record Product Data.

D. Evidence of compliance with requirements of governing authorities including the certificate of occupancy, and certain other certificates of inspection and use permits as required mechanical and electrical equipment.

E. Schedules and Reports: Finalized copies of schedules and reports submitted under Division 1 Section "Submittal Procedures."

F. Commissioning: Submit approved pre-functional checklists and functional performance testing reports from the commissioning documentation.

G. Operations and Maintenance Manuals:

1. Submit one copy of operations and maintenance manuals to the Commissioning

Authority for review concurrent with review by Architect and Owner.

2. Operation instructions and maintenance data, including maintenance personnel instructions, service manuals, and specifications, to be bound in black 3-ring binders, indexed with dividers, for a legible, permanent reference. Submit three copies of instruction books which shall include the following information:

   a. Binder covers with title "Operations and Maintenance Manuals," the title of the Project, and subject matter of the binder when multiple binders are used.

   b. Name, address, and phone number of the firm/person who installed the equipment or system.

   c. Name, address, and phone number of the nearest service facility authorized by the manufacturer.

   d. Complete technical information, such as electrical and mechanical schematics, diagrams, parts lists, data sheets, connection details, and similar data.

   e. Operating instructions such as start up procedures, inspection and maintenance routines.

   f. If standard product literature covers more than one model type, the correct model number and data for the item installed shall be neatly checked off in ink.

   g. If the system or equipment is unique, custom written information shall be provided.

   h. The Commissioning Authority is responsible to compile, organize and index all commissioning data into labeled and indexed three-ring binders for delivery to the Owner. The manual summarizes all of the tasks, findings, and documentation of the commissioning process. The report addresses the actual performance of the building systems in reference to the design intent and contract documents.

H. All warranties and bonds.

I. Keys and keying schedule.

J. Spare parts and extra stock.

K. Evidence of payment, release of liens and final wage certificates.

L. Certificate of insurance for products and completed operations.

M. Final payment and release of retainage will be withheld until all closeout submittals have been received and approved by the Owner.

1.4 COORDINATION

A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

B. Commissioning Authority Review:

1. Prior to substantial completion, the Commissioning Authority (CA) reviews the O&M mauals for systems that were commissioned. The manuals are reviewed for completeness and for adherence to the requirements of the specifications. The CA will communicate deficiencies in the manuals to the Owner.

2. Materials may be added, or requested from the Contractors and design/build contractors, to stress and enhance the importance of system interactions, troubleshooting, and long-term preventative maintenance and operation. This work does not supercede the Architect and Owner's review of the O&M manuals.

3. The commissioning requirements of Division 1 Section “General Commissioning Requirements” must be complete prior to final acceptance, unless approved in writing by the Owner. Exceptions to this are any required seasonal or approved deferred testing.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 INSTRUCTION

A. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

B. Schedule as many training sessions as necessary with the maintenance personnel prior to any occupancy of the building. Cover topics such as system start-up, operation, and maintenance procedures. Training sessions shall be conducted by the appropriate subcontractors, with assistance from the Contractor.

3.2 CLEANING

A. Remove clearing and demolition debris, excess construction materials, and construction equipment.

B. Floors and Pavements:

1. Interior floors and pavements shall be vacuum cleaned or swept with a hair push broom.

2. All exterior floors, pavements, and decks shall be swept clean with a heavy fiber push broom or power sweeper.

C. Finished building surfaces and appurtenances shall be clean, free from labels, stains, and soil of all kinds wherever located.

D. Hardware shall have paint and dirt marks removed. It shall be polished and in perfect operation and adjustment.

E. Glass and plastics shall be clean and polished, with all labels removed. Fixtures and equipment shall be clean and in perfect operation and adjustment.

END OF SECTION

DEMOLITION

PART 1 GENERAL

1.1 SUMMARY

A. Furnish labor, material and equipment required for the partial demolition and removal of pavement, interior walls, ceilings, and other material as required preparatory to remodeling.

B. Scope of demolition and removal work is shown on the Drawings.

1.2 PROJECT CONDITIONS

A. Existing Conditions: Verify existing conditions at the site and include all work evident by site inspection whether or not shown on the Drawings. Include demolition that is implied or consequential to other trades to achieve the intended results.

C. Notify the Architect in advance of cutting or alteration which may affect the structural safety of any portion of the project.

D. All material and debris resulting from demolition Work, unless specifically designated for reuse or to be turned over to the Owner, shall become property of the Contractor and be removed from the site at Contractor's expense.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 EXAMINATION

A. Inspect the work to determine condition of existing building and amount of existing materials and debris to be removed. Remove debris from the site as demolition progresses and do not allow to accumulate on the premises.

3.2 PREPARATION AND COORDINATION

A. Utilities: Coordinate demolition work with affected electrical and mechanical crafts. Completely remove all existing utility services which are not a part of new work or designated to remain. Save and protect existing utilities shown to remain. Notify Architect at once if unknown utilities are found in the work.

B. Laws and Ordinances: Comply with the applicable laws and ordinances governing the disposal of debris on or off the site, and commit no trespass on any public or private property in any operation due to or connected with demolition.

3.3 DEMOLITION PROTECTION

A. Existing Facilities: Protect adjacent walkways, building entries, and other building facilities during demolition operations.

B. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during demolition and cleaned and reinstalled in their original locations after demolition operations are complete.

C. Salvaged Items for Reuse in the Work:

1. Clean salvaged items.

2. Pack or crate items after cleaning. Identify contents of containers.

3. Store items in a secure area until installation.

4. Protect items from damage during transport and storage.

5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.

6. The following items shall be salvaged for reuse:

a. Lighting.

b. Electrical and low voltage devices.

c. Fire extinguisher cabinets and portable fire extinguishers.

d. Other items as indicated on drawings.

D. Existing Utilities: Maintain utility services indicated to remain and protect them against damage during demolition operations.

1. Do not interrupt existing utilities serving adjacent occupied or operating facilities unless authorized in writing by Owner.

2. Provide temporary services during interruptions to existing utilities, as acceptable to Owner.

E. Temporary Protection: Erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise from portions of the building that are outside the scope of this Project.

3.4 DEMOLITION, GENERAL

A. General: Demolish indicated portions of existing building as detailed. Include demolition that is implied or consequential to other trades to achieve the intended results. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Do not use cutting torches until work area is cleared of flammable materials. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.

2. Maintain adequate ventilation when using cutting torches.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

1. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn demolished materials.

3.6 HAZARDOUS MATERIAL ABATEMENT

A. If during the course of the demolition work, the Contractor observes or suspects the existence of hazardous material in the building, the Contractor shall immediately stop work in that area and promptly notify the Owner. Coordinate with the Owner the removal of hazardous material by other contractors so as not to delay the Work.

END OF SECTION

ROUGH CARPENTRY

PART 1 GENERAL

1.1 SUMMARY

A. Furnish all labor, materials, equipment, and services necessary for the installation of all rough carpentry.

B. The General Structural Notes shall be used in conjunction with these specifications. The General Structural Notes shall supersede items in this specification when discrepancies exist.

1.2 REFERENCES

A. American Institute of Timber Construction (AITC).

B. American Lumber Standards Committee (ALSC).

C. American National Standards Institute (ANSI).

D. American Society for Testing and Materials (ASTM).

E. American Wood Preservers' Association (AWPA).

F. APA - The Engineered Wood Association.

G. International Code Council (ICC).

H. Voluntary Product Standard (PS).

I. West Coast Lumber Inspection Bureau (WCLIB).

J. American Forest and Paper Association (AF&PA).

K. Western Wood Products Association (WWPA).

1.3 SUBMITTALS

A. Submit the following in accordance with Division 1 Section "Submittal Procedures."

B. Composite wood manufacturer certification of compliance with requirement for no added urea-formaldehyde resins in composite wood products.

C. Certificate of Conformance with Attachments 1 and 2 indicating compliance with AITC or APA requirements.

D. Certification of conformance to treated lumber requirements.

1.4 QUALITY ASSURANCE

A. Materials shall be grade stamped equal to or better than the grades hereinafter called for according to the following associations governing their various species of lumber products:

1. American Institute of Timber Construction (AITC).

2. APA - The Engineered Wood Association.

3. Unless otherwise noted, moisture content of material shall conform to WCLIB Rule No. 16, General Grading Provisions, Paragraph 3, Seasoning Provisions.

B. Treated Lumber: Inspection of material for conformity to the requirements of this specification shall be in accordance with AWPA Standard M2, Standard for Inspection of Treated Timber Products.

1.5 DELIVERY, STORAGE, AND HANDLING

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

1.6 SEQUENCING AND SCHEDULING

A. Coordinate with Division 7 Section "Modified Bituminous Membrane Roofing" for installation of roof insulation stops and sleepers, and plywood decking.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Product manufacturers are listed in Paragraph 2.2, Materials.

B. Other Manufacturers: Submit Substitution Requests prior to bid date in accordance with Division 1 Section "Product Requirements."

2.2 MATERIALS

A. Framing Lumber:

1. Structural Light Framing: WWPA No. 2, kiln dried, Douglas-fir/larch.

2. Beams and Stringers: WWPA No. 1, kiln dried, Douglas-fir/larch.

3. Posts and Timbers: WWPA No. 1, kiln dried, Douglas-fir/larch.

B. Treated Lumber:

1. Decay Resistance-Treated Lumber: No. 2 S4S Douglas-fir, shall be pressure-treated with ammoniacal copper quaternary (ACQ) or copper azole (CA) in accordance with AWPA Standard U1, minimum Use Category UC2. All pressure-treated lumber shall bear the AWPA Use Category quality mark. Lumber marked "treatment to point of refusal" is not acceptable.

a. ACQ Products: "Nature Wood" by Osmose, 800/241-0240; "ACQ Preserve" by Chemical Specialties, Inc., 800/421-8661. Do not use in contact with single ply roof membranes.

b. CA Products: "Natural Select" by Arch Wood Protection, Inc., 866/789-4567.

C. Subfloor, Wall Sheathing and Roof Sheathing: Structural-Use panels of all-veneer, Group 1, APA Rated Sheathing, Exposure 1, C-D, thickness as detailed, span rating to match support spacing. Roof sheathing under singly ply membrane roofing shall be minimum 5/8-inch thick plywood.

D. Plywood for Equipment Boards: 3/4-inch thick APA Group 1, C-D, UL FR-S label.

E. Anchor Bolts: ASTM F1554, Grade 36, American made machine thread cut bolts, 5/8-inch full diameter, 10-inches long unless noted otherwise on Drawings, with 2-inch hooked end, complete with nut and washer.

F. Framing Connectors:

1. ICC approved stock framing connectors, G90 galvanized ASTM A653, (G185 galvanized ASTM A653 or Type 304 stainless steel in contact with treated lumber), rated according to recorded tests. Provide special framing anchor nails as required and other fastenings as detailed and normal for installation.

2. Manufacturers: K.C. Metals "Superspeed Connectors," Silver, and Simpson Strong Tie.

G. Fasteners:

1. Power-Driven Fasteners: NES NER-272.

2. Lag Bolts: ASME B18.2.1.

3. Nails, Brads, and Staples: ASTM F 1667.

4. Wood Screws: ASME B18.6.1.

5. Type S-12 screws, bugle or pan head as required, ASTM C954.

6. Bolts: Steel bolts complying with ASTM A 307, Grade A, with ASTM A 563 hex nuts and, where indicated, flat washers.

7. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.

a. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.

b. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2, for use with treated lumber.

H. Fasteners for Treated Lumber: Type 304 stainless steel in contact with decay-resistant treated lumber or fire-resistant treated lumber.

I. Construction Adhesive:

1. Water dispersed industrial adhesive.

2. Manufacturers: 3M Co. "Scotch-Grip" 1357.

PART 3 EXECUTION

3.1 INSTALLATION

A. Framing Standard: Comply with AF&PA's "Details for Conventional Wood Frame Construction," unless otherwise indicated.

B. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.

C. Metal Framing Anchors: Install metal framing anchors to comply with manufacturer's written instructions.

D. Do not splice structural members between supports, unless otherwise indicated.

E. Selection and placement of exposed wood products: All wood products designed to be left exposed to view in the completed building shall be selected for good appearance, free of wanes, heartwood, pitch pockets, splintering, checking, banding indentations, grade stamps, and other defacements.

F. Cut and repair framing where required by electrical, mechanical or other mechanics throughout the job. Boring of holes for pipes and conduits not included. Where cutting is required in a structural member that is likely to weaken the construction, consult with the Architect as to the measures taken in order to perform the work without causing any deficiencies of strength or workmanship. Close all openings with incombustible material where pipes and ducts pass through framing.

G. Accurately fit all connections as detailed, all bolt holes drilled and properly sized to the bolts. Predrill lag and wood screw holes. Washers required under head and nut of all wood connections.

H. Nailers, Cants and Crickets: Include rough carpentry as detailed and specified for installation of roofing and miscellaneous nailers. Use pressure-preservative-treated lumber throughout. Build wood framed curbs and nailers for support and anchoring of flashing and equipment as detailed. Permanently attach to roof deck, walls, or other structural substrate with approved fasteners, two or more fasteners per member and spaced at not over 36-inches o.c. Securely nail all splices, laps and built-up members.

I. Sills and Plates: Use pressure-preservative-treated sills and plates in all conditions where bearing on concrete. Double top plate on all partitions with end joints lapped and staggered. Reinforce top plates where cut for electrical and mechanical work with 16 gauge metal splice plates.

J. Studs, Caps and Headers: Use straight material throughout; twisted material not permitted. Set all items as necessary for rigid frame.

K. Headers: Install over all openings. Fabricate from two or more members on edge with shims as required, spike solidly together. Install stud and cripple minimum at each rough jamb. Minimum schedule unless otherwise noted on Drawings.

1. Up to 4-feet inclusive: Two 2 x 6.

2. 4-feet to 6-feet inclusive: Two 2 x 8.

3. 6-feet to 8-feet inclusive: Two 2 x 10.

4. Over 8-feet: As detailed.

L. Beams: Install in locations as detailed, anchoring solidly. Stay and brace members in position until all connections are complete. Handle and protect specially wrapped or prepared items to avoid damage or scarring.

M. Firestops and Blocking:

1. Install as detailed and in no case more than 120-inches apart vertically and horizontally, in exterior and interior wood stud walls throughout. Fire block at ceiling line where wall finish does not continue above ceiling.

N. Wood Contacting Concrete: Wherever joists, beams, rafters, etc., make end or side contact against concrete walls and slabs, install two layers of 30 lb. roofing felt so there will be no contact between wood and concrete.

O. Treated Wood Contacting Metal: Wherever decay-resistant treated wood comes in contact with any type of metal, install one layer of 30 lb. roofing felt so there will be no contact between wood and metal.

P. Subfloor, Wall Sheathing and Roof Sheathing Structural-Use Panels:

1. Secure sheathing panels with nail size and pattern as detailed. Lay panels with face grain perpendicular to the supports with joints in adjacent panels staggered and butted at center line of joists.

2. Apply 1/4-inch diameter continuous bead of construction adhesive to tops of joists, blocking, and plates immediately prior to placing subfloor panels.

3. Install subfloor panels with 1/8-inch space between sheets and clearance at boundary walls and rigid penetrations through floor.

4. Provide blocking or "Ply-Clips" at unsupported edges of roof sheathing as detailed and whenever framing is spaced more than 16-inches o.c. Install with plugged face up.

Q. Equipment Boards: Secure equipment mounting boards 8-inches o.c. at each stud, "C" face exposed.

R. Blocking and Backing: Verify that solid blocking or backing is provided in framing for attachment of all wall and ceiling mounted items and equipment. Coordinate specific blocking requirements of all items specified in each specification Section that mount on walls and ceilings. Use templates and fastening devices furnished with item or appropriate screws and bolts. Check Hardware Schedule for locations of wall-mounted door bumpers. Do not fasten solely to wall and ceiling finish materials.

S. Deflection Head Construction: Required at the top of all non-bearing wall partitions that occur under open-web type framing members. Allow 3/4-inch space between top plate of wall and bottom truss chord for deflection tolerance.

T. Fasteners in Withdrawal: Non-structural wood components held in place with fasteners that would be in withdrawal loading after the final assembly is complete shall be fastened with bugle head screws with the same frequency as scheduled for nails. Screws shall be minimum length to penetrate substrate 1-1/2-inches.

3.2 FIELD QUALITY CONTROL

A. Tests and Inspections: The Owner will employ the services of an independent testing laboratory for conducting inspection services on plywood nailing and as noted within the Statement of Special Inspections on the Structural Drawings.

END OF SECTION

ARCHITECTURAL WOODWORK

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes but is not necessarily limited to the following architectural millwork:

1. Plastic laminate casework.

1.2 REQUIREMENT OF REGULATORY AGENCIES

A. Comply with all national, state and local codes including:

1. Building codes.

2. Environmental codes.

3. Fire codes: Where required by code, all materials must be fire rated. Except for enclosed exitways and corridors, a Class C interior finish (76 to 200 flame spread) is required. In corridors, Class B interior finish (26 to 75 flame spread) is required.

4. Codes of any other regulatory agency having jurisdiction.

1.3 REFERENCES

A. Standards: The following referenced standards and standard specifications, referred to thereafter by designation only, form a part of this Section.

1. American National Standards Institute (ANSI):

a. ANSI A208.1-1987, Mat-Formed Wood Particleboard.

b. ANSI A208.2-1980, Medium Density Fiberboard for Interior Use.

c. ANSI/AHA A135.4-1982, Basic Hardboard.

2. American Society for Testing and Materials (ASTM):

a. D523-89, Test Method for Specular Gloss.

b. D2898-81 (1986), Test Methods for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing.

c. E84-89a, Test Method for Surface Burning Characteristics of Building Materials.

3. Architectural Woodwork Quality Standards (AWS): Architectural Woodwork Standards, Guide Specifications and Quality Certification Program, Edition 1, adopted and published jointly by Architectural Woodwork Institute, Architectural Woodwork Manufacturers Association of Canada and The Woodwork Institute.

4. National Particleboard Association (NPA):

a. NPA 8-86, Voluntary Standard for Formaldehyde Emission from Particleboard.

b. NPA 9-87, Voluntary Standard for Formaldehyde Emission from Medium Density Fiberboard (MDF).

5. National Electrical Manufacturers Association (NEMA): NEMA LD 3-91, Application, Fabrication, and Installation of High-Pressure Decorative Laminates.

6. Hardwood Plywood and Veneer Association (HPVA): ANSI/HPVA HP-1-2009, American National Standard for Hardwood and Decorative Plywood.

7. National Hardwood Lumber Association (NHLA).

8. U.S. Voluntary Product Standard (PS): U.S. Voluntary Product Standard PS 1-83, Construction and Industrial Plywood.

9. Western Wood Products Association (WWPA).

1.4 DEFINITIONS

A. Exposed Surfaces: Surfaces visible when doors and drawers are closed; bottoms of casework more than 4-feet above finished floor, backs of hinged doors and edges of hinged doors exposed when opened, visible surfaces of open shelving and surfaces behind glass doors.

B. Semi-Exposed Surfaces: Surfaces that become visible when drawers and doors are opened, tops of cases 6-feet, 6-inches or more above finished floor.

C. Concealed Surfaces: Surfaces not visible after installation.

1.5 SUBMITTALS

A. Submit the following in accordance Division 1 Section “Submittal Procedures.”

B. Product Data:

1. Include catalog cuts for cabinet hardware and other equipment.

2. Provide samples for hinges, catches, door/drawer pulls, and cabinet locks.

C. Shop Drawings:

1. Submit shop drawings of woodwork showing location of each item, dimensioned plans and elevations, grain direction, large scale details, joints, sections and connections to adjacent work.

2. Include details of framing, blocking and furring and coordination for interface work at substrates.

3. Include hardware schedule for cabinet hardware.

D. Samples:

1. Plastic laminate finished samples: Submit 4-inch x 4-inch of each pattern specified.

E. Composite wood manufacturer certification of compliance with requirement for no added urea-formaldehyde resins in composite wood products.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Firm with at least 5 years experience in successfully producing architectural woodwork similar to that indicated for this Project, with sufficient production capacity to produce required units without causing delay in the Work.

B. Single-Source Manufacturing and Installation Responsibility: Engage a qualified manufacturer to assume undivided responsibility for woodwork specified in this Section, including fabrication, finishing, and installation.

C. Grade of Architectural Woodwork: Conform to AWS "Custom Grade" standards for material, fabrication and installation.

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Storage: Storage areas shall be clean and the relative humidity held steady within 25% to 55%.

1.8 PROJECT CONDITIONS

A. Verify dimensions before proceeding and obtain measurements at job site for work required to be accurately fitted to other construction. Measurements shall be accurate so that finished work is precisely assembled and fitted.

B. Report unsatisfactory tolerances in adjoining work.

C. Proceed with woodwork only after substrate construction and penetrating work have been completed and if necessary, corrected by other trades.

1.9 WARRANTY

A. Woodwork: Provide one-year warranty agreeing to repair or replace work which is not in conformance with requirements of Contract Documents or work that becomes out of adjustment.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Approved Manufacturers:

1. Artek Contracting, Inc., 503-641-6877.

2. Milltech Group, 800-755-3092.

3. Uncommon Cabinetry, Inc. 541-929-2701.

4. Burgener's Woodworking, 360-694-9408.

5. Custom Source Woodworking, Inc., 360-491-9365.

6. J.S. Perrott, 503-234-1880.

B. Manufacturers: Submit company profile, marketing brochures, and list of references with names and phone numbers of Owner, Architect, and Contractor with your bid submittal.

C. Other Manufacturers: Submit Substitution Requests prior to bid date in accordance with Division 1 Section "Product Requirements."

2.2 SOLID LUMBER MATERIALS

A. Blocking, Framing and Furring:

1. Sound, thoroughly-seasoned, and free from warp that cannot be corrected in process of bridging or nailing. Use same species for members in any one assembly.

2. Grades for framing materials: Conform to grading rules of The Softwood Manufacturer's Association for species of wood being used.

2.3 CABINET HARDWARE

A. Hinges:

1. Door hinges: Concealed hinges for full overlay doors, 170 degrees opening with integral horizontal and vertical adjustment; soft-closing.

2. Approved Manufacturers: Julius Blum, Inc., and Grass America, Inc.

3. Door hinge quantity:

a. Two hinges for doors up to 36 inches high, 24 inches wide.

b. Three hinges for doors up to 48 inches high, 24 inches wide.

c. Four hinges for doors up to 82 inches high, 24 inch wide.

B. Drawer Slides:

1. Description: Full extension ball bearing slides. Julius Blum, Inc., and Accuride approved.

2. Mounting: Side.

3. Load capacity:

a. Desk drawers: 75 pounds per pair.

b. Bins and file drawers: 150 pounds per pair.

C. Pulls:

1. Plastic laminate faced casework: Hafele America 115.61.601, stainless steel, satin sheen.

2. Wood casework: Hafele America 115.61.601, stainless steel with threaded breakoff screw, M4 022.35.887.

3. Lateral file drawers and where noted: Hafele America 126.27.904 integrated pull, anodized aluminum, satin sheen.

D. Shelf Support Pin:

1. 5mm bored holes at 32mm o.c. with shelf pins.

2. U. S. Tek, 626-859-9225 "Engstrom #11 Seismic Shelf Clip," double pin, 500 lb. capacity.

3. Location: Open and concealed shelving.

E. Cable Holes: Holes in countertops covered with high impact ABS cable hole covers with spring closure top, Hafele America Co. Series 429.99, color compatible with countertop. Equal products manufactured by Doug Mockett approved.

F. Drawer and Door Locks:

1. Description: 5 pin tumbler, interchangeable core, keyed to building master, 2 keys per lock. Provide spacers to install lock flush with face of cabinet.

2. Finish: Brushed stainless steel 626.

3. Locations: Provide for each door and drawer where indicated.

4. Manufacturer: Schlage Lock CL777R (door) and CL888R (drawer).

G. Anchor Brackets:

1. Material: Aluminum, Alloy 6061

2. Thickness: Varies

3. Finish: Clear Anodized

4. D. Adjustment: +/- 5%, Bolt Drive with 9/16” Hex.

H. Assembly Mounting Bracket:

1. Material: Aluminum, Alloy 6061

2. Thickness: 1/4”

3. Finish: Clear Anodized

I. Countertop Mounting Bracket:

1. Material: Aluminum, Alloy 6061

2. Thickness: 1/4”

3. Finish: Clear Anodized

2.4 PLASTIC LAMINATE CASEWORK

A. PL Tops and Faces: 0.050 grade NEMA Type 1 on countertops and open shelves and cabinet faces. Balance back sheet 0.020-inches thick on concealed portion of work.

1. PL Colors: Refer to Finish Material Legend.

B. Countertops Under High Pressure Laminate: 45 lb. density particleboard, 3/4-inch thick. Particleboard not permitted in sink counters.

C. Plywood in Sink Counters: HPVA hardwood plywood, exterior glue, 3/4-inch thick.

D. Particleboard Core Stock: 3/4-inch thick, complying with ANSI A208.1, 45 lbs./cu.ft. density, minimum average modulus of rupture of 2400 psi, minimum average modulus of elasticity of 400,000 psi.

E. Semi-Exposed Surfaces, Cabinet Shelves, and Partitions: Low pressure laminate (LPL) (polyester or melamine) laminated to particleboard with edge banding of the same material where edges are exposed. Color to be selected by Architect. Shelves 3/4-inches thick for spans up to 32-inch, 1-inch thick for spans from 32-inches up to 42-inches. Low pressure laminate on all semi-exposed surfaces.

F. Open Shelving:

1. PL face on shelf top and front edge. Balance sheet on shelf underside. Shelves 1-inch thick particleboard for spans up to 42-inches.

2. Shelf Hardware: Knape & Vogt heavy duty standard 87 and heavy duty bracket 186. Length of bracket shall match shelf depth.

G. Frame Stock: No. 1 shop kiln dried Douglas-fir.

H. Drawer and Door Edge Banding, Edge Banding on Open Shelves and Edges Behind Drawers and Doors: Square edge 3mm PVC, color to match plastic laminate.

2.5 FABRICATION

A. Fabrication:

1. Comply with referenced AWS standards.

2. Provide details and profiles indicated.

3. Fabricate units rigid, neat, free from defects, warp or buckle in accordance with final shop drawings.

4. Provide factory cutouts for openings in units as required to receive associated work.

5. Assemble prefinished units at the factory to the greatest degree possible and disassemble only as required for shipping to the site. Accurately mark units for assembly at site.

B. Cabinets:

1. Comply with AWS Section 10 Custom Grade.

2. Casework with Plastic Laminate Finish: Apply high pressure laminate to tops, fronts, faces, ends, backsplashes, and trim in accordance with AWI Custom grade standards and as detailed and noted on the Drawings. Self-edge all countertops.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine substrates and adjoining construction and conditions under which work will be installed. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide all necessary blocking, backing, framing, suspension, and other components necessary to provide a complete functioning system in the profile, dimensions, configurations, and materials indicated.

B. Exposed Blocking: Install surface mounted wood blocking, nailers, furring and grounds as required for wall-hung cabinetry and other wall-hung items, whether or not such blocking and similar items are indicated on drawings.

C. Unexposed Blocking: Unexposed internal blocking within the wall construction by others. Location of unexposed blocking to be determined by this trade.

3.3 INSTALLATION

A. General:

1. Comply with AWS Sections 6-Interior and Exterior Millwork, 8-Wall Surfacing, 10-Casework, and 11-Countertops, Custom Grade.

2. Install in accordance with final shop drawings and manufacturer's instructions.

3. Assemble and install work without machine and tool marks.

4. Neatly fit and scribe work to adjacent surfaces.

B. Cabinets:

1. Install with back mounted concealed fasteners, plumb and level, no exposed fasteners.

2. Securely attach to supporting substrates and blocking and furring.

3. Coordinate with electrical requirements to provide openings at receptacles and switches.

C. Countertops:

1. Install countertops straight, level and plumb.

2. Provide concealed grounds and anchor securely to walls.

3. Coordinate with electrical and plumbing requirements to provide openings at receptacles, switches and plumbing fixtures.

3.4 ADJUSTING AND REPAIR

A. Before completion of work, adjust hardware until components operate properly.

B. Replace defective, damaged or missing hardware.

C. Touch-up marred finishes, including shop finishes to match adjacent surfaces.

D. Remove and replace units which are warped, bowed, not properly fitted or finished or otherwise damaged.

3.5 CLEANING AND PROTECTION

A. Clean work upon completion. Protect units during construction so that they will be without any evidence of damage or use at time of acceptance.

END OF SECTION

JOINT SEALANTS

PART 1 GENERAL

1.1 SUMMARY

A. Furnish all labor, materials, equipment, and services necessary for the installation of building sealants for weatherproofing and joint filling including, but not limited to:

1. Perimeter of door and relite frames.

2. Penetrations of mechanical and electrical equipment.

3. Construction and expansion joints.

4. Miscellaneous sealant products used throughout job.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM).

B. Federal Specifications (FS).

1.3 SYSTEM PERFORMANCE REQUIREMENTS

A. Provide elastomeric joint sealants that have been produced and installed to establish and to maintain watertight and airtight continuous seals without causing staining or deterioration of joint substrates.

1.4 SUBMITTALS

A. Submit the following in accordance with Division 1 Section "Submittal Procedures."

B. Product data from manufacturers for each joint sealant product required.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that sealants comply with requirements.

D. Preconstruction Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:

1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.

2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

E. Certificates from manufacturers of joint sealants attesting that their products comply with specification requirements and are suitable for the use indicated.

F. Sample warranty.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who has completed joint sealant applications similar in material, design, and extent to that indicated for Project that have resulted in construction with a record of successful in-service performance.

B. Single Source Responsibility for Joint Sealant Materials: Obtain joint sealant materials from a single manufacturer for each different product required.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multicomponent materials.

B. Store and handle materials in compliance with manufacturer's recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.7 PROJECT CONDITIONS

A. Environmental Conditions: Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside the limits permitted by joint sealant manufacturer or below 40°F.

2. When joint substrates are wet.

B. Joint Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than allowed by joint sealant manufacturer for application indicated.

C. Joint Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with their adhesion are removed from joint substrates.

1.8 WARRANTY

A. Special Installer's Warranty: Manufacturer's standard form in which Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period. Include repair and replacement of defective work, such as leaks, failure of material, loss of adhesion, running of compound, or staining of adjacent work.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer's standard form in which joint-sealant manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period:

a. 20 years from date of Substantial Completion for silicone sealants.

b. 10 years from date of Substantial Completion for polyurethane sealants.

c. 10 years from date of Substantial Completion for Silyl-Terminated-Poly-Ether (STPe) sealants.

d. 5 years from date of Substantial Completion for acrylic latex sealants.

C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:

1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.

2. Disintegration of joint substrates from natural causes exceeding design specifications.

3. Mechanical damage caused by individuals, tools, or other outside agents.

4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Product manufacturers are listed in Paragraph 2.3.

B. Other Manufacturers: Submit Substitution Requests prior to bid date in accordance with Division 1 Section "Product Requirements."

2.2 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

B. Colors: Provide custom colors of exposed joint sealants to match Architect's samples.

2.3 ELASTOMERIC JOINT SEALANTS

A. Sealant 1:

1. One-part neutral cure medium modulus moisture curing silicone, FS TT-S-00230C, Type 2, Class A, or ASTM C920, Type S, Grade NS, Class 25. Uses NT, M, G, A, and O, and capable of withstanding movement of 50% in extension and compression in service.

2. Products:

a. Dow Corning "795."

b. Pecora "895 NST" (non-staining technology).

c. Tremco "Spectrem 2."

B. Sealant 2:

1. One-part low modulus moisture curing silicone, FS TT-S-00230C, Type 2, Class A, TT-S-001543A, Class A, or ASTM C920, Type S, Grade NS, Class 100/50. Uses NT, M, G, A, and O, and capable of withstanding movement of 100% in extension and 50% in compression in service.

2. Products:

a. Dow Corning "790."

b. G.E. "Silpruf SCS 2000."

c. Pecora "890 FTS" (field-tintable, non-staining technology).

d. Tremco "Spectrem 1."

C. Sealant 3:

1. One-part mildew resistant silicone sealant, FS TT-S-00230C, Class A, TT-S-1543A, Class A, or ASTM C920, Type S, Grade NS, Class 25. Uses NT, A and as applicable to non-porous joint substrates indicated, O, formulated with fungicide, intended for sealing interior joints with non-porous substrates and subject to in-service exposure to conditions of high humidity and temperature extremes.

2. Products:

a. Tremco "Tremsil 200."

b. Pecora "898."

D. Sealant 4:

1. One-part acrylic latex sealant, ASTM C834.

2. Products:

a. Tremco "Acrylic Latex 834" paintable caulk.

b. Pecora "AC-20" paintable caulk.

2.4 JOINT SEALANT BACKING

A. General: Provide sealant backings of material and type that are non-staining; compatible with joint substrates, sealants, primers and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Plastic Foam Joint Fillers:

1. Preformed, compressible, resilient, non-staining, non-waxing, non-exuding strips of flexible plastic foam of size, shape, and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

2. Material: Bi-cellular extruded polyolefin foam material consisting of a network of both open and closed cells and with nonabsorbing outer skin, non-outgassing when punctured, ASTM C1330, Type B.

3. Products:

a. Nomaco "SOF ROD."

b. Backer Rod Manufacturing, Inc., “TITAN FOAM.”

C. Bond Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.5 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint sealant substrate tests and field tests.

B. Cleaners for Non-Porous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming in any way joint substrates and adjacent non-porous surfaces, and formulated to promote optimum adhesion of sealants with joint substrates.

C. Masking Tape: Non-staining, non-absorbent material compatible with joint sealants and surfaces adjacent to joints.

D. Sanded Joints: Clean masonry sand, ASTM C144.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint

sealant performance. Do not proceed with installation of joint sealants until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with recommendations of joint sealant manufacturer and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

2. Clean concrete, masonry, unglazed surfaces of ceramic tile, and similar porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil free compressed air.

3. Remove laitance and form release agents from concrete.

4. Clean metal, glass, glazed surfaces of ceramic tile, and other non-porous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

B. Joint Priming: Prime joint substrates where indicated or where recommended by joint sealant manufacturer based on preconstruction joint sealant substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer's recommendations. Confine primers to areas of joint sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint sealant manufacturer's printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply.

B. Sealant Installation Standard: For joint sealants as applicable to materials, applications, and conditions indicated, per ASTM C1193.

C. Installation of Sealant Backings: Install sealant backings to comply with the following requirements:

1. Install joint fillers of type indicated to provide support of sealants during application and at position required to produce the cross sectional shapes, depths, and surface bond area of installed sealants relative to joint widths that allow optimum sealant movement capability.

a. Do not leave gaps between ends of joint fillers.

b. Do not stretch, twist, puncture, or tear joint fillers.

c. Remove absorbent joint fillers that have become wet prior to sealant application and replace with dry material.

2. Install sealants at dynamic sealant joints to a uniform cross-sectional shape with depths relative to joint widths that allow optimum sealant movement capability as recommended by sealant manufacturer. This requires a 2:1 width-to-depth ratio with an hourglass configuration after tooling.

3. Install bond breaker tape between sealants where backer rods are not used between sealants and joint fillers or back of joints.

D. Installation of Sealants: Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross sectional shapes and depths relative to joint widths that allow optimum sealant movement capability. Install sealants at the same time sealant backings are installed.

E. Tooling of Non-Sag Sealants: Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

1. Provide concave joint configuration per Figure 5A in ASTM C1193, unless otherwise indicated.

2. Provide flush joint configuration, per Figure 5B in ASTM C1193, where indicated.

3. Provide recessed joint configuration, per Figure 5C in ASTM C1193, of recess depth and at locations indicated. Use masking tape to protect adjacent surfaces of recessed tooled joints.

3.4 CLEANING

A. Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so that installations with repaired areas are indistinguishable from original work.

3.6 SCHEDULE

A. Primerless Type Silicone Sealant: Exterior and interior joints in vertical surfaces of concrete and masonry, between metal and concrete, and all other exterior joints not indicated otherwise; penetrations, form tie holes, and toilet room fixtures.

1. Medium modulus type for ±50% joint movement, general building sealing and joints bordering glass: Sealant 1.

a. Sealant 1 is structural silicone and is the only sealant to use for structural glazed insulating glass units, but can also be used where no, or very little movement is expected such as sealing form tie holes, and joints between like materials that don't expand and contract differently, and are not expansion joints.

b. Where joints are required to be painted, do not use products that cannot be painted.

B. Mildew Resistant Silicone: Interior wet areas, Sealant 3.

C. Acrylic Emulsion Sealant: Interior joints in field-painted vertical and overhead surfaces; at perimeter of elevator door frames and hollow metal door frames; in gypsum board, plaster, concrete and concrete masonry; and all other interior joints not indicated otherwise: Sealant 4.

END OF SECTION

PREFINISHED STEEL DOOR & RELITE FRAMES

PART 1 GENERAL

1.1 SUMMARY

A. Furnish all labor, material, equipment and services necessary for the installation of prefinished, shop frbricated, and site assembled steel door frames.

B. Related Sections: Division 8 Sections “Wood Doors,” “Door Hardware,” and “Glazing.”

1.2 REFERENCES

A. REF ASTM A1008M – Standard for cold rolled material.

B. ASTM D2197 - Standard Test Method for Adhesion of Organic Coatings by Scrape Adhesion.

C. ASTM D2247 - Practice for Testing Water Resistance of Coatings in 100% Relative Humidity.

D. ASTM D2794 - Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).

E. ASTM D3361 - Standard Practice for Unfiltered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.

F. ASTM B117 – Standard test for salt spray testing.

1.3 SUBMITTALS

A. Submit the following in accordance with Division 1 Section "Submittal Procedures."

B. Shop Drawings: Indicate frame elevations, reinforcement required, and spacing, location of embosses for hardware, and finish.

C. Manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

A. Installers: Individuals that are manufacturer “Certified Prefinished Frame Installers” for the installation of site assembled door frames.

B. Frames: Provide all prefinished frames for project from same manufacturer.

1.5 DELIVERY, STORAGE, AND PROTECTION

A. Transport, handle, store, and protect products in a dry area off the ground.

B. Accept frames on site in manufacturer's box packaging with identification labels intact. Inspect for damage.

C. Do not open individual boxes until installation is to begin.

1.6 PROJECT CONDITIONS

A. Coordinate the work with frame opening construction, door and hardware installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Timely Industries, A Division of SDS Industries, Inc., 800-247-6242. Web site: www.timelyframes.com.

B. Other Manufacturers: Submit Substitution Requests prior to bid date in accordance with Division 1 Section “Product Requirements.”

2.2 DOOR FRAMES

A. Frame Material: C-Series, 18 gauge cold rolled steel, for interior frames.

B. Frame Throat Opening: To suit finished wall thickness.

C. Frame Casings: Standard steel type, Model TA-8 with 6 mm (1/4 inch) reveal, on steel frames. Fit factory assembled units with MiterGard corner alignment clips.

2.3 ACCESSORIES

A. Silencers: Clear stick-on type.

B. Fasteners: Drywall type.

2.4 FABRICATION

A. Cut, notch and fabricate frames at manufacturer's facility.

B. Provide minimum 14 gauge hinge reinforcement plate, tapped for machine screws supplied with hinges. Mechanically attach hinge plate to hinge emboss on frame.

C. Casing Clips: Fabricate frames with factory applied, heat treated clips to prevent deflection in the clip upon application or removal of casing. Attachment clips may not be of same material as frame.

D. Provide notches and tabs or stops (or both) for positive alignment of frame parts at all corners.

E. Notch mullions to provide tight joints.

F. Provide manufacturer’s standard mullion brackets for positive connection of frame and mullion parts.

G. Provide manufacturer’s standard steel glass stop, factory cut to exact length.

H. Provide insert channel full width of light for sidelight and borrowed light frames installed on finish floor. Provide full width head channel for ceiling height units.

I. Provide fixed type transom bars with same profiles as jamb and head.

J. Prepare frames for ASA 4 7/8 inch (124 mm) strikes, where required. Provide minimum 1/4 inch (6.35 mm) depth of threads in factory tapped screw holes.

K. Provide corner alignment clips.

L. Silencers: Provide three (3) single silencers for single doors on strike side of frames.

2.5 FINISH

A. Frame Units: Prefininshed with factory applied impact resistant, polyester baked enamel finish.

B. Steel Casing: Prefinished with factory applied impact resistant, polyester baked enamel finish.

C. Custom Colors: As selected by Architect from manufacturer's full color range.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify acceptability of existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

3.2 INSTALLATION

A. Install frames in accordance with manufacturer's requirements.

B. Install prefinished frames near end of the project after completing wall painting and wall coverings.

C. Install frames using certified installers.

D. Coordinate installation of glass and glazing in glazed units.

E. Coordinate installation of frames with installation of hardware specified in Division 8 Section "Door Hardware," and doors in Division 8 "Wood Doors."

F. Touch-up blemishes on finished frames.

3.3 CLEANING

A. Upon completion, perform cleanup, remove surplus materials, rubbish, tools and equipment in accordance with Division 1 Section "Closeout Procedures."

3.4 PROTECTION

A. Protect installed product from damage during construction.

B. Repair damage to adjacent materials caused by door frame installation.

END OF SECTION

WOOD DOORS

PART 1 GENERAL

1.1 SUMMARY

A. Provide all labor, material, equipment and services necessary to furnish and install wood flush face doors, and stile and rail wood doors.

B. Related Sections:

1. Division 8 Sections “Prefinished Steel Door Frames” and “Door Hardware.”

2. Division 9 Section “Painting.”

1.2 REFERENCES

A. Architectural Woodwork Quality Standards (AWS): Architectural Woodwork Standards, Guide Specifications and Quality Certification Program, Edition 1, adopted and published jointly by Architectural Woodwork Institute, Architectural Woodwork Manufacturers Association of Canada and The Woodwork Institute.

B. Wood Door Manufacturers Association (WDMA).

1.3 SUBMITTALS

A. Submit the following in accordance with Division 1 Section "Submittal Procedures."

B. Product data for each type of door, including details of core and edge construction, trim for door lite openings and louvers.

C. Shop drawings indicating location and size of each door, elevation of each kind of door, details of construction, location and extent of hardware blocking, requirements for veneer matching and other pertinent data. For factory-machined doors, indicate dimensions and locations of cutouts for locksets and other cutouts adjacent to lite and louver openings.

D. Samples for verification: Corner sections of doors approximately 12-inches square with door faces and edgings representing the typical range of color and grain for each species of veneer and solid lumber required.

E. Certification: Manufacturer’s letter of certification of specification compliance.

1.4 QUALITY ASSURANCE

A. Flush Doors: Doors shall comply with WDMA Industry Standard I.S. 1A-11 Architectural Wood Flush Doors and AWS Quality Standards. Any door not meeting these standards shall be replaced without cost to the Owner.

1. Solid Core Doors: Fabrication shall comply with AWS PC-5 or PC-7 construction for non-rated doors.

B. Stile and Rail Doors: Doors shall comply with WDMA Industry Standard I.S. 6A-11 Architectural Stile and Rail Doors and AWS Quality Standards. Any door not meeting these standards shall be replaced without cost to the Owner.

C. Doors shall bear a temporary tag including the manufacturer's name with full description of face veneer assembly, species, cut, match, door type, elevation, size, hardware machining information, providing for total reconciliation with their submittals and the wood door specification. Such tag shall be affixed to the top of the door.

D. Manufacturer to provide a statement of certification as to their intended full compliance with the wood door specification.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect during transportation handling and storage from surface damage, moisture and soiling. Doors hung and protected as soon as possible after delivery.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until building is enclosed, wet-work is complete, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.

1.7 WARRANTY

A. Provide manufacturer's full lifetime warranty of door construction and original installation including rehanging and refinishing.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Product Manufacturers:

1. Ampco Products, Inc.

2. Eggers Industries.

3. Island Precision Architectural Woodwork.

4. Lynden Door.

5. Marshfield Door Systems, Inc.

6. Oshkosh Architectural Door.

7. Pacific Architectural Wood Products.

8. Vancouver Door Company.

9. VT Industries.

10. Oregon Door.

B. Other Manufacturers: Submit Substitution Requests prior to bid date in accordance with Division 1 Section "Product Requirements."

2.2 MANUFACTURED UNITS

A. Solid Core Doors:

1. WDMA Door Aesthetic Grade: Premium.

2. WDMA Performance Duty Level: Extra heavy duty.

a. Hinge Loading: WDMA TM-8, 1990, 550 lbs.

b. Door Face, Blocked Particleboard: 700 lbs.

c. Verticle Door Edge: 550 lbs.

d. Horizontal Door Edge: 300 lbs.

3. Particleboard core, ANSI A208.1, Grade LD-2, flush face, no added urea-formaldehyde and manufactured from FSC certified wood.

a. Blocking: Provide hardwood blocking in particleboard-core doors as needed to eliminate through-bolting hardware.

4. Premium grade five-ply and seven-ply architectural doors with stiles and rails bonded to the core by means of a thermal setting (hot press) adhesive and sanded prior to assembly of face veneers.

5. All doors have double banded laminated stiles without finger joints in outer band and outer band at least 1/2-inch thick. Outer band same species as face veneer, bonded to the core. Laminated stile1-3/8-inches minimum thickness after trim.

6. Door thickness 1-3/4-inches.

7. Wood Veneers:

a. Doors with Transparent Finish:

(1) Premium face (Grade AA, edge glued joints), plain sliced, center and book matched maple.

(2) Face veneers tight and smoothly cut, joints parallel to the edges of the door, and without sharp contrasts in color or grain.

(3) Individual pieces of veneer forming the face veneer edge glued with a thermosetting adhesive. 6-inch minimum flitch width per AWS.

(4) Minimum 1/50-inch veneer thickness at 12% moisture content before sanding at project site.

(5) Double doors to be matched.

b. Doors with Paint Finish:

(1) Premium grade, MDO faces.

(2) Surface of the door must be sound and provide a smooth surface without any imperfections that will show through the finish.

B. Stile and Rail Doors:

1. WDMA Door Aesthetic Grade: Premium.

2. WDMA Performance Duty Level: Extra heavy duty.

3. Wood Veneer Grade, Cut, Species, and Match: AA, plain sliced, balanced slip matched, maple, clear finish.

a. Face veneers tight and smoothly cut, joints parallel to the edges of the door, and without sharp contrasts in color or grain.

b. Individual pieces of veneer forming the face veneer edge glued with a thermosetting adhesive.

c. Minimum 1/50-inch veneer thickness at 12% moisture content before sanding at project site.

4. Door Type: glass.

5. Door Thickness: 1-3/4-inches.

C. Lites and Louvers:

1. See door patterns scheduled.

2. Provide flush style matching wood stop beads for all openings unless detailed otherwise.

3. Wood flat slat or sightproof louvers unless otherwise noted.

4. Comply with building code requirements for handicap accessibility.

2.3 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.

B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.

C. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.

D. Openings: Cut and trim openings through doors in factory.

E. Lite Openings: Trim openings with moldings of material and profile indicated.

F. Glazing: Factory install glazing. Comply with applicable requirements in Division 8 Section "Glazing."

G. Louvers: Factory install louvers in prepared openings.

2.4 SHOP PRIMING

A. Stain/Transparent Finish: After doors have been prepared to receive hardware, shop seal faces and edges of doors for stain/transparent finish as specified in Division 9 Section “Painting.” Seal all four edges, edges of cutouts, and mortises with first coat of finish.

B. Doors with Opaque Finish: Shop prime doors with one coat of enamel primer for wood specified in Division 9 Section "Painting." Seal all four edges, edges of cutouts, and mortises with primer.

PART 3 EXECUTION

3.1 INSTALLATION

A. Fit with 1/8-inch clearance in frames, head and jambs, 3/16-inch clearance over saddles and thresholds, and 3/8-inch clearance over floor or floor coverings at openings without saddles and thresholds. Bevel lock and hinge stile edges 1/8-inch in 2-inches to operate without binding. Undercut when specially noted on the Drawings or as scheduled. Fit for other clearances when required by special details, hardware, or floor coverings as approved by Architect.

B. Accurately locate surface-mounted hardware on doors by dimension, jig, and template. Pre-drill all screw fastening device holes.

END OF SECTION

DOOR HARDWARE

PART 1 GENERAL

1.1 SUMMARY

A. Furnish and install all door hardware as specified within this Section. Do not, however, construe the following specification as complete in every detail. Furnish all items classified as door hardware and necessary to complete construction.

1.2 SUBMITTALS

A. Submit the following in accordance with Division 1 Section "Submittal Procedures."

B. If requested by the Architect, furnish properly labeled hardware samples within three weeks following award of the Contract. These samples may be retained by the Architect until completion of the job. All delivered hardware must conform to the approved samples.

C. Schedule of Hardware:

1. Format: Comply with scheduling sequence and vertical format in DHI's (Door and Hardware Institute) "Sequence and Format for Hardware Schedule". Double space entries and number/date each page. Prepare the Schedule of Hardware as follows:

   a. List each opening, location, door size, door hand, door and frame material, door label, manufacturer's number and finish.

   b. Any deviation in hardware listed from that specified must be approved by the Architect in writing prior to Bid Opening.

2. Deliver copies of this schedule to the Architect for review.

D. Manufacturer Information: Provide manufacturer's technical product data in the form of catalog cut sheets, clearly marked for each hardware item. Include installation details, material descriptions, dimensions of individual components and profiles, and finishes.

E. Templates: Furnish templates to metal door and frame suppliers within one week from receipt of approved hardware schedule and verification at the Preconstruction Meeting.

F. Keying Schedule: Detailed keying instructions and diagram and index, detailing Owner's final keying instructions resulting from the Keying Conference.

1.3 QUALITY ASSURANCE

A. Qualifications:

1. Door Hardware Supplier:

   a. Provide services of an AHC or DAHC (Architectural Hardware Consultant) member of Door & Hardware Institute with the technical experience and availability for consultation with the Architect, Owner and Contractor.

b. Hardware supplier shall have and maintain a factory direct status with all manufacturers specified or approved during the course of the project.

c. The door hardware consultant shall:

(1) Be an employee of supplier.

(2) Be knowledgeable on local, state, and federal life safety fire codes, and accessibility codes and requirements to assist the Architect when necessary.

(3) Assist in developing the keying schedule by meeting with the Owner and Architect, and make at least two job site inspections and one final inspection to ensure that all hardware has been properly installed according to the manufacturer's directions.

(4) Notify the door closer installer for final adjustment of door closers prior to the consultant's final inspection.

2. Contractor: Employ an experienced worker to receive, supervise, and distribute hardware at the building site, and provide a locked room with temporary shelving for hardware.

3. Distributor: Provide hardware from a factory authorized distributor. Only those manufacturers specified or approved in writing prior to bidding are acceptable. All components of each hardware item shall be by the same manufacturer.

4. Hardware Installer: Make final adjustments to all door closers.

B. Regulatory Requirements: All hardware shall comply with applicable local and state fire and current building codes.

C. Pre-Construction Meeting: After receipt of the Architect-reviewed hardware schedule, conduct a final "hardware function" coordination meeting with the Owner, Architect, and hardware consultant. Do not release hardware templates to door fabricators until final resolution of the hardware coordination meeting.

D. Keying Conference: Conduct a keying coordination meeting with the Owner and Architect. Incorporate keying conference decisions into a keying schedule for review and approval, including but not limited to:

1. Preliminary key system schematic diagram.
2. Requirements for key control system.
3. Address for delivery of keys.
4. Index of each key set to unique door designations.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver all door hardware to job site unless directed otherwise. Each item shall be properly wrapped in its original factory shipping carton, labeled, and numbered for the opening for which it is intended. All items shall be shipped from the factory to the hardware supplier for final checking before sending to job site.

B. Include all necessary screws, bolts, or other fastenings of suitable size and type to securely anchor in position, and harmonize with the hardware material and finish. Furnish where necessary with sex bolts, toggle bolts, expansion shields or other approved anchors according to the material to which it is applied and recommended by the manufacturers.

1.5 WARRANTY

A. All hardware shall carry a factory warranty for a minimum of one year after Substantial Completion that hardware is free from defects in workmanship and material. Hardware must be installed exactly to the manufacturer's printed instructions to prevent voiding the warranty. Provide a 3 year material and labor warranty for exit devices and 10 year material and labor warranty for closers.

B. Provide factory order numbers to the Owner/GC for hardware warranty purposes.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Product Manufacturers:

1. DON: Don-Jo Manufacturing.

2. IVE: Ives.

3. LCN: LCN.

4. SCH: Schlage.

5. VON: Von Duprin.

6. ZER: Zero.

B. Other Manufacturers: Submit Substitution Requests prior to bid date in accordance with Division 1 Section "Product Requirements."

2.2 MATERIALS

A. Butt Hinges: 1-1/2 pair minimum per door unless scheduled otherwise.

B. Locks and Latches: Verify operation, hand of doors, and function for each opening as scheduled.

C. Keying:

1. It shall be mandatory that keying be done by the lock manufacturer for security, Owner's convenience, and permanent keying records. In the event any keying security procedure is violated, replace all locks, cylinder units, padlocks, cylinders, etc., at no additional expense to the Owner.

2. Provide manufacturer's standard keyway with standard cylinders except where interchangeable core cylinders are specified. Interchangeable core cylinders to have temporary construction cores.

3. Furnish two keys with each lock, and five master keys. Keying and master keying schedule as established by the Owner.

4. All master keys and keying transcript to be sent by registered mail from the factory to the Owner. This procedure is mandatory.

D. Closers: Verify hand of door, degree of opening, frequency of use, and head condition. Furnish cast iron body type only.

E. Silencers: Furnish in number and type to protect finishes wherever doors or hardware thereon will strike adjacent surfaces and materials. Furnish 3 rubber silencers for metal door frames that are not equipped with gaskets.

F. Hardware Finishes: As specified below in the Schedule. Verify all finishes on the Schedule and at the Site.

PART 3 EXECUTION

3.1 INSTALLATION

A. Locate and place hardware on work accurately using templates when required. Install permanently using proper nails, screws or bolts, matching finish of hardware. Remove and place in original packages all hardware after setting to permit application of finishes and reinstall when finish application is complete. Deliver any adjusting tools to Owner properly tagged and identified.

B. Properly wrap all hardware subjected to hand usage during construction for protection. Replace hardware that has damaged finish.

C. Butt Hinges: Install top hinges 5-inches from head of frame or door top to top of hinge. Bottom hinge 10-inches from finished floor to bottom of hinge. Center intermediate hinges between top and bottom hinges.

D. Locks and Latches: Install 38-inches to center line of knob locks and latches.

E. Exit Devices: Mount according to manufacturer's instructions at 38-inches.

F. Deadlock: Install 48-inches to center line of deadlock. Vary as necessary to avoid conflict with door pulls, etc.

G. Door Pulls and Push Plates: Install 42-inches to center of grip for door pulls and push/pull bars. 48-inches to center line of push plates.

H. Thresholds: Set in bed of silicone sealant. Thresholds requiring additional support, set in bed of non-shrink grout.

I. Door Closers: The maximum force to open doors shall not exceed 8-1/2 lbs. for exterior hinged doors and 5 lbs. for interior hinged doors.

3.2 SCHEDULE

A. See drawings for scheduled hardware sets.

END OF SECTION

GLAZING

PART 1 GENERAL

1.1 SUMMARY

A. Furnish all labor, material, equipment and services necessary for installation of glass in doors and relites, including all glazing hardware.

B. Examine glass requirements of this project and furnish and install all glass in accordance with the requirements of the Building Code and the US Consumer Product Safety Commission.

C. To the fullest extent possible, all products and materials provided by this Specification Section shall comply the U.S. Department of Transportation, Federal Transit Administration, Buy America Requirements (49 CFR 661), most current annual edition.

1.2 REFERENCES

A. American National Standards Institute (ANSI).

B. American Society for Testing and Materials (ASTM):

1. ASTM C1036, Flat Glass.

2. ASTM C1048, Standard Specification for Heat-Treated Flat Glass-Kind HS, Kind FT Coated and Uncoated Glass.

C. Glass Association of North America (GANA), (formerly FGMA) Glazing Manual, Installation Recommendations.

1.3 DEFINITIONS

A. Manufacturers of Glass Products: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by traditional thickness designations according to ASTM C 1036.

1.4 SUBMITTALS

A. Submit the following in accordance with Division 1 Section "Submittal Procedures."

B. Product Data: For each glass product and glazing material indicated.

C. Glazing Schedule: Use same designations indicated on Drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.

D. Qualification Data: For installers.

E. Preconstruction Adhesion and Compatibility Test Report: From glazing sealant manufacturer indicating glazing sealants were tested for adhesion to glass and glazing channel substrates and for compatibility with glass and other glazing materials.

F. Product Test Reports: For each of the following types of glazing products:

1. Glazing sealants.

G. Structural calculations by a structural engineer registered in the State of Oregon showing that glazing complies with the Building Code.

H. Glass warranties and guarantees.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for this Project; whose work has resulted in glass installations with a record of successful in-service performance; and who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

B. Source Limitations for Glazing Accessories: Obtain glazing accessories through one source from a single manufacturer for each product and installation method indicated.

C. Elastomeric Glazing Sealant Product Testing: Obtain sealant test results for product test reports in "Submittals" Article from a qualified testing agency based on testing current sealant formulations within a 36-month period.

1. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C1021 to conduct the testing indicated, as documented according to ASTM E548.

2. Test elastomeric glazing sealants for compliance with requirements specified by reference to ASTM C920, and where applicable, to other standard test methods.

D. Preconstruction Adhesion and Compatibility Testing: Submit to elastomeric glazing sealant manufacturers, for testing indicated below, samples of each glazing material type, tape sealant, gasket, glazing accessory, and glass-framing member that will contact or affect elastomeric glazing sealants:

1. Use ASTM C1087 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.

2. Submit not fewer than four pieces of each type of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.

3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.

4. For materials failing tests, obtain sealant manufacturer's written instructions for corrective measures, including the use of specially formulated primers.

5. Testing will not be required if elastomeric glazing sealant manufacturers submit data based on previous testing of current sealant products for adhesion to, and compatibility with, glazing materials matching those submitted.

E. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201.

1. Subject to compliance with requirements, obtain safety glazing products permanently marked with certification label of the Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction.

2. Where glazing units, including ASTM C1038 Kind FT glass are specified in Part 2 articles for glazing lites more than 9 sq. ft. in exposed surface area of one side, provide glazing products that comply with Category II materials, for lites 9 sq. ft. or less in exposed surface area of one side, provide glazing products that comply with Category I or II materials, except for hazardous locations where Category II materials are required by 16 CFR 1201 and regulations of authorities having jurisdiction.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

1.7 WARRANTY

A. Provide a warranty for replacement and reglazing of units that become defective during a two year warranty period, at no cost to the Owner.

PART 2 PRODUCTS

2.1 MATERIALS

A. General: Glass thicknesses specified are minimum required. Structural calculations required by this Section may require greater thicknesses to comply with local codes. Also, greater thicknesses required where noted on the Drawings.

B. Glass Standards:

1. Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated.

2. Heat-Treated Float Glass: ASTM C 1048; Type I; Quality-Q3; Class I (clear) unless otherwise indicated; of kind and condition indicated.

C. Accessories: Furnish all clips, glazier’s points, blocks, felt, and other items required to set all glass throughout the building.

D. Glazing Tape and Sealants:

1. Glazing Tape:

a. Color: Black.

b. Manufacturers: Norton “Norseal V980.”

E. Elastic Glazing Compound:

1. Sealant, metal sash types.

2. Manufacturers: Dow “Insta Glaze.”

F. GL-1, Clear Float Glass: 1/4-inch minimum thickness clear float glass, glazing quality.

1. Location: Interior relites that are not required by code to be tempered.

G. GL-2, Clear Tempered Glass: 1/4-inch minimum thickness, ASTM C1048 Kind FT (fully tempered) clear float glass, tempered after cutting.

1. Location: Glass in doors and relites that are required by code to be tempered.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine glazing channels, and stops for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.

2. Minimum required face and edge clearances.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels immediately before glazing. Remove coatings not firmly bonded to substrates.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Maintain original labels on each piece of glass, naming manufacturer, quantity and thickness. Deliver other glazing material in original containers with original manufacturer’s labels attached. Remove labels as soon as possible after installation.

C. Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

D. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

E. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

F. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

G. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

3.4 INTERIOR GLAZING

A. Set glass using elastic glazing compound; apply ample compound in rabbet to bed entire perimeter of glass and place necessary setting blocks; press glass, centered, into rabbet.

B. For lites held in place by stop beads all around, bed beads against glass and bottom of rabbet with compound.

C. Secure bead with countersunk fasteners. Strip surplus compound from both sides of glass at an angle; do not undercut.

3.5 CLEANING

A. Clean and remove all stains and excess glazing compound and sealants from glass, sash, and adjoining surfaces. Washing of glass is specified in Division One.

3.6 PROTECTION

A. Protect all glazing from breakage. Reglaze wherever work or material are defective. Replace all glazing damaged prior to Substantial Completion.

B. Do not apply paint or attach temporary signs or festoons directly to glass faces.

END OF SECTION

GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.1 SUMMARY

A. Furnish all labor, material, equipment and services necessary for the installation and finishing of all gypsum board partitions and ceilings on wood framing and furring. Include installation of acoustical insulation.

B. Related Sections:

1. Division 9 Section “Ceramic Tiling” for wall assembly components.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM).

1. ASTM C 475/C 475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2002.

2. ASTM C 840 - Standard Specification for Application and Finishing of Gypsum Board; 2005.

3. ASTM C 1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base; 2005.

4. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2004.

B. GA-600 - Fire Resistance Design Manual; Gypsum Association; current addition.

1.3 SUBMITTALS

A. Submit the following in accordance with Division 1 Section "Submittal Procedures."

B. Manufacturer’s product data.

1.4 QUALITY ASSURANCE

A. Fire Resistance Ratings:

1. Comply with fire resistance ratings as required and approved by the governing authorities and codes. Provide classification labeled materials, and accessories identical to that of assemblies tested for fire resistance per ASTM E119 by a testing and inspecting agency acceptable to authorities having jurisdiction for the type of construction scheduled.

2. Reference the Drawings for wall and ceiling types that indicate specific testing lab assembly and material requirements.

B. Provide completed assemblies complying with ASTM C 840.

C. All gypsum board products shall be manufactured in the United States of America.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Coordinate delivery with installation to minimize storage periods. Deliver in unopened containers, bundles or packages fully identified with the manufacturer's name, brand, type and grade. Protect from weather, soiling and damage.

1.6 PROJECT CONDITIONS

A. Examine the conditions under which the gypsum board is to be installed. Commencement of work establishes acceptance of work conditions.

B. Installation not permitted until a uniform temperature of 55°F to 70°F can be maintained in the building and ventilation provided to eliminate excessive moisture.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Product manufacturers are listed in Paragraph 2.2.

B. Other Manufacturers: Submit Substitution Requests prior to bid date in accordance with Division 1 Section "Product Requirements."

2.2 MATERIALS

A. Obtain all components and materials of the gypsum board system from manufacturers recommended and approved by the gypsum board manufacturer, unless otherwise indicated.

B. Gypsum Board:

1. Walls and Ceilings: G-P Gypsum Corporation "ToughRock Fireguard," or USG "Sheetrock Brand Firecode," Type X fire retardant type, 5/8-inch thick, tapered edges, 48-inches wide and in lengths as long as practical to minimize number of joints. UL labeled and ICC approved, ASTM C1396.

2. High Moisture Areas: G-P Gypsum Corporation "DensArmor Plus Fireguard," or USG "Sheetrock Brand Mold Tough Firecode X Core," 5/8-inch thick, Type X fire retardant, moisture resistant ASTM C1178, mildew resistant ASTM D3273, UL SCX labeled and ICC approved.

C. Non-Fire Rated Gypsum Board:

1. Attic Draft Stops: ASTM C1396, 1/2-inch thick, tapered edges, 48-inches wide and in lengths as long as practical to minimize number of joints.

2. Refer to Division 1 Section "allowances" for payment of this work.

D. Ceramic Tile Backing Board:

1. G-P Gypsum Corporation "Dens-Shield Fireguard Tile Backer," 5/8-inch thick, glass mat facings front and back, ASTM C1178, Type X fire retardant, mildew resistant ASTM D3273, UL labeled and ICC approved.

2. USG "Fiberock Brand AR," 5/8-inch thick, fiber reinforced water resistant, ASTM C1278, Type FRX-G fire retardant, mildew resistant ASTM D3273, UL labeled and ICC approved.

E. Liner Board: G-P Gypsum Corporation "Dens-Glass Ultra Shaftliner,"1-inch thick, Type X shaft wall liner ASTM C1396, UL labeled and ICC approved, coated glass mat both facings ASTM C1177, mildew resistant ASTM D3273, beveled edge, lengths as required.

F. Low Wall Reinforcing: NoFlex, 800-720-1994, 14 gauge vertical steel tube welded to 3-inch x 8-inch x 3/8-inch steel base plate, space 4-feet o/c, anchored to concrete floors with three 1/2-inch diameter expansion bolts, 3-1/2-inch embedment.

G. Resilient Channels: ClarkDietrich Building Systems “RC-Deluxe,” 25 gauge galvanized steel, 2-5/8-inches wide, 1/2-inch deep, Type S screw attachment only, no substitutions.

H. Fasteners: Type W screws or annular ringed nails for wood framing, Type GWB-54, 1-7/8-inch length. Parker or six penny (6d) cooler type nails.

I. Joint Treatment: Provide materials from same manufacturer as gypsum board, ASTM C475/C475M.

1. Joint Tape:

a. Gypsum Board: Paper.

b. Tile Backing Panels: As recommended by panel manufacturer.

2. Joint Compound for Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

a. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.

b. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.

c. Use setting-type compound for installing paper-faced metal trim accessories.

d. Fill Coat: For second coat, use drying-type, all-purpose compound.

e. Finish Coat: For third coat (final coat of Level 4 finish), use drying-type, all-purpose compound.

3. Joint Compound for Tile Backing Panels:

a. Water-Resistant Gypsum Backing Board: Use setting-type taping compound and setting-type, sandable topping compound.

b. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.

J. Acoustical Insulation: Friction fit, un-faced, formaldehyde-free fiberglass batt insulation containing at least 25% post-consumer or 50% post-industrial recycled glass. Comply with local code, Class I flame-spread rating of 15 to 25 as tested per ASTM E84, and with ASTM C665, Type I, R-11.

K. Sealant:

1. Non-setting, non-staining, acoustically tested sealant, ASTM C919.

2. Products:

a. Sheetrock Acoustical Sealant by U.S. Gypsum.

b. Acoustical Sealant by Tremco. A black synthetic rubber material suitable for concealed locations only.

c. Sil Pruf, SCS 2000 by General Electric.

L. Fire-rated Acoustic Sealants:

1. CP 601 S Elastomeric Firestop Sealant by HILTI.

2. Fyre Sil by Tremco.

3. Fire Barrier 1000 N/S, 2000 by 3M.

M. Trim Accessories:

1. Hot-dip galvanized steel corner beads, edge trim, and control joints, ASTM C1047.

2. Shapes indicated below by reference to Fig. 1 designations in ASTM C1047:

a. Corner bead on outside corners, unless otherwise indicated.

b. LC-bead with both face and back flanges; face flange formed to receive joint compound, provide for edge trim unless otherwise indicated.

c. L-bead with face flange only; face flange formed to receive joint compound, provide where indicated.

d. U-bead with face and back flanges; face flange formed to remain without application of joint compound, provide where indicated.

e. One-piece control joint formed with V-shaped slot, with removable strip covering slot opening.

PART 3 EXECUTION

3.1 INSTALLATION

A. Installation Standards: Installation of gypsum board assemblies, ASTM C840.

B. Gypsum Board:

1. Acoustic Insulation: Prior to commencing gypsum board installation, install acoustical insulation where detailed in accordance with insulation manufacturer's installation instructions. Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions. Press blankets firmly in place against the back of one of the layers of gypsum board. Tightly butt ends of blankets, leaving no voids.

2. In areas where gypsum board is called for on the walls and ceiling, install the ceiling first then the wall unless detailed otherwise.

3. Where partitions are sound or fire-rated construction, apply caulking sealant to all cut-outs and intersections with adjoining structure as described in Sealant Application, below. This requires that the gypsum board be cut for loose fit around the partition perimeter leaving a space approximately 1/8-inch wide. Line the inside of equipment recesses with gypsum board to maintain the integrity of sound and fire-rated wall construction.

   a. Install resilient channels according to manufacturer's instructions.

   b. Verify that electrical receptacle boxes have been properly installed in sound rated walls. Electrical receptacle boxes in walls should be spaced a minimum of 24" apart. Boxes on opposite sides of the wall should not be placed in the same stud cavity.

4. Use gypsum board 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. Use "Floating Interior Angle" application at all ceilings. Bottom edge of gypsum board on walls shall be a maximum of 1/4-inch above floor.

5. Attach gypsum board to wood framing supports, fasten 7-inches o.c. on ceilings and 8-inches o.c. on walls. For double fastening method, apply first fastener12-inches o.c. with second fastener in close proximity (2-inches). Fasteners spaced at not less than 3/8-inch from edge and ends of board.

6. While fasteners are being driven, hold gypsum board in firm contact with underlying supports, fastening from the center of the board toward ends and edges. Drive fasteners tight, with heads slightly below surface, taking care to avoid breaking the paper face.

7. 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. Where board appears loose from framing, install second fastener within 1-1/2-inches of first.

8. Finish in every location with metal edge and corner bead unless finishing details are given and edge is covered with molding or trim. Install control joints vertically at corners of door frames, and at a maximum of 30-feet apart on unbroken wall surfaces.

9. Use water-resistant type board at wet and high moisture areas, including restrooms. Seal all cut ends and openings with recommended sealant.

C. Sealant Application:

1. Acoustical Sealant Installation: At sound-rated assemblies and elsewhere as indicated, seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations.

2. Partition Perimeter: Apply a 1/4-inch minimum bead of sealant on each side of plates, including those used at intersections with dissimilar wall construction. Immediately install gypsum board, squeezing sealant into firm contact with adjacent surfaces. Fasten board as specified.

3. Partition Intersections: Before taping and finishing, seal edges of face layer of gypsum board abutting intersecting partitions.

4. Openings: Apply a 1/4-inch continuous bead of sealant around all cut-outs to seal openings of electrical boxes, ducts, pipes and similar penetrations. Caulk sides and backs to seal electrical boxes.

5. Control Joints: Before installing control joints, apply sealant in back of joint to reduce flanking sound path.

6. In all sound-rated walls, electrical receptacle boxes shall be sealed around the perimeter with acoustical caulk, and all unused knock-out holes shall be plugged with knock-out caps.

   a. Electrical outlet box back putty pads shall be installed on all boxes on both sides of the wall in all walls with a rating of STC 49 or higher. Install pads to the back of installed electrical boxes, mold to box and fold around conduit cable entering the box.

D. Ceramic Tile Backing Board: Coordinate wall assembly components with Division 9 Section “Ceramic Tiling.” Install as a substrate to all ceramic tile on walls. Before starting the installation, verify that all framing supporting ceramic tile is spaced no greater than 16-inches o.c. Install horizontally with end joints over framing members. Secure to framing with screws spaced not more than 8-inches o.c. with 1-inch bugle head Type S High-Low screw.

E. Joint Finishing:

1. Level 1, ASTM C840 and GA-214-10: Rough taping permitted only in concealed spaces and service or unfinished areas as scheduled, including gypsum board which will be covered by rigid finish material fully concealing joints and which will not telegraph unevenness.

2. Level 4, ASTM C840 and GA-214-10:

a. Tape joint compound and finishing compound as recommended by manufacturer of gypsum board.

b. Using suitable tool or machine, apply a thin uniform layer of joint compound approximately 3-inches wide to the joint to be reinforced.

c. Center tape over the joint and seat into the compound, leaving sufficient compound under the tape to provide proper bond.

d. Apply first, fill (second), and finish (third) coats of joint compound over joints, angles, fastener heads, and accessories.

e. Touch-up and sand between coats and after last coat as needed to produce a surface free of visual defects and ready for decoration.

f. Use only water resistant materials with moisture resistant type gypsum board.

g. Upon completion of finish sanding to a smooth surface, remove all dust from wall surface. Wipe down the entire wall surface with a damp sponge mop.

h. Apply Level 4 Finish to all exposed paper faced gypsum board, except where Level 1 is allowed.

3.2 INSTALLATION OF TRIM AND ACCESSORIES

A. Control Joints: Place control joints consistent with lines of building spaces and as indicated. In public areas, confirm locations with Architect for visual effect. Frame both sides of joints independently.

1. Not more than 30 feet apart on walls and ceilings over 50 feet long.

2. Fire-Rated Joints: Comply with Gypsum Association GA-234 for control joints in fire-rated assemblies.

B. Corner Beads: Install at external corners, using longest practical lengths.

C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials and as indicated.

1. U-Bead: Use at exposed panel edges.

2. L-Bead: Use at all exposed terminations of gypsum board, at all floor joints and joints to receive sealants.

3.3 CLEANING

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

END OF SECTION

CERAMIC TILING

PART 1 GENERAL

1.1 SUMMARY

A. Furnish all labor, materials, equipment, and services necessary for the installation of ceramic tile.

B. Related Sections:

1. Division 9 Section "Gypsum Board" for installation of ceramic tile backing board.

1.2 REFERENCES

A. American National Standards Institute (ANSI), Specifications for the Installation of Ceramic Tile, A108.1,.4,.5,.6,.8,.9,.10; A118.1,.3,.4,.7,.8; A136.1; and A137.1.

B. American Society for Testing and Materials (ASTM) C206, Finishing Hydrated Lime.

C. Tile Council of North America, Inc. (TCNA) Handbook for Ceramic, Glass, and Stone Tile Installation, current edition.

1.3 DEFINITIONS

A. Ceramic Tile: A generic term inclusive of all tile materials that are set with mortar and joints grouted as defined by the Tile Council of North America, Inc. (TCNA) Handbook for Ceramic, Glass, and Stone Tile Installation, current edition.

1.4 SUBMITTALS

A. Submit the following in accordance with Division 1 Section "Submittal Procedures."

B. Tile and grout samples for review of color selection.

1.5 QUALITY ASSURANCE

A. All work performed by workers skilled in the installation of ceramic tile in accordance with TCNA recommendations, specifications and tile manufacturer's instructions.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver all materials in manufacturer's unbroken packages and properly store to protect from contamination.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Ceramic Tile: Refer to Finish Material Legend.

B. Mortar, Grout, and Adhesive: Refer to Finish Material Legend.

C. Other Manufacturers: Submit Substitution Requests prior to bid date in accordance with Division 1 Section "Product Requirements."

2.2 PERFORMANCE

A. Water-Cleanable Epoxy Adhesives and Grout: Shall be stainproof, chemical resistant 100% solids epoxy with high temperature resistance and shall meet the following minimum physical requirements in compliance with ANSI A118.3 test methods:

1. Compressive Strength: 4500 psi min.

2. Shear Bond Strength: 1000 psi min.

3. Water Absorption: 0.5% max.

4. Service Temperature: Up to 230°F.

5. The finished epoxy grout shall be chemically and stain resistant to ketchup, mustard, tea, coffee, milk, soda, beer, wine, bleach (5% solution), ammonia, juices, vegetable oil, detergent, brine, sugar, cosmetics, and blood. It shall also be chemically resistant to dilute acids and alkalis, gasoline, turpentine, and mineral spirits.

2.3 MATERIALS

A. Ceramic tile shall be Quality Certified by the TCNA, ANSI/TCNA A137.1, and as scheduled.

1. Base: Where wall tile occurs, base is integral with wall tile; at other wall finishes, base is 6-inches high with bullnose top edge. All base shall have a coved bottom edge.

2. Furnish all standard and accessory shapes and sizes as required to complete the work. Do all cutting of units with tile saw.

B. Epoxy Mortar: Laticrete “Latapoxy 300 Adhesive,” epoxy resin, hardener, and chemical resistant silica filler for walls and floors.

C. Epoxy Grout:

1. Laticrete “SpectraLOCK Pro Premium Grout” (Walls and Floors).

2. Color: See drawings

Waterproof Membrane, Liquid-Applied: “Laticrete “HydroBan.”

D. Uncoupling Membrane: Laticrete “Strata_Mat,” fleece laminated polyethylene membrane with mortar hydration vents, for use with modified mortar.

E. Joint Tape: 2-inches wide coated fiberglass tape.

F. Joint Sealant:

1. Mildew resistant silicone sealant. Color as selected.

2. Products:

a. DAP "8640."

b. G.E. "Sanitary 1700."

G. Sealer: As recommended by tile manufacturer.

H. Edge Trim: Schluter Systems "Schluter-SCHIENE-E," stainless steel edge protection, height sized to fit tile.

PART 3 EXECUTION

3.1 EXAMINATION

A. Inspect all surfaces and conditions on which material is to be installed. Notify Architect of any condition that would be detrimental to the proper installation, and verify all environmental requirements.

3.2 INSTALLATION

A. Walls:

1. Walls with Ceramic Tile Backing Board Substrate:

a. Coordinate with Division 9 Section "Gypsum Board" for application of ceramic tile backing board substrate.

b. Check for soundness of framing, adequate fastening, and fit of joints.

c. Cover all horizontal and vertical joints with fiberglass tape embedding in a skin coat of mortar.

d. Use TCNA W245-16 "Coated Glass Mat Water-Resistant Gypsum Backer Board" installation procedure consisting of epoxy mortar bond coat on ceramic tile backing board and epoxy grouted ceramic tile. Do not install vapor retarder behind backing board (see installation instructions of ceramic tile backing board manufacturer, GP DensShield.

e. Use TCNA W247-16 "Fiber-Reinforced Water-Resistant Gypsum Backer Board" installation procedure consisting of epoxy mortar bond coat on ceramic tile backing board and epoxy grouted ceramic tile. Do not install vapor retarder behind backing board (see installation instructions of ceramic tile backing board manufacturer, USG Fiberock.

f. Provide edge trim tile at all exposed tile edges.

B. Sealant: Install in joint between wall base and floor tile.

C. Sealer: Apply sealer before and after grouting on tiles that the manufacturer recommends sealer application.

3.3 CLEANING

A. Sponge and wash tile diagonally across joints when setting and grouting is complete. Do not use acid or acid cleaner on glazed tile. Acid clean unglazed tile not less than ten days after setting, wet tile before applying acid wash, carefully follow manufacturer's instructions, protect all adjacent surfaces, and thoroughly flush with water when completed. Finally, polish with clean dry cloths.

3.4 SCHEDULE

A. Refer to Finish Material Legend.

END OF SECTION

ACOUSTICAL CEILINGS

PART 1 GENERAL

1.1 SUMMARY

A. Furnish all labor, material, equipment, and services necessary for the installation of acoustical ceilings, complete with suspension systems.

B. Related Sections:

1. Division 1 Section “Bidder-designed System Requirements” for suspended acoustical ceilings.

1.2 REFERENCES

A. Acoustical and Insulating Materials Association Bulletin.

B. American Society for Testing and Materials (ASTM).

1.3 SUBMITTALS

A. Submit the following in accordance with Division 1 Section "Submittal Procedures."

B. Samples of exposed tee grid and acoustical board for review of color.

C. Shop drawings showing coordination of suspension grid layout with room dimensions and penetrations of ceiling mounted equipment. Include layout of systems utilizing acoustic isolation components.

D. Suspension System Design Data: 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, intermediate, or heavy duty system. Include manufacturer’s literature or ICC Reports and identification of connection devices and approved loading capabilities.

E. Manufacturer’s Suspension System Data: When using a standard 24-inch x 24-inch or 24-inch x 48-inch grid system in lieu of an Engineered Design, submit copies of manufacturer’s literature or ICC Report indicating light, intermediate, or heavy duty system. Include fixture schedule and other ceiling supported equipment and their weight, with connection devices and approved loading capabilities.

1.4 QUALITY ASSURANCE

A. Installer’s Qualifications: All work performed by skilled acoustical mechanics in the best and most professional manner. Material installed to provide a proper and symmetrical pattern in each area with joints straight and true and all corners level.

B. Regulatory Agency Requirements: All ratings in conformance with the Acoustical and Insulating Materials Association Bulletin.

C. Seismic Requirements:

2. Suspended acoustical ceiling systems, with or without lighting fixtures, air terminals, or other ceiling mounted items shall comply with the requirements of ASTM C635, ASTM C636, and the building code.

3. Ceiling areas of 144 s.f. or less surrounded by walls which connect directly to the structure above shall be exempt from these standards.

4. Light Duty systems to be used only where no loads other than ceiling acoustical materials weighing not more than 1.5 lbs./s.f. are supported by the suspension system.

5. Intermediate and Heavy Duty classification systems shall be used where suspension system is used to support acoustical material weighing more than 1.5 lbs./s.f., lighting fixtures or other equipment.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Properly store material within the building in such a manner and sufficiently in advance of installation to ensure adjustment to building temperatures and humidities.

1.6 PROJECT CONDITIONS

A. Do not begin installation until residual moisture from concrete, plaster and other wet application material is dissipated, building enclosed with permanent heating/cooling equipment in operation.

1.7 SEQUENCING AND SCHEDULING

A. Coordinate with Divisions 23 and 26 for installation of heating and lighting components integrated in the ceiling installation.

1.8 WARRANTY

A. Provide manufacturer’s standard warranty, one year minimum. This Warranty shall be in addition to, and not a limitation of, other rights the Owner may have against the Contractor under the Contract Documents.

1.9 MAINTENANCE

A. Extra Materials: Furnish to the Owner in factory-sealed containers a 2% overrun of acoustical board from the same production run as that used in this installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acoustical Board: Armstrong

B. Exposed Tee Grid: Armstrong

C. Other Manufacturers: Submit Substitution Requests prior to bid date in accordance with Division 1 Section "Product Requirements."

2.2 MATERIALS

A. ACT-1, Acoustical Board:

1. As scheduled in drawings.

B. Suspension Systems:

1. As scheduled in drawings.

C. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.

D. Wire for Hangers and Ties: ASTM A 641, Class 1 zinc coating, soft annealed, with a yield stress load of at least time three design load, but not less than 12 gauge

PART 3 EXECUTION

3.1 INSTALLATION

A. Suspension Systems:

1. System to be supported on minimum 12 gauge galvanized hanger wire at 4-feet o.c. Suspension wires spaced at greater than 4-feet shall be 10 gauge.

2. Approved type attachment devices capable of supporting five times the ceiling load and not less than 100 lbs. Powder driven devices not permitted. Vertical wires attached with a minimum of three turns and not hang more than 1-in-6 out-of-plumb unless countersloping hangers are provided.

3. Carrying channels and main runners to be level within 1/8-inch in 12-feet with hangers taut. Bending or kinking of hangers not permitted. Deflection limited to 1/360 (1/8-inch) in 4-feet. Fixture loads causing excess deflection shall be independently supported or the grid supplementally supported within 6-inches of each corner, and such loads shall not cause rotation of runners more than 2 degrees from vertical. Provide trapeze type system where obstructions preclude direct attachment. All runners shall be supported within 8-inches of wall or discontinuity.

4. Lateral bracing required in lieu of Engineered Design installed within 4-feet of walls and at 12-feet o.c. in each direction. Install four 12 gauge wires within 2-inches of a main runner intersection with a cross runner and splayed at 90 degrees from each other and at an angle not exceeding 45 degrees of the ceiling plane.

5. Adjacent and parallel to the wall, secure a stabilizer bar to the members perpendicular to the wall to prevent spreading. The wall closure member may be used at two adjacent walls with clearances maintained at the other two walls.

6. Seismic Clips: Install in compliance with ASTM C636, CISCA, and standard industry practices.

7. Light Fixture Support:

   a. Positively attach all lighting fixtures to the suspended ceiling system. The attachment device shall have a capacity of 100% of the lighting fixture weight acting in any direction.

   b. When intermediate systems are used, 12 gauge hangers shall be attached to the grid members within 3-inches of each corner of each fixture. Tandem fixtures may utilize common wires.

   c. Where heavy-duty systems are used, supplemental hangers are not required if a 48-inch modular hanger pattern is followed. When cross runners are used without supplemental hangers to support lighting fixtures, these cross runners must provide the same carrying capacity as the main runner.

   d. Lighting fixtures weighing less than 56 lbs. shall have, in addition to the requirements outlined above, two 12-gauge hangers connected from the fixture housing to the structure above. These wires may be slack. Lighting fixtures weighing 56 lbs. or more shall be supported directly from the structure above by approved hangers.

   e. Pendant-hung lighting fixtures shall be supported directly from the structure above using 9 gauge wire or approved alternate support without using the ceiling suspension system for direct support.

8. Air Terminal Support:

   a. Ceiling mounted air terminals or services weighing less than 20 lbs. shall be positively attached to the ceiling suspension main runners or to cross runners with the same carrying capacity as the main runners.

   b. Terminals or services weighing 20 lbs. but not more than 56 lbs., in addition to the above, shall have two 12-gauge hangers connected from the terminal or service to the ceiling system hangers or to the structure above. These wires may be slack.

   c. Terminals or services weighing more than 56 lbs. shall be supported directly from the structure above by approved hangers.

B. Exposed Tee Suspension System: Where suspended acoustic tee bar ceilings are called for on the Drawings, the suspension system shall be an exposed T grid. Standard hangers placed 48-inches o.c. in both directions. Exposed metal parts finished with white baked enamel. Suspension system hung in a true plane with a grid pattern of 2-feet x 4-feet unless otherwise noted.

C. Beveled tegular edge boards that are cut to fit less than full size ceiling grid modules shall have a matching beveled tegular edge routed into the cut edge. Paint the routed beveled tegular edge with paint type and color to match the factory finish.

3.2 COMPLETION

A. Adjusting Defective Work: Adjust grid height as required to maintain ceiling system leveled to within 1/8-inch in 12-feet. Remove and replace panels and tiles which are improperly placed, broken, or damaged. Adjust perimeter molding where gaps between molding and vertical surface exceeds 1/8-inch. Adjust suspension system grid to form flush hairline joints.

3.3 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

RESILIENT FLOORING

PART 1 GENERAL

1.1 SUMMARY

A. Furnish all labor, material, equipment, and services required to install resilient floor covering and base. Prepare floors to receive new material.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM).

1.3 SUBMITTALS

A. Submit the following in accordance with Division 1 Section "Submittal Procedures."

B. Sample of each color and pattern of resilient flooring and welding rods. Do not start work until samples of material have been approved.

1.4 QUALITY ASSURANCE

A. Conform to resilient flooring manufacturer's installation instructions.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver finish materials to job site only when satisfactory conditions for storage can be provided. Maintain in manufacturer's unbroken packages with original labels thereon.

1.6 PROJECT CONDITIONS

A. Do not begin installation until the work of all other trades including painting has been completed and the temperature of the rooms maintained at 70°F at least 48 hours before work proceeds.

B. The Owner will employ the services of an Independent Testing Laboratory (ITL) for testing the moisture content of concrete slabs. Cooperate with the Testing Laboratory by providing the required environmental conditions for moisture testing.

1.7 WARRANTY

A. Provide manufacturer's standard warranty for each resilient flooring type.

1.8 MAINTENANCE

A. Extra Materials: Furnish to Owner two boxes of same run of each pattern and color of tile.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Product manufacturers are listed below.

B. Other Manufacturers: Submit Substitution Requests prior to bid date in accordance with Division 1 Section "Product Requirements."

2.2 MATERIALS

A. Resilient flooring:

1. As scheduled in drawings.

B. Rubber Base:

1. ASTM F1861 Type TS, Group 1, thermoset vulcanized SBR rubber, continuous roll, 1/8-inch gauge, height as schedule in drawings, coved toe at hard floor finishes, straight base at carpet.

2. Manufacturers: Flexco, Roppe, Burke/Mercer, Johnsonite, and Nora.

3. Color: Refer to Finish and Material Legend.

C. TS-1, Rubber Transition Strip:

1. Manufacturer: Johnsonite “Rubber Reducer Strip 158.”

2. Size: 3/8-inch carpet edge reducer to resilient flooring.

3. Color: As selected by architect.

D. Stair tread and riser:

1. As scheduled in drawings.

E. Adhesives: Refer to product manufacturer's recommendations for appropriate low VOC adhesive. Use only adhesives approved by resilient flooring manufacturer.

F. Mastic Underlayment and Patching Compound:

1. Latex underlayment.

2. Manufacturer: Armstrong "S-760."

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates, with installer present, for compliance with requirements for installation tolerances, moisture content, and other conditions affecting performance.

1. Verify that finishes of substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written recommendations to ensure adhesion of resilient products.

B. Concrete Substrates: Prepare according to ASTM F710 except for:

1. Moisture testing paid for by the Owner:

2. Removal of curing compounds and hardeners used to reduce moisture emission;

3. Repair of concrete floors performed by Division 3 Section “Cast-in-place Concrete.”

3.3 INSTALLATION

A. Linoleum: Install using manufacturer's written installation system. Applicators shall be experienced in this type of installation. Pre-plan installation for least seams. All seams heat welded.

B. Rubber Reducing Strip: Install edge reducing strip at all exposed edges of resilient flooring in doorways or borders of resilient flooring and other floor finish, except not required where carpet binder bar is provided, or at metal thresholds.

C. Base:

1. Install top-set base on floor covering with corners neatly fitted.

2. Install straight base at carpets and coved base at hard floor finishes.

3. Inside corners mitered and outside corners formed from continuous roll extending at least 12-inches beyond corner and installed with contact cement.

4. Install base on cabinets where scheduled.

5. Where wall finish opening at floor is over 1/4-inch, do not install base until gap in substrate has been reduced to 1/4-inch or less with appropriate filler material.

6. Cut coved toe back at 45 degree angle at door frame terminations.

3.4 CLEANING AND SEALING

A. When floors have sufficiently seated themselves to permit cleaning and other trades have completed their work, sweep and damp mop the floors. Do not wash or machine scrub the floor for at least 5 days after installation.

B. Linoleum:

1. Remove all surface soil by sweeping or dust mopping.

2. Scrub with rotary or automatic scrubber and scrubber pad using neutral pH (7/8.5) detergent. Do not strip the factory finish. Do not saturate the floor, use as little water as possible, rinse with clean water and allow the floor to dry.

C. Demonstration: Provide instruction for Owner's maintenance personnel on proper procedures of maintaining linoleum flooring.

END OF SECTION

CARPETING

PART 1 GENERAL

1.1 SUMMARY

A. Furnish all labor, materials, equipment, and services necessary for the installation of carpet.

1.2 REFERENCES

A. American Association for Textile Chemists and Colorists (AATCC).

B. American Society for Testing and Materials (ASTM).

C. Carpet and Rug Institute (CRI).

1.3 SUBMITTALS

A. Submit the following in accordance with Division 1 Section “Submittal Procedures.”

B. Shop drawings showing the layout for each area to receive carpet. Show carpet color, trim strips, and any pertinent installation details. Do not install carpet prior to layout approval.

C. Product Data: Data on specified products describing physical and performance characteristics, patterns and colors available, and methods of installation.

D. Written certification from carpet manufacturer to the Owner stating that the register numbered carpet furnished was manufactured in accordance with these Specifications.

E. Samples:

1. Full size tile of each carpet.

2. Furnish samples of carpet to the job when and as directed by Architect for testing by an independent testing laboratory. Costs for all testing will be paid in accordance with Division 1 Section “Quality Control.”

F. Carpet manufacturer's maintenance and cleaning procedures for maximum life and appearance of carpet. This includes but is not limited to commercial cleaning, spot cleaning and vacuum cleaning for each carpet selected.

G. Warranty, as described below.

H. Certification and description of reclamation and recycling process.

I. Carpet manufacturer certification of compliance with the Carpet and Rug Institute Green Label Indoor Air Quality Test Program.

1.4 QUALITY ASSURANCE

A. Indoor Air Quality: Carpet shall meet or exceed the minimum standards contained in the Carpet and Rug Institute (CRI) consumer information label.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver all carpet to the job site in original mill wrappings, each package having register number tags attached or register number marked on packaging. Do not deliver material to job site until notification and arrangements are made to properly handle, store, and protect materials. Store under cover in well ventilated spaces as soon as delivered; protect from damage, dirt, stains, and moisture during transit and storage.

1.6 PROJECT CONDITIONS

A. Do not begin installation until the work of all other trades including painting has been completed and the temperature of the rooms maintained at 70 degrees F at least 48 hours before work proceeds.

1.7 SEQUENCING AND SCHEDULING

A. Make provisions for and do all necessary work to receive or adjoin other work, install carpet accessories, and provide holes and openings necessary to fit work of other trades.

1.8 WARRANTY

A. Contractor's Warranty: Written one year warranty starting at Substantial Completion and covering all repair or replacement due to defective materials or their installation. Any manufacturer's regular guarantee shall remain in effect for its full duration in addition to Contractor's guarantee.

B. Manufacturer's Warranty:

1. Ten year warranty against 10% loss of face fiber.

2. Ten year warranty against edge ravelling, snags, picks, runs, and delamination.

3. Five year warranty against permanent staining.

4. Five year warranty against fading (at not less than gray scale rating of 4).

5. Carpet warranted not to generate more than 3.5 KV at 70°F and 20% R.H. for life of carpet.

6. Antimicrobial effectiveness warranted for life of carpet.

1.9 MAINTENANCE

A. Extra Materials: Furnish scheduled overrun for future repairs and replacement, wrapped, packaged and labeled at the factory. Same dye lot and run as carpet installed. Save and package usable remnants; label and deliver to Owner.

B. Retain and identify trim pieces of usable size. Package and store same as specified for Overrun, below.

C. Overrun Schedule (each color):

Installed	Overrun
0 - 50 sq.yds.	10%
51 - 250 sq.yds.	5%
251+ sq.yds.	3%

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Product manufacturers are listed below.

B. Other Manufacturers: Submit Substitution Requests prior to bid date in accordance with Division 1 Section “Product Requirements.”

2.2 MATERIALS

A. All materials new and of domestic manufacture. Carpet of first quality and from the same dye lot for each color to be installed. Materials, construction, and appearance are based on the following performance specifications.

B. CPT, Carpet: Refer to Finish Material Legend.

C. Accessories:

1. Edging for Glue-Down Carpet and Walk-Off Mat: Metal or vinyl edging of standard color to complement carpet color as selected by Architect.

2. Adhesives: Solvent-free adhesives and seam sealants with low VOC emissions as recommended by carpet manufacturer. Zero-VOC if available, maximum VOC level not to exceed 50 g/l.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates, with installer present, for compliance with requirements for installation tolerances, moisture content, and other conditions affecting performance.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of carpet products.

2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written recommendations to ensure adhesion of carpet products.

B. Do not install carpet until all other trades have completed their work in the area to be carpeted.

C. Inspect carpet before laying for streaking, shading, spots, soil, tears, pull tufts, or other defects. Remove defective carpet from premises and replace with undamaged carpet.

D. Acclimate carpet a minimum of 24 hours prior to installation.

3.3 INSTALLATION

A. Carpet Tile:

1. Blend carpet tiles from different cartons to ensure minimal variation in color match. Lay carpet tile in square pattern, with pile direction parallel to next unit, set parallel to building lines.

2. Locate change of color or pattern between rooms under door centerline.

3. Fully adhere carpet tile to substrate.

4. Trim carpet tile neatly at walls and around interruptions.

3.4 CLEANING

A. Remove debris after installation and clean carpet of all spots with manufacturer approved spot remover. Remove all threads with sharp scissors and thoroughly vacuum clean. Installed carpet shall be free of spots and dirt, and be without tears, fraying, or pulled tufts.

3.5 DEMONSTRATION

A. Instruct Owner in proper care and maintenance of the carpet.

3.6 PROTECTION

A. Protection of carpet after completion of installation is specified as general work and is made a part of the work of all trades doing work in areas after carpet installation.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure carpet is without damage or deterioration at the time of Substantial Completion.

END OF SECTION

PAINTING

PART 1 GENERAL

1.1 SUMMARY

A. Furnish all labor, material, equipment, and services necessary for and incidental to painting work. Paint all surfaces in finished room areas as scheduled and those which normally require a paint finish for proper appearance and best serviceability such as wood, gypsum board, metal work, exposed conduit, pipes and ducts, and grilles, unless excepted.

B. Related Documents:

1. "Door Schedule" for door color and paint system.

2. "Finish Schedule" for room color and paint system.

3. Divisions 21 through 23 for painting of mechanical items such as piping, equipment, ductwork, etc., as required by those Divisions.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM).

B. Architectural Woodwork Institute (AWI).

C. Master Painters Institute (MPI).

D. The Society for Protective Coatings (SSPC).

E. Painting and Decorating Contractors of America (PDCA).

1.3 DEFINITIONS

A. Regardless of the specular gloss name paint manufacturers give their products, provide specular gloss as measured on a 60° and 85° geometry Parallel-Beam Glossmeter per ASTM D523 and as defined by Master Painters Institute as follows:

1. Gloss Level 1: Traditional matte finish; flat. Gloss at 60°: Maximum 5 units. Sheen at 85°: Maximum 10 units.

2. Gloss Level 2: High side sheen flat; velvet-like finish. Gloss at 60°: Maximum 10 units. Sheen at 85°: 10 to 35 units.

3. Gloss Level 3: Traditional eggshell-like finish. Gloss at 60°: 10 to 25 units. Sheen at 85°: 10 to 35 units.

4. Gloss Level 4: Satin-like finish. Gloss at 60°: 20 to 35 units. Sheen at 85°: Minimum 35 units.

5. Gloss Level 5: Traditional semi-gloss. Gloss at 60°: 35 to 70 units.

6. Gloss Level 6: Traditional gloss. Gloss at 60°: 70 to 85 units.

7. Gloss Level 7: High gloss. Gloss at 60°: More than 85 units.

1.4 SUBMITTALS

A. Submit in accordance with requirements of Division 1 Section "Submittal Procedures."

B. Samples: Samples of mixed paint, wood stain/clear coating and clear coating applied to surfaces approximating job conditions with test areas painted on job if required. 12-inch x 12-inch minimum size of samples. Obtain preliminary approval of samples before doing any work on job.

C. Complete materials list indicating all materials proposed for use; show manufacturer's name, material type and name, color name and formulation, gloss level, and location where material will be used. Revise list for changes made during construction and resubmit. Where paint provided varies from specified manufacturer's product, submit product data for both the specified basis of design product and proposed paint product. Clearly note any variance between submitted product data and specified product data.

D. Paint manufacturer certification of compliance with the VOC and chemical component limits of Green Seal requirements.

1. Flat paint: Maximum of 50 grams/liter VOC.

2. Non-flat paints and Primers: Maximum of 150 grams/liter VOC.

E. Painting subcontractor's PDCA membership status for national, state, and local levels.

1.5 QUALITY ASSURANCE

A. Paints and coatings shall comply with the VOC and chemical component limits of Green Seal requirements.

B. Painter shall be a PDCA member at national, state, and local levels.

C. Mock-ups:

1. Brush-out areas, 5-feet x 5-feet, as selected by Architect for each color and gloss level for review and prior to final color approval. After acceptance of color brush out, use that work as the reference standard to be matched by subsequent completed work.

2. 10 l.f. of paint color and finish for handrails, trim, and other linear elements of in-place surfaces. Acceptable samples may be incorporated into the Work.

3. One brush-out area of approximately 100 s.f. painted with the predominate wall color in a well-lit area selected by Architect. Paint 100 s.f. of primer, 70 s.f. of first finish coat and 40 s.f. of second finish coat such that the completed mock-up will have three levels of paint, i.e., primer only, primer plus one finish coat, and primer plus two finish coats. Leave approved mock-up in place during painting as a standard of comparison to finished

work. At completion of painting, repaint mock-up wall as necessary to conceal all lap marks.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Designate one location for the storage and mixing of materials. Keep location in a neat and clean condition at all times.

B. Deliver materials only when building is closed in and completed sufficiently to prevent freezing and other damage to paint products.

C. Deliver all materials to the job site in new and unopened containers, with the manufacturer's name, brand name, batch number, color, directions for tinting, mixing and application on a printed label on every container.

1.7 MAINTENANCE

A. Extra Materials: Furnish one gallon of each color and paint type for future repairs, packaged and labeled at the factory. Extra paint shall be mixed at the same time as paint installed.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Paint Manufacturers:

1. PPG Amercoat.

2. Benjamin Moore.

3. Burke Industrial Coatings.

4. Kelly-Moore.

5. R.J. McGlennon.

6. Miller.

7. PPG Paints.

8. Rodda.

9. Sherwin Williams.

10. USG.

B. Other Manufacturers: Submit Substitution Requests prior to bid date in accordance with Division 1 Section "Product Requirements."

2.2 MATERIALS

A. Provide paint products from one or more manufacturers as required to comply with the color/gloss level/product type combinations. The gloss level of manufacturer's product numbers in this specification may not match the required gloss level specified. Adjust manufacturer's product numbers within the same quality line to match the required gloss level.

B. Interior:

1. Enamel, Gloss Level 5, on Metal (System A):

a. Prime Coat:

(1) Ferrous Metals, Galvanized Metals, and Non-ferrous Metals:

(a) First coat latex metal primer.

(b) Manufacturers: PPG Pitt Tech Primer Finish DTM 90-712.

(2) Precoated Metal (PVDF): Treat painted surfaces with solvent and prime with epoxy.

(a) Solvent Manufacturers: PPG Amercoat "Amerase."

(b) Epoxy Primer Manufacturers: PPG ADS 510 EPOXY PVDF Bonding Primer

b. Second and Third Coats:

(1) Water-based alkyd enamel, gloss level 5.

(2) Manufacturers: PPG Speedhide WB Alkyd Semi Gloss 6-1510

2. Water-Based Acrylic, Gloss Level 5, on Wood (System H):

a. Prime and Backprime Coat:

(1) Water-based acrylic wood primer.

(2) Manufacturer: PPG “Seal Grip FD Latex Wood Primer 17-9517 Primer."

b. Second and Third Coats:

(1) Interior water-based alkyd enamel, gloss level 5.

(2) Manufacturer: PPG “Speedhide WB Alkyd Semi-Gloss 6-1510.”

3. Acrylic, Gloss Level 2, on Gypsum Board (System J):

a. Prime Coat:

(1) Vinyl acrylic latex primer.

(2) Manufacturer: USG "Sheetrock Brand Primer Surfacer Tuff-Hide."

(3) PPG Paints Speedhide MaxBuild Surfacer 6-1

b. Second and Third Coats:

(1) 100% acrylic latex, gloss level 2.

(2) Manufacturer: PPG “Speedhide Zero VOC Latex Eggshell 6-4310XI,” 4-10 @ 60.

4. Acrylic, Gloss Level 3, on Gypsum Board (System K):

a. Prime Coat:

(1) Vinyl acrylic latex primer.

(2) Manufacturer: USG "Sheetrock Brand Primer Surfacer Tuff-Hide."

(3) PPG Paints Speedhide MaxBuild Surfacer 6-1

b. Second and Third Coats:

(1) 100% acrylic latex, gloss level 3. Gloss Level 10 – 35 @ 85, 10 – 25 @ 60.

(2) Manufacturer: PPG “Speedhide Zero VOC Latex Satin 6-4410XI,” 10-20 @ 60

5. Acrylic, Gloss Level 4, on Gypsum Board (System L):

a. Prime Coat:

(1) Vinyl acrylic latex primer.

(2) Manufacturer: USG "Sheetrock Brand Primer Surfacer Tuff-Hide."

(3) PPG Paints Speedhide MaxBuild Surfacer 6-1

b. Second and Third Coats:

(1) Vinyl acrylic latex, gloss level 4.

(2) Manufacturer: PPG “Ultra Hide 150 Interior Lo Luster Latex 1433,” 20-30 @ 60.

6. Acrylic, Gloss Level 5, on Gypsum Board (System M):

a. Prime Coat:

(1) Vinyl acrylic latex primer.

(2) Manufacturer: USG "Sheetrock Brand Primer Surfacer Tuff-Hide."

(3) PPG Paints Speedhide MaxBuild Surfacer 6-1

b. Second and Third Coats:

(1) 100% acrylic latex, gloss level 5.

(2) Manufacturer: PPG “Speedhide Zero VOC Latex Semi-Gloss 6-4510XI,” 35-50 @ 60.

7. Epoxy, Gloss Level 5, on Gypsum Board (System N):

a. Prime Coat:

(1) Vinyl acrylic latex primer.

(2) Manufacturer: USG "Sheetrock Brand Primer Surfacer Tuff-Hide."

(3) PPG Paints Speedhide MaxBuild Surfacer 6-1

b. Second and Third Coats:

(1) Waterborne polyamide epoxy, gloss level 5.

(2) Manufacturer: PPG “Pitt-Glaze WB1 Pre Catalyzed WB Epoxy Semi Gloss 16-510.”

PART 3 EXECUTION

3.1 PROTECTION

A. Protection of Surfaces and Cleaning: Protect floors and other adjoining surfaces from paint droppings and spillage of materials.

3.2 SURFACE PREPARATION

A. General:

1. Carefully examine all surfaces over which finish is to be applied. Any surface not suitable for the proper finish which cannot be rectified by light sanding, cleaning, etc., must be brought to the attention of the Architect before any materials are applied. Do not proceed with the work until such conditions have been rectified. Beginning work denotes acceptance of substrates.

2. All surfaces shall be thoroughly dry before any finish is applied and application shall not be done in severely cold weather except under instructions from the Architect.

B. Wood:

1. Prime and back prime all woodwork immediately upon receipt at the job. Required for all wood finish and trim unless material has been pressure preserved or dip treated and sealed. One coat primer or undercoat as used for finishing on painted work, or one coat sealer compatible with finish coats on transparent/stain finished work.

2. Properly sand wood surfaces before any paint is applied. Knots or sappy places shall be given one coat of shellac at least twelve hours before being painted. Shellac is not to be used on any other surfaces. Use putty or wood filler of the same shade as the finish coat in filling nail holes, checks, and other blemishes, then lightly sand smooth as soon as filler has hardened.

C. Metal:

1. All metal installation shall be made complete and ready for painting. Touch-up shop or prime coats that have been damaged with material of the same type and quality as originally used on the shop coat. Thoroughly remove all rust previous to this priming operation.

2. Etch galvanized metal with phosphoric acid solution prior to applying primer.

3. Prepare substrate and apply coatings in strict adherence with coating manufacturer's instructions.

D. Gypsum Board 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 which may have formed.

E. Existing Painted Surfaces: Prepare by sanding or other procedures necessary prior to application of new paint. Primer only required on surfaces of bare substrate unless needed for adhesion to painted substrate. Verify compatibility of new and old paint prior to application of two top coats.

3.3 APPLICATION

A. Employ workers skilled in the application of paint products specified.

B. When paint mixing is required on the job, perform mixing on the premises immediately before applying, and thoroughly stir and strain all materials. Do not change or reduce any material in any way except as specified by paint manufacturer.

C. Except where method of application is specifically noted, all materials shall be applied by brush or roller. Application by spray only where approved by the Architect. All spray application shall be by airless method only.

D. Coverage and Workmanship:

1. Assume all responsibility for paint coats applied over surfaces and undercoats which 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.

2. The visible parts of the structure behind grilles and louvers are to be painted with flat black enamel.

E. Drying: Apply paints to surfaces at atmospheric temperatures of not less than 50°F and maintain this minimum temperature throughout the drying time. Ensure adequate ventilation in all painted spaces. Allow sufficient time to elapse as recommended by the manufacturer, between successive coats, to permit proper drying. Modify as necessary to suit adverse weather conditions.

F. Interior:

1. Wood Enamel: For doors, trim and other wood items where required. All surfaces are to receive three coats, one prime coat and two coats of enamel. Sheen of finish as specified above or selected. Sand smooth all surfaces after puttying, removing excess putty and prime coat imperfections. Sand lightly between second and third coats. Paint top, bottom and edges of all doors the same number of coats as the door faces after doors have been fitted.

2. Metal Enamel: All surfaces are to receive three coats (total including prime coat) of materials as specified above. All exposed interior metal, including but not limited to, grilles, registers, conduit, pipe, mechanical ducts, etc., in finished room areas are to be painted as called for above.

3. Gypsum Board: All surfaces shall receive three coats of material, as specified above including walls behind tackboards, chalkboards, markerboards acoustical panels and other surface applied accessories. Remove dust from surfaces, clean off or seal all stains and marks which may show or bleed through finishes.

4. Epoxy Finish on Gypsum Board: Apply one prime coat and two finish coats using manufacturer’s application instructions.

3.4 COLOR SCHEDULE

A. Refer to Finish Material Legend.

END OF SECTION

TOILET ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

A. Furnish all labor, material, equipment and services required for the installation of toilet and bath accessories. Supply in type, size, number and kind necessary to complete the work. Examine the Drawings for locations and any special installation details.

1.2 SUBMITTALS

A. Submit the following in accordance with Division 1 Section "Submittal Procedures."

B. Shop drawings showing detail of any modifications required to suit the installation.

C. Manufacturer's detail sheets showing installation details, listing all necessary parts and accessories, and listing color or finish options unless special finish is specified.

1.3 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by disabled persons, proper installation, adjustment, operation, cleaning, and servicing of accessories.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Specification is based on Bobrick Washroom Equipment; Bradley Corp. approved.

B. Other Manufacturers: Submit Substitution Requests prior to bid date in accordance with Division 1 Section "Product Requirements."

2.2 MATERIALS

A. Furnish type of accessories for each room as scheduled in drawings. Furnish all items with chrome plated or stainless steel finish unless specifically noted otherwise. Furnish scribe filler strips at all mirror installations where overlapping ceramic tile wainscot.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install all accessories in accordance with published standard specifications and manufacturer's recommendations. Verify required installation variations with Architect before proceeding with the work.

B. Verify that walls and surfaces to which accessories are to be mounted are reinforced or provided with backing or blocking for solid anchorage. Provide fasteners long enough to penetrate into solid anchorage. Fastening with toggle bolts, molly screws, or similar fittings not permitted.

3.2 ADJUSTING

A. Damaged Items: Bent, dented, and racked items are not acceptable. Field repairs not permitted. Refinish scratched and abraded finishes equal to original finish and indistinguishable from adjacent surfaces.

END OF SECTION

FIRE PROTECTION SPECIALTIES

PART 1 GENERAL

1.1 SUMMARY

A. Furnish all labor, material, and equipment required for the installation of fire extinguishers and cabinets.

1.2 REFERENCES

A. NFPA 10 - Standard for Portable Fire Extinguishers; National Fire Protection Association; 2007.

B. UL (FPED) - Fire Protection Equipment Directory; Underwriters Laboratories Inc.; current edition.

1.3 SUBMITTALS

A. Submit the following in accordance with Division 1 Section "Submittal Procedures."

B. Shop drawings.

C. Manufacturer’s product information.

1.4 REGULATORY REQUIREMENTS

A. Fire Extinguishers: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.

B. Provide extinguishers classified and labeled by Underwriters Laboratories Inc. for the purpose specified and indicated.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Product Manufacturers:

1. J.L. Industries, div. of J.N. Johnson Co.

2. Larsen’s Manufacturing Company.

B. Other Manufacturers: Submit Substitution Requests prior to bid date in accordance with Division 1 Section "Product Requirements."

2.2 MATERIALS

A. Cabinets:

1. Semi-Recessed: J.L. Industries " Ambassador Model 1017" with 3-inch return.

2. Door Style: J.L. Industries "V" contemporary vertical duo, door glazing No. 10 clear acrylic, vertical lettering.

B. Fire Extinguishers: UL rated 4A-80BC, J.L. Industries “Cosmic 10E," steel shell, 5-inch cylinder diameter, 20-1/2-inches high, provide one in each cabinet and one on each wall hanger.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install cabinets in accordance with manufacturer’s instructions. Refer to Drawings for wall construction and thickness for verification of requirements of semi-recessed cabinets and hardware and fasteners for installation. Set cabinets neatly and securely in place, plumb and true to building lines.

END OF SECTION

SECTION 23 05 29
HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Support and attachment components.

1.02 RELATED REQUIREMENTS

A. Section 23 05 48 - Vibration and Seismic Controls for HVAC.

1.03 REFERENCE STANDARDS

A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

C. ASTM A181/A181M - Standard Specification for Carbon Steel Forgings, for General-Purpose Piping.

D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.

E. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings.

F. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.

G. ASTM A395/A395M - Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures.

H. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

I. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel.

J. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

K. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials.

L. FM (AG) - FM Approval Guide.

M. MFMA-4 - Metal Framing Standards Publication.

N. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation.

O. UL (DIR) - Online Certifications Directory.

P. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.
   2. Coordinate the work with other trades to provide additional framing and materials required for installation.
   3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
   4. Coordinate the arrangement of supports with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
   5. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for channel (strut) framing systems, post-installed concrete and masonry anchors, and thermal insulated pipe supports.

C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

1.06 QUALITY ASSURANCE

A. Comply with applicable building code.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 SUPPORT AND ATTACHMENT COMPONENTS

A. General Requirements:
   1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of work.
   2. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.
   3. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported. Include consideration for vibration, equipment operation, and shock loads where applicable.
   4. Do not use wire, chain, perforated pipe strap, or wood for permanent supports unless specifically indicated or permitted.
   5. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
      a. Indoor Dry Locations: Use zinc-plated steel or approved equivalent unless otherwise indicated.
      b. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
      c. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.

B. Prefabricated Trapeze-Framed Metal Strut Systems:
   1. MFMA-4 compliant, pre-fabricated, MSS SP-58 type 59 continuous-slot metal strut channel with associated tracks, fittings, and related accessories.
   2. Strut Channel or Bracket Material:
      a. Indoor Dry Locations: Use painted steel, zinc-plated steel, or galvanized steel.
   3. Accessories: Provide bracket covers, cable basket clips, cable tray clips, clamps, conduit clamps, fire-retarding brackets, j-hooks, protectors, and vibration dampeners.

C. Strut Channels:
   1. ASTM A653/A653M galvanized steel bracket with clamps for surface mounting of piping or plumbing equipment support.
   2. Channel or Bracket Kits: Include rods, brackets, end-fixed fittings, covers, clips, and other related hardware required to complete sectional trapeze section for piping or other support.

D. Hanger Rods:
   1. Threaded zinc-plated steel unless otherwise indicated.
   2. Minimum Size, Unless Otherwise Indicated or Required:
      a. Equipment Supports: 1/2 inch diameter.
      b. Piping up to 1 inch: 1/4 inch diameter.
      c. Piping larger than 1 inch: 3/8 inch diameter.

d. Trapeze Support for Multiple Pipes: 3/8 inch diameter.

E. Thermal Insulated Pipe Supports:
1. General Requirements:
a. Insulated pipe supports to be provided at hanger, support, and guide locations on pipe requiring insulation or additional support.
b. Surface Burning Characteristics: Flame spread index/smoke developed index of 5/30, maximum, when tested in accordance with ASTM E84 or UL 723.
c. Pipe supports to be provided for nominally sized, 1/2 to 30 inch iron pipes.
d. Insulation inserts to consist of rigid polyisocyanurate (urethane) insulation surrounded by a 360 degree, PVC jacketing.
2. PVC Jacket:
a. Pipe insulation protection shields to be provided with a ball bearing hinge and locking seam.
b. Moisture Vapor Transmission: 0.0071 perm inch, when tested in accordance with ASTM E96/E96M.
c. Thickness: 60 mil.
3. Pipe insulation protection shields to be provided at the hanger points and guide locations on pipes requiring insulation as indicated on drawings.

F. Pipe Supports:
1. Material: ASTM A395/A395M ductile iron, ASTM A36/A36M carbon steel, ASTM A47/A47M malleable iron, ASTM A181/A181M forged steel, or ASTM A283/A283M steel.
2. Liquid Temperatures Up To 122 degrees F:
a. Overhead Support: MSS SP-58 Types 1, 3 through 12.
b. Support From Below: MSS SP-58 Types 35 through 38.

G. Beam Clamps:
1. MSS SP-58 types 19 through 23, 25 or 27 through 30 based on required load.
2. Beam C-Clamp: MSS SP-58 type 23, malleable iron and steel with plain, stainless steel, and zinc finish.
3. Small or Junior Beam Clamp: MSS SP-58 type 19, malleable iron with plain finish. For inverted usage provide manufacturer listed size(s).
4. Wide Mouth Beam Clamp: MSS SP-58 type 19, malleable iron with plain finish.
5. Centerload Beam Clamp with Extension Piece: MSS SP-58 type 30, malleable iron with plain finish.
6. FM (AG) and UL (DIR) Approved Beam Clamp: MSS SP-58 type 19, plain finish,
7. Provide clamps with hardened steel cup-point set screws and lock-nuts for anchoring in place.
8. Material: ASTM A395/A395M ductile iron, ASTM A36/A36M carbon steel, ASTM A47/A47M malleable iron, ASTM A181/A181M forged steel, or ASTM A283/A283M steel.

H. Riser Clamps:
1. For insulated pipe runs, provide two bolt-type clamps designed for installation under insulation.
2. MSS SP-58 type 1 or 8, carbon steel or steel with epoxy plated, plain, stainless steel, or zinc plated finish.
3. Medium Split Horizontal Pipe Clamp: MSS SP-58 type 4, carbon steel or stainless steel with epoxy plated, plain, stainless steel, or zinc plated finish.
4. Copper Tube Pipe Clamp: MSS SP-58 type 8, epoxy plated copper.
5. UL (DIR) listed: Pipe sizes 1/2 to 8 inch.

I. U-Bolts:
1. MSS SP-58 Type 24, carbon steel u-bolt for pipe support or anchoring.

J. Strut Clamps:
1. Pipe Clamp: Two-piece rigid, universal, or outer diameter type, carbon steel with epoxy copper or zinc finish.

K. Insulation Clamps:

1. Two bolt-type clamps designed for installation under insulation.
2. Material: Carbon steel with epoxy copper or zinc finish.

L. Pipe Hangers:
1. Split Ring Hangers:
   a. Provide hinged split ring and yoke roller hanger with epoxy copper or plain finish.
   b. Material: ASTM A47/A47M malleable iron or ASTM A36/A36M carbon steel.
   c. Provide hanger rod and nuts of the same type and material for a given pipe run.
   d. Provide coated or plated hangers to isolate steel hangers from dissimilar metal tube or pipe.
2. Clevis Hangers, Adjustable:
   a. Copper Tube: MSS SP-58 Type 1, epoxy-plated copper.
   b. Felt-Lined: MSS SP-58 Type 1, zinc-plated, silicone-free carbon steel.
   c. Light-Duty: MSS SP-58 Type 1, zinc-colored, epoxy plated.
   d. Standard-Duty: MSS SP-58 Type 1, zinc-colored, epoxy plated.

M. Dielectric Barriers: Provide between metallic supports and metallic piping and associated items of dissimilar type; acceptable dielectric barriers include rubber or plastic sheets or coatings attached securely to pipe or item.

N. Pipe Shields for Insulated Piping:
1. General Construction and Requirements:
   a. Surface Burning Characteristics: Comply with ASTM E84 or UL 723.
   b. Shields Material: UV-resistant polypropylene with glass fill.
   c. Maximum Insulated Pipe Outer Diameter: 12-5/8 inch.
   d. Minimum Service Temperature: Minus 40 degrees F.
   e. Maximum Service Temperature: 178 degrees F.
   f. Pipe shields to be provided at hanger, support, and guide locations on pipe requiring insulation or additional support.

O. Anchors and Fasteners:
1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.
2. Hollow Stud Walls: Use toggle bolts.
3. Steel: Use beam-ceiling clamps, beam clamps, machine bolts, or welded threaded studs.
4. Beam Ceiling Flanges: ASTM A47/A47M Grade 32510, malleable iron or stainless steel with copper, plain, stainless steel, or zinc finish.
5. Sheet Metal: Use sheet metal screws.
6. Wood: Use wood screws.

P. Pipe Installation Accessories:
1. Seismic Bracing Hardware:
   a. Cable Suspension Systems:
      1) Strut channel or bracket-fitted fitting with locking mechanism for pipe or equipment suspension using cable wires extended to surface-mounted end-fixing fittings.
      2) Provide cable wire and end-fixing as required to hold minimum weight of 120 lb.
   b. Cable Sway Bracing Systems:
      1) Cable wire hanger with fix and release spring mechanism enclosed using zinc housing with 302 stainless steel components for pipe or equipment suspension to surface-mounted end-fixing fittings.
      2) Provide cable wire and end-fixing as required to hold minimum weight of 25 lb.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that mounting surfaces are ready to receive support and attachment components.

B. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Provide independent support from building structure. Do not provide support from piping, ductwork, conduit, or other systems.

C. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.

D. Unless specifically indicated or approved by Architect, do not provide support from roof deck.

E. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.

F. Provide thermal insulated pipe supports complete with hangers and accessories. Install thermal insulated pipe supports during the installation of the piping system.

G. Equipment Support and Attachment:
   1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
   2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
   3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
   4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.

H. Secure fasteners according to manufacturer's recommended torque settings.

I. Remove temporary supports.

3.03 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for additional requirements.

B. Inspect support and attachment components for damage and defects.

C. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.

D. Correct deficiencies and replace damaged or defective support and attachment components.

END OF SECTION

SECTION 23 05 48
VIBRATION AND SEISMIC CONTROLS FOR HVAC

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Vibration isolation requirements.

B. Seismic control requirements.

C. Vibration isolators.

D. Seismic restraint systems.

1.02 RELATED REQUIREMENTS

A. Section 01 45 33 - Code-Required Special Inspections and Procedures.

B. Section 03 30 00 - Cast-in-Place Concrete.

C. Section 23 05 29 - Hangers and Supports for HVAC Piping and Equipment.

1.03 DEFINITIONS

A. HVAC Component: Where referenced in this section in regards to seismic controls, applies to any portion of the HVAC system subject to seismic evaluation in accordance with applicable codes, including distributed systems (e.g., ductwork, piping).

B. Seismic Restraint: Structural members or assemblies of members or manufactured elements specifically designed and applied for transmitting seismic forces between components and the seismic force-resisting system of the structure.

1.04 REFERENCE STANDARDS

A. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures.

B. ASCE 19 - Structural Applications of Steel Cables for Buildings.

C. ASHRAE (HVACA) - ASHRAE Handbook - HVAC Applications.

D. FEMA 412 - Installing Seismic Restraints for Mechanical Equipment.

E. FEMA 413 - Installing Seismic Restraints for Electrical Equipment.

F. FEMA 414 - Installing Seismic Restraints for Duct and Pipe.

G. FEMA E-74 - Reducing the Risks of Nonstructural Earthquake Damage.

H. ICC (IBC) - International Building Code.

I. MFMA-4 - Metal Framing Standards Publication.

J. SMACNA (SRM) - Seismic Restraint Manual Guidelines for Mechanical Systems.

1.05 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate selection and arrangement of vibration isolation and/or seismic control components with the actual equipment to be installed.
   2. Coordinate the work with other trades to provide additional framing and materials required for installation.
   3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
   4. Seismic Controls:
      a. Coordinate the arrangement of seismic restraints with piping, conduit, equipment, and other potential conflicts installed under other sections or by others.
      b. Coordinate the work with other trades to accommodate relative positioning of essential and nonessential components in consideration of seismic interaction.
   5. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

B. Sequencing:

1. Do not install products on or provide attachment to concrete surfaces until concrete has fully cured in accordance with Section 03 30 00.

1.06 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for products, including materials, fabrication details, dimensions, and finishes.
   1. Vibration Isolators: Include rated load capacities and deflections; include information on color coding or other identification methods for spring element load capacities.
   2. Seismic Controls: Include seismic load capacities.

C. Shop Drawings - Vibration Isolation Systems:
   1. Include dimensioned plan views and sections indicating proposed arrangement of vibration isolators; indicate equipment weights and static deflections.

D. Shop Drawings - Seismic Controls:
   1. Include dimensioned plan views and sections indicating proposed HVAC component locations and distributed system routing, with locations and details of gravity supports and seismic restraints and associated attachments.
   2. Identify anchor manufacturer, type, minimum embedment, minimum spacing, minimum member thickness, and minimum edge distance requirements.
   3. Indicate proposed arrangement of distributed system trapeze support groupings.
   4. Indicate proposed locations for distributed system flexible fittings and/or connections.
   5. Indicate locations of seismic separations where applicable.

1.07 QUALITY ASSURANCE

A. Comply with applicable building code.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 VIBRATION ISOLATION REQUIREMENTS

A. Design and provide vibration isolation systems to reduce vibration transmission to supporting structure from vibration-producing HVAC equipment and/or HVAC connections to vibration-isolated equipment.

B. Comply with applicable general recommendations of ASHRAE (HVACA), where not in conflict with other specified requirements:

C. General Requirements:
   1. Select vibration isolators to provide required static deflection.
   2. Select vibration isolators for uniform deflection based on distributed operating weight of actual installed equipment.

D. Equipment Isolation:
   1. Equipment Type: Fan Coil Units.
      a. Location: Indoor.

E. Piping Isolation:
   1. Provide vibration isolators for piping supports:
      a. Located in equipment rooms.
      b. For piping over 2 inch located below or within 50 feet of noise-sensitive areas indicated.

2.02 SEISMIC CONTROL REQUIREMENTS

A. Design and provide HVAC component restraints, supports, and attachments suitable for seismic loads determined in accordance with applicable codes, as well as gravity and operating

loads and other structural design considerations of the installed location. Consider wind loads for outdoor HVAC components.

B. Seismic Design Criteria: ICC (IBC).
   1. Seismic Design Category: D.

C. Seismic Restraints:
   1. Provide seismic restraints for HVAC components except where exempt according to applicable codes and specified seismic design criteria, as approved by authorities having jurisdiction.
   2. Comply with applicable general recommendations of the following, where not in conflict with applicable codes, seismic design criteria, or other specified requirements:
      a. ASHRAE (HVACA).
      b. FEMA 412.
      c. FEMA 413.
      d. FEMA 414.
      e. FEMA E-74.
      f. SMACNA (SRM).
   3. Seismic restraint capacities to be verified by a Nationally Recognized Testing Laboratory (NRTL) or certified by an independent third-party registered professional engineer acceptable to authorities having jurisdiction.
   4. Seismic Type Vibration Isolators:
      a. Comply with seismic design requirements, including conditions of equipment seismic certification where applicable.
   5. Seismic Restraint Systems:
      a. Except where otherwise restricted, use of either cable or rigid restraints is permitted.
      b. Use only cable restraints to restrain vibration-isolated HVAC components, including distributed systems.
      c. Use only one restraint system type for a given HVAC component or distributed system (e.g., ductwork, piping) run; mixing of cable and rigid restraints on a given component/run is not permitted.
      d. Size restraint elements, including anchorage, to resist seismic loads as necessary to restrain HVAC component in all lateral directions; consider bracket geometry in anchor load calculations.
      e. Use rod stiffener clips to attach bracing to hanger rods as required to prevent rod buckling from vertical (upward) compressive load introduced by cable or rigid restraints loaded in tension, in excess of downward tensile load due to supported HVAC component weight.
      f. Select hanger rods and associated anchorage as required to accommodate vertical (downward) tensile load introduced by rigid restraints loaded in compression, in addition to downward tensile load due to supported HVAC component weight.
      g. Clevis hangers may only be used for attachment of transverse restraints; do not use for attachment of longitudinal restraints.
      h. Where seismic restraints are attached to clevis hangers, provide clevis bolt reinforcement accessory to prevent clevis hanger deformation.
      i. Do not introduce lateral loads on open bar joist chords or the weak axis of beams, or loads in any direction at other than panel points unless approved by project Structural Engineer of Record.
   6. Ductwork Applications:
      a. Provide independent support and seismic restraint for in-line components (e.g., fans, heat exchangers, humidifiers) having an operating weight greater than 75 pounds.
      b. Positively attach appurtenances (e.g., dampers, louvers, diffusers) with mechanical fasteners.

D. Seismic Attachments:
   1. Attachments to be bolted, welded, or otherwise positively fastened without consideration of frictional resistance produced by the effects of gravity.

2. Post-Installed Concrete and Masonry Anchors: Evaluated and recognized by ICC Evaluation Service, LLC (ICC-ES) or qualified evaluation service acceptable to authorities having jurisdiction for compliance with applicable building code, and qualified for seismic applications; concrete anchors to be qualified for installation in both cracked and uncracked concrete.
3. Do not use power-actuated fasteners.
4. Do not use friction clips (devices that rely on mechanically applied friction to resist loads). Beam clamps may be used for supporting sustained loads where provided with restraining straps.
5. Comply with anchor minimum embedment, minimum spacing, minimum member thickness, and minimum edge distance requirements.
6. Concrete Housekeeping Pads:
   a. Increase size of pad as required to comply with anchor requirements.
   b. Provide pad reinforcement and doweling to ensure integrity of pad and connection and to provide adequate load path from pad to supporting structure.

E. Seismic Interactions:
1. Include provisions to prevent seismic impact between HVAC components and other structural or nonstructural components.
2. Include provisions such that failure of a component, either essential or nonessential, does not cause the failure of an essential component.

F. Seismic Relative Displacement Provisions:
1. Use suitable fittings or flexible connections to accommodate:
   a. Relative displacements at connections between components, including distributed systems (e.g., ductwork, piping); do not exceed load limits for equipment utility connections.
   b. Relative displacements between component supports attached to dissimilar parts of structure that may move differently during an earthquake.
   c. Design displacements at seismic separations.
   d. Anticipated drifts between floors.

2.03 VIBRATION ISOLATORS

A. Manufacturers:
1. Vibration Isolators:
   a. Kinetics Noise Control, Inc: www.kineticsnoise.com/#sle.
   b. Mason Industries: www.mason-ind.com/#sle.
   c. Vibro-Acoustics: www.vibro-acoustics.com/#sle.

B. General Requirements:
1. Resilient Materials for Vibration Isolators: Oil, ozone, and oxidant resistant.
2. Spring Elements for Spring Isolators:
   a. Color code or otherwise identify springs to indicate load capacity.
   b. Lateral Stability: Minimum lateral stiffness to vertical stiffness ratio of 0.8.
   c. Designed to operate in the linear portion of their load versus deflection curve over deflection range of not less than 50 percent above specified deflection.
   d. Designed to provide additional travel to solid of not less than 50 percent of rated deflection at rated load.
   e. Selected to provide designed deflection of not less than 75 percent of specified deflection.
   f. Selected to function without undue stress or overloading.
3. Seismic Snubbing Elements for Seismic Isolators:
   a. Air Gap: Between 0.125 inches and 0.25 inches unless otherwise indicated.
   b. Points of Contact: Cushioned with resilient material, minimum 0.25 inch thick; capable of being visually inspected for damage and replaced.

C. Vibration Isolators for Seismic Applications:
1. Restrained Spring Isolators, Seismic:

a. Description: Isolator assembly consisting of single or multiple free-standing, laterally stable steel spring(s) in series with elastomeric (e.g., neoprene, rubber) isolator material within a metal housing designed to prevent movement of supported equipment above an adjustable vertical limit stop; specifically designed and rated for seismic applications with integral snubbing in all directions.
b. Bottom Load Plate: Steel with provisions for bolting to supporting structure as required.
c. Furnished with integral leveling device for positioning and securing supported equipment.
d. Provides constant free and operating height.

2. Spring Isolator Hangers, Seismic:
a. Description: Isolator assembly designed for installation in hanger rod suspension system utilizing single or multiple free-standing, laterally stable steel spring(s) in series with an elastomeric element for the lower hanger rod connection; specifically designed and rated for seismic applications with vertical limit stop to prevent upward travel of hanger rod and cushion impact.
b. Designed to accommodate misalignment of bottom hanger rod up to 30 degrees (plus/minus 15 degrees) without short-circuiting of isolation.

2.04 SEISMIC RESTRAINT SYSTEMS

A. Description: System components and accessories specifically designed for field assembly and attachment of seismic restraints.

B. Cable Restraints:
1. Comply with ASCE 19.
2. Cables: Pre-stretched, galvanized steel wire rope with certified break strength.
3. Cable Connections: Use only swaged end fittings. Cable clips and wedge type end fittings are not permitted in accordance with ASCE 19.
4. Use protective thimbles for cable loops where potential for cable damage exists.

C. Rigid Restraints: Use MFMA-4 steel channel (strut), steel angle, or steel pipe for structural element; suitable for both compressive and tensile design loads.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that mounting surfaces are ready to receive vibration isolation and/or seismic control components and associated attachments.

B. Verify that conditions are satisfactory for installation prior to starting work.

3.02 CODE-REQUIRED SPECIAL INSPECTIONS

A. Arrange work to accommodate tests and/or inspections performed by Special Inspection Agency employed by Owner or Architect in accordance with Section 01 45 33 and statement of special inspections as required by applicable building code.

B. Frequency of Special Inspections: Where special inspections are designated as continuous or periodic, arrange work accordingly.
1. Continuous Special Inspections: Special Inspection Agency to be present in the area where the work is being performed and observe the work at all times the work is in progress.
2. Periodic Special Inspections: Special Inspection Agency to be present in the area where work is being performed and observe the work part-time or intermittently and at the completion of the work.

C. Seismic special inspections include, but are not limited to:
1. Installation and anchorage of vibration isolation systems for Seismic Design Categories C, D, E, and F where the approved Contract Documents require a nominal clearance of 1/4 inch or less between equipment support frame and seismic restraint; periodic inspection.
2. Verification of required clearances between HVAC equipment, distribution systems, and associated supports and fire protection sprinkler system drops and sprigs for Seismic

Design Categories C, D, E, and F; periodic inspection.

D. Prior to starting work, Contractor to submit written statement of responsibility to authorities having jurisdiction and to Owner acknowledging awareness of special requirements contained in the statement of special inspections.

E. Special Inspection Agency services do not relieve Contractor from performing inspections and testing specified elsewhere.

3.03 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install anchors and fasteners in accordance with ICC Evaluation Services, LLC (ICC-ES) evaluation report conditions of use where applicable.

C. Secure fasteners according to manufacturer's recommended torque settings.

D. Install flexible piping connections to provide sufficient slack for vibration isolation and/or seismic relative displacements as indicated or as required.

E. Vibration Isolation Systems:
   1. Spring Isolators:
      a. Position equipment at operating height; provide temporary blocking as required.
      b. Lift equipment free of isolators prior to lateral repositioning to avoid damage to isolators.
      c. Level equipment by adjusting isolators gradually in sequence to raise equipment uniformly such that excessive weight or stress is not placed on any single isolator.
   2. Isolator Hangers:
      a. Use precompressed isolator hangers where required to facilitate installation and prevent damage to equipment utility connection provisions.
      b. Locate isolator hangers at top of hanger rods in accordance with manufacturer's instructions.
   3. Clean debris from beneath vibration-isolated equipment that could cause short-circuiting of isolation.
   4. Use elastomeric grommets for attachments where required to prevent short-circuiting of isolation.
   5. Adjust isolators to be free of isolation short circuits during normal operation.
   6. Do not overtighten fasteners such that resilient material isolator pads are compressed beyond manufacturer's maximum recommended deflection.

F. Seismic Controls:
   1. Provide specified snubbing element air gap; remove any factory-installed spacers, debris, or other obstructions.
   2. Use only specified components, anchorage, and hardware evaluated by seismic design. Comply with conditions of seismic certification where applicable.
   3. Where mounting hole diameter exceeds bolt diameter by more than 0.125 inch, use epoxy grout, elastomeric grommet, or welded washer to reduce clearance to 0.125 inch or less.
   4. Equipment with Sheet Metal Housings:
      a. Use Belleville washers to distribute stress over a larger surface area of the sheet metal connection interface as approved by manufacturer.
      b. Attach additional steel as approved by manufacturer where required to transfer loads to structure.
      c. Where mounting surface is irregular, do not shim housing; reinforce housing with additional steel as approved by manufacturer.
   5. Concrete Housekeeping Pads:
      a. Size in accordance with seismic design to meet anchor requirements.
      b. Install pad reinforcement and doweling in accordance with seismic design to ensure integrity of pad and associated connection to slab.
   6. Seismic Restraint Systems:

a. Do not attach seismic restraints and gravity supports to dissimilar parts of structure that may move differently during an earthquake.
b. Install restraints within permissible angles in accordance with seismic design.
c. Install cable restraints straight between component/run and structural attachment; do not bend around other nonstructural components or structural elements.
d. Install cable restraints for vibration-isolated components slightly slack to prevent short-circuiting of isolation.
e. Install hanger rod stiffeners where indicated using only specified clamps; do not weld stiffeners to hanger rod.

END OF SECTION

SECTION 23 05 53
IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Nameplates.

B. Tags.

C. Pipe markers.

D. Ceiling tacks.

1.02 REFERENCE STANDARDS

A. ASME A13.1 - Scheme for the Identification of Piping Systems.

B. ASTM D709 - Standard Specification for Laminated Thermosetting Materials.

1.03 SUBMITTALS

A. List: Submit list of wording, symbols, letter size, and color coding for mechanical identification.

B. Chart and Schedule: Submit valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.

C. Product Data: Provide manufacturers catalog literature for each product required.

PART 2 PRODUCTS

2.01 IDENTIFICATION APPLICATIONS

A. Air Terminal Units: Tags.

B. Automatic Controls: Tags. Key to control schematic.

C. Control Panels: Nameplates.

D. Dampers: Ceiling tacks, where located above lay-in ceiling.

E. Ductwork: Nameplates.

F. Instrumentation: Tags.

G. Piping: Tags.

H. Thermostats: Nameplates.

I. Valves: Tags and ceiling tacks where located above lay-in ceiling.

2.02 NAMEPLATES

A. Manufacturers:
   1. Advanced Graphic Engraving, LLC: www.advancedgraphicengraving.com/#sle.
   2. Brimar Industries, Inc: www.pipemarker.com/#sle.
   3. Craftmark Pipe Markers: www.craftmarkid.com/#sle.
   4. Kolbi Pipe Marker Co: www.kolbipipemarkers.com/#sle.
   5. Seton Identification Products, a Tricor Direct Company: www.seton.com/#sle.

B. Letter Color: White.

C. Letter Height: 1/4 inch.

D. Background Color: Black.

E. Plastic: Comply with ASTM D709.

2.03 TAGS

A. Manufacturers:
   1. Advanced Graphic Engraving: www.advancedgraphicengraving.com/#sle.
   2. Brady Corporation: www.bradycorp.com/#sle.
   3. Brimar Industries, Inc: www.pipemarker.com/#sle.
   4. Craftmark Pipe Markers: www.craftmarkid.com/#sle.

5. Kolbi Pipe Marker Co: www.kolbipipemarkers.com/#sle.
6. Seton Identification Products, a Tricor Company: www.seton.com/#sle.

B. Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch diameter with smooth edges.

C. Valve Tag Chart: Typewritten letter size list in anodized aluminum frame.

2.04 PIPE MARKERS

A. Manufacturers:
1. Brady Corporation: www.bradycorp.com/#sle.
2. Brimar Industries, Inc: www.pipemarker.com/#sle.
3. Craftmark Pipe Markers: www.craftmarkid.com/#sle.
4. Kolbi Pipe Marker Co: www.kolbipipemarkers.com/#sle.
5. Seton Identification Products, a Tricor Company: www.seton.com/#sle.

B. Color: Comply with ASME A13.1.

C. Plastic Pipe Markers: Factory fabricated, flexible, semi- rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.

2.05 CEILING TACKS

A. Manufacturers:
1. Craftmark Pipe Markers: www.craftmarkid.com/#sle.

B. Description: Steel with 3/4 inch diameter color coded head.

C. Color code as follows:
1. HVAC Equipment: Yellow.
2. Fire Dampers and Smoke Dampers: Red.
3. Heating/Cooling Valves: Blue.

PART 3 EXECUTION

3.01 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

3.02 INSTALLATION

A. Install nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.

B. Install tags with corrosion resistant chain.

C. Install plastic pipe markers in accordance with manufacturer's instructions.

D. Locate ceiling tacks to locate valves or dampers above lay-in panel ceilings. Locate in corner of panel closest to equipment.

END OF SECTION

SECTION 23 05 93
TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Testing, adjustment, and balancing of air systems.

B. Testing, adjustment, and balancing of hydronic, steam, and refrigerating systems.

C. Measurement of final operating condition of HVAC systems.

D. Sound measurement of equipment operating conditions.

E. Vibration measurement of equipment operating conditions.

1.02 REFERENCE STANDARDS

A. ASHRAE Std 111 - Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems.

B. SMACNA (TAB) - HVAC Systems Testing, Adjusting and Balancing.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. TAB Plan: Submit a written plan indicating the testing, adjusting, and balancing standard to be followed and the specific approach for each system and component.
   1. Include at least the following in the plan:
      a. List of all air flow, water flow, sound level, system capacity and efficiency measurements to be performed and a description of specific test procedures, parameters, formulas to be used.
      b. Copy of field checkout sheets and logs to be used, listing each piece of equipment to be tested, adjusted and balanced with the data cells to be gathered for each.
      c. Discussion of what notations and markings will be made on the duct and piping drawings during the process.
      d. Final test report forms to be used.
      e. Expected problems and solutions, etc.
      f. Procedures for formal deficiency reports, including scope, frequency and distribution.

C. Control System Coordination Reports: Communicate in writing to the controls installer all setpoint and parameter changes made or problems and discrepancies identified during TAB that affect, or could affect, the control system setup and operation.

D. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
   1. Revise TAB plan to reflect actual procedures and submit as part of final report.
   2. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Architect and for inclusion in operating and maintenance manuals.
   3. Include actual instrument list, with manufacturer name, serial number, and date of calibration.
   4. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.
   5. Units of Measure: Report data in both I-P (inch-pound) and SI (metric) units.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

A. Perform total system balance in accordance with one of the following:
   1. ASHRAE Std 111, Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning, and Refrigeration Systems.
   2. SMACNA (TAB).

B. Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.

C. Where HVAC systems and/or components interface with life safety systems, including fire and smoke detection, alarm, and control, coordinate scheduling and testing and inspection procedures with the authorities having jurisdiction.

D. TAB Agency Qualifications:
   1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.
   2. Having minimum of three years documented experience.
   3. Certified by one of the following:
      a. AABC, Associated Air Balance Council: www.aabc.com/#sle; upon completion submit AABC National Performance Guaranty.
      b. NEBB, National Environmental Balancing Bureau: www.nebb.org/#sle.
      c. TABB, The Testing, Adjusting, and Balancing Bureau of National Energy Management Institute: www.tabbcertified.org/#sle.

E. TAB Supervisor and Technician Qualifications: Certified by same organization as TAB agency.

3.02 EXAMINATION

A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:
   1. Systems are started and operating in a safe and normal condition.
   2. Temperature control systems are installed complete and operable.
   3. Proper thermal overload protection is in place for electrical equipment.
   4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
   5. Duct systems are clean of debris.
   6. Fans are rotating correctly.
   7. Fire and volume dampers are in place and open.
   8. Air coil fins are cleaned and combed.
   9. Access doors are closed and duct end caps are in place.
   10. Air outlets are installed and connected.
   11. Duct system leakage is minimized.
   12. Service and balance valves are open.

B. Submit field reports. Report defects and deficiencies that will or could prevent proper system balance.

C. Beginning of work means acceptance of existing conditions.

3.03 PREPARATION

A. Hold a pre-balancing meeting at least one week prior to starting TAB work.
   1. Require attendance by all installers whose work will be tested, adjusted, or balanced.

B. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Architect to facilitate spot checks during testing.

C. Provide additional balancing devices as required.

3.04 ADJUSTMENT TOLERANCES

A. Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.

B. Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.

3.05 RECORDING AND ADJUSTING

A. Field Logs: Maintain written logs including:
   1. Running log of events and issues.

2. Discrepancies, deficient or uncompleted work by others.
3. Contract interpretation requests.
4. Lists of completed tests.

B. Ensure recorded data represents actual measured or observed conditions.

C. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.

D. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.

E. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

3.06 AIR SYSTEM PROCEDURE

A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities at site altitude.

B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.

C. Measure air quantities at air inlets and outlets.

D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.

E. Use volume control devices to regulate air quantities only to extend that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.

F. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.

G. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.

H. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.

I. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.

J. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.

K. Where modulating dampers are provided, take measurements and balance at extreme conditions. Balance variable volume systems at maximum air flow rate, full cooling, and at minimum air flow rate, full heating.

L. Measure building static pressure and adjust supply, return, and exhaust air systems to provide required relationship between each to maintain approximately 0.05 inches positive static pressure near the building entries.

M. Check multi-zone units for motorized damper leakage. Adjust air quantities with mixing dampers set first for cooling, then heating, then modulating.

N. For variable air volume system powered units set volume controller to air flow setting indicated. Confirm connections properly made and confirm proper operation for automatic variable air volume temperature control.

3.07 SCOPE

A. Test, adjust, and balance the following:
1. Fans.
2. Air Terminal Units.
3. Air Inlets and Outlets.

3.08 MINIMUM DATA TO BE REPORTED

A. Air Moving Equipment:
   1. Location.
   2. Manufacturer.
   3. Model number.
   4. Serial number.
   5. Arrangement/Class/Discharge.
   6. Air flow, specified and actual.
   7. Return air flow, specified and actual.
   8. Outside air flow, specified and actual.
   9. Total static pressure (total external), specified and actual.
   10. Inlet pressure.
   11. Discharge pressure.
   12. Sheave Make/Size/Bore.
   13. Number of Belts/Make/Size.
   14. Fan RPM.

B. Exhaust Fans:
   1. Location.
   2. Manufacturer.
   3. Model number.
   4. Serial number.
   5. Air flow, specified and actual.
   6. Total static pressure (total external), specified and actual.
   7. Inlet pressure.
   8. Discharge pressure.
   9. Sheave Make/Size/Bore.
   10. Number of Belts/Make/Size.
   11. Fan RPM.

C. Air Distribution Tests:
   1. Air terminal number.
   2. Room number/location.
   3. Terminal type.
   4. Terminal size.
   5. Area factor.
   6. Design velocity.
   7. Design air flow.
   8. Test (final) velocity.
   9. Test (final) air flow.
   10. Percent of design air flow.

END OF SECTION

SECTION 23 07 13
DUCT INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Duct insulation.

B. Duct liner.

C. Jacketing and accessories.

1.02 RELATED REQUIREMENTS

A. Section 23 05 53 - Identification for HVAC Piping and Equipment.

B. Section 23 31 00 - HVAC Ducts and Casings: Glass fiber ducts.

1.03 REFERENCE STANDARDS

A. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

B. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form.

C. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.

D. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation.

E. ASTM C916 - Standard Specification for Adhesives for Duct Thermal Insulation.

F. ASTM C1423 - Standard Guide for Selecting Jacketing Materials for Thermal Insulation.

G. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

H. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials.

I. SAE AMS3779 - Tape, Adhesive, Pressure-Sensitive Thermal Radiation Resistant, Aluminum Coated Glass Cloth.

J. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible.

K. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials.

1.04 SUBMITTALS

A. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site in original factory packaging, labelled with manufacturer's identification, including product density and thickness.

B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

1.06 FIELD CONDITIONS

A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.

B. Maintain temperature during and after installation for minimum period of 24 hours.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with UL 723.

2.02 GLASS FIBER, FLEXIBLE

A. Manufacturer:
   1. CertainTeed Corporation: www.certainteed.com/#sle.
   2. Johns Manville: www.jm.com/#sle.
   3. Knauf Insulation; Atmosphere Duct Wrap: www.knaufinsulation.com/#sle.
   4. Owens Corning Corporation: www.ocbuildingspec.com/#sle.

B. Insulation: ASTM C553; flexible, noncombustible blanket.

C. Vapor Barrier Jacket:
   1. Kraft paper with glass fiber yarn and bonded to aluminized film.
   2. Moisture Vapor Permeability: 0.02 perm inch, when tested in accordance with ASTM E96/E96M.
   3. Secure with pressure-sensitive tape.

2.03 GLASS FIBER, RIGID

A. Manufacturer:
   1. CertainTeed Corporation: www.certainteed.com/#sle.
   2. Johns Manville: www.jm.com/#sle.
   3. Knauf Insulation: www.knaufinsulation.com/#sle.
   4. Owens Corning Corporation; 700 Series FIBERGLAS Insulation: www.ocbuildingspec.com/#sle.

B. Insulation: ASTM C612; rigid, noncombustible blanket.

C. Vapor Barrier Jacket:
   1. Kraft paper with glass fiber yarn and bonded to aluminized film.
   2. Moisture Vapor Permeability: 0.02 perm inch, when tested in accordance with ASTM E96/E96M.
   3. Secure with pressure-sensitive tape.

2.04 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

A. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 1, in sheet form.
   1. Minimum Service Temperature: Minus 40 degrees F.
   2. Maximum Service Temperature: 180 degrees F.
   3. Connection: Waterproof vapor barrier adhesive.

2.05 JACKETING AND ACCESSORIES

A. Aluminum Jacket:
   1. Comply with ASTM B209/B209M, Temper H14, minimum thickness of 0.016 inch with factory-applied polyethylene and kraft paper moisture barrier on the inside surface.
   2. Thickness: 0.016 inch sheet.
   3. Finish: Smooth.
   4. Joining: Longitudinal slip joints and 2 inch laps.
   5. Fittings: 0.016 inch thick die-shaped fitting covers with factory-attached protective liner.
   6. Metal Jacket Bands: 3/8 inch wide; 0.015 inch thick aluminum.

B. Reinforced Tape:
   1. FSK tape suitable for sealing seams between insulation, insulated elbows, and fittings resulting in a tight, smooth surface without wrinkles.
   2. Comply with UL 723 or ASTM E84.
   3. Moisture Vapor Permeability: 0.00 perm inch, when tested in accordance with ASTM E96/E96M.
   4. Finish: Match insulation.

2.06 DUCT LINER

A. Manufacturers:
   1. Armacell LLC; ArmaFlex Ultra with FlameDefense: www.armacell.us/#sle.
   2. CertainTeed Corporation: www.certainteed.com/#sle.

3. Ductmate Industries, Inc, a DMI Company: www.ductmate.com/#sle.
4. Johns Manville: www.jm.com/#sle.
5. Knauf Insulation: www.knaufinsulation.com/#sle.
6. Owens Corning Corporation; QuietR Rotary Duct Insulation: www.ocbuildingspec.com/#sle.

B. Note: Choose the liner type - Elastomeric Foam or Glass Fiber.

C. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation. Comply with ASTM C916.

PART 3 EXECUTION

3.01 EXAMINATION

A. Test ductwork for design pressure prior to applying insulation materials.

B. Verify that surfaces are clean, foreign material removed, and dry.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Insulated Ducts Conveying Air Below Ambient Temperature:
1. Provide insulation with vapor barrier jackets.
2. Finish with tape and vapor barrier jacket.
3. Continue insulation through walls, sleeves, hangers, and other duct penetrations.
4. Insulate entire system, including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.

C. Ducts Exposed in Mechanical Equipment Rooms or Finished Spaces (below 10 feet above finished floor): Finish with PVC jacketing.

D. Duct and Plenum Liner Application:
1. Secure insulation with mechanical liner fasteners. Refer to SMACNA (DCS) for spacing.
2. Duct dimensions indicated are net inside dimensions required for airflow. Increase duct size to allow for insulation thickness.

3.03 REFER TO DRAWINGS FOR DUCT INSULATION SCHEDULE.

END OF SECTION

SECTION 23 07 19
HVAC PIPING INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Piping insulation.

B. Flexible removable and reusable blanket insulation.

C. Jacketing and accessories.

D. Engineered wall outlet seals and refrigerant piping insulation protection.

1.02 RELATED REQUIREMENTS

A. Section 07 84 00 - Firestopping.

B. Section 23 23 00 - HVAC Piping: Placement of inserts.

1.03 REFERENCE STANDARDS

A. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus.

B. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

C. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.

D. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form.

E. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation.

F. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.

G. ASTM D610 - Standard Practice for Evaluating Degree of Rusting on Painted Steel Surfaces.

H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

I. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials.

J. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

1.06 FIELD CONDITIONS

A. Maintain ambient conditions required by manufacturers of each product.

B. Maintain temperature before, during, and after installation for minimum of 24 hours.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.02 GLASS FIBER, RIGID

A. Manufacturers:

1. CertainTeed Corporation: www.certainteed.com/#sle.

2. Johns Manville Corporation: www.jm.com/#sle.
3. Knauf Insulation; Earthwool 1000 Degree Pipe Insulation: www.knaufinsulation.com/#sle.
4. Owens Corning Corporation; Fiberglas Pipe Insulation ASJ: www.ocbuildingspec.com/#sle.
5. Owens Corning Corporation; VaporWick Pipe Insulation: www.ocbuildingspec.com/#sle.

B. Insulation: ASTM C547 and ASTM C795; rigid molded, noncombustible.
1. K Value: ASTM C177, 0.24 at 75 degrees F.
2. Maximum Service Temperature: 850 degrees F.
3. Maximum Moisture Absorption: 0.2 percent by volume.

C. Insulation: ASTM C547 and ASTM C795; rigid molded, noncombustible, with wicking material to transport condensed water to the outside of the system for evaporation to the atmosphere.
1. K Value: ASTM C177, 0.23 at 75 degrees F.
2. Maximum Service Temperature: 220 degrees F.
3. Maximum Moisture Absorption: 0.2 percent by volume.

D. Insulation: ASTM C547 and ASTM C795; semi-rigid, noncombustible, end grain adhered to jacket.
1. Maximum Service Temperature: 650 degrees F.
2. Maximum Moisture Absorption: 0.2 percent by volume.

2.03 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

A. Manufacturers:
1. Aeroflex USA, Inc; Aerocel Stay-Seal with Protape (SSPT): www.aeroflexusa.com/#sle.
2. Armacell LLC; ArmaFlex Ultra with FlameDefense: www.armacell.us/#sle.
3. K-Flex USA LLC; K-Flex Titan: www.kflexusa.com/#sle.

B. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 1; use molded tubular material wherever possible.
1. Minimum Service Temperature: Minus 40 degrees F.
2. Maximum Service Temperature: 180 degrees F.
3. Connection: Waterproof vapor barrier adhesive.

2.04 JACKETING AND ACCESSORIES

A. PVC Plastic.
1. Jacket: One piece molded type fitting covers and sheet material, off-white color.
a. Minimum Service Temperature: 0 degrees F.
b. Maximum Service Temperature: 150 degrees F.
c. Moisture Vapor Permeability: 0.002 perm inch, maximum, when tested in accordance with ASTM E96/E96M.
d. Thickness: 10 mil, 0.010 inch.
e. Connections: Brush on welding adhesive.
2. Covering Adhesive Mastic: Compatible with insulation.

B. Aluminum Jacket:
1. Comply with ASTM B209/B209M, Temper H14, minimum thickness of 0.016 inch with factory-applied polyethylene and kraft paper moisture barrier on the inside surface.

2.05 ENGINEERED WALL OUTLET SEALS AND REFRIGERANT PIPING INSULATION PROTECTION

A. Pipe Penetration Wall Seal: Seals HVAC piping wall penetrations with compression gasket wall mounted rigid plastic outlet cover.
1. Outlet Cover Color: Gray.

B. Insulation Protection System: Refrigerant piping insulation PVC protective cover.
1. PVC Insulation Cover Color: Black with full-length velcro fastener.
2. Flame Spread and Smoke Development Rating of 24/450: Comply with ASTM E84 or UL 723.

2.06 ACCESSORIES

A. General Requirements:
   1. Provide required accessories in accordance with and subject to the recommendations of the insulation manufacturer.
   2. Furnish compatible materials which do not contribute to corrosion, soften, or otherwise attack surfaces to which applied, in either the wet or dry state.
   3. Comply with ASTM C795 requirements for materials to be used on stainless steel surfaces.
   4. Supply materials that are asbestos free.

B. Corrosion Inhibitors:
   1. Corrosion Control Gel:
      a. Corrosion Protection: Comply with ASTM B117 and ASTM D610.

PART 3 EXECUTION

3.01 EXAMINATION

A. Test piping for design pressure, liquid tightness, and continuity prior to applying insulation materials.

B. Verify that surfaces are clean and dry, with foreign material removed.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Insulated Pipes Conveying Fluids Below Ambient Temperature:
   1. Insulate entire system, including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.

C. Glass Fiber Insulated Pipes Conveying Fluids Below Ambient Temperature:
   1. Provide vapor barrier jackets, factory-applied or field-applied; secure with self-sealing longitudinal laps and butt strips with pressure-sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.
   2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.

D. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, see Section 07 84 00.

E. Pipe Exposed in Mechanical Equipment Rooms or Finished Spaces (less than 10 feet above finished floor): Finish with canvas jacket sized for finish painting.

3.03 REFER TO DRAWINGS FOR PIPE INSULATION SCHEDULE

END OF SECTION

SECTION 23 09 13
INSTRUMENTATION AND CONTROL DEVICES FOR HVAC

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Terminal Equipment Controller.

B. Wall-, Surface-, and Duct-Mounted Sensors:
   1. Temperature sensors.
   2. 410a refrigerant sensors.

C. Thermostats:
   1. Electric thermostats.
   2. Room-mount thermostat accessories.

1.02 RELATED REQUIREMENTS

A. Section 23 33 00 - Air Duct Accessories.

B. Section 26 05 83 - Wiring Connections: Electrical characteristics and wiring connections.

C. Section 26 27 26 - Wiring Devices: Elevation of exposed components.

1.03 REFERENCE STANDARDS

A. NEMA DC 3 - Residential Controls - Electrical Wall-Mounted Room Thermostats.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.05 SUBMITTALS

A. Product Data: Provide description and engineering data for each control system component. Include sizing as requested. Provide data for each system component and software module.

B. Operation and Maintenance Data: Include inspection period, cleaning methods, recommended cleaning materials, and calibration tolerances.

C. Project Record Documents: Record actual location of control components, including panels, thermostats, and sensors.

PART 2 PRODUCTS

2.01 EQUIPMENT - GENERAL

A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

2.02 TERMINAL EQUIPMENT CONTROLLER

A. Terminal equipment controllers provided for each piece of equipment, as specified, and includes point inputs and outputs as necessary to perform specified control sequences.

B. Each controller performing space temperature control provided with a matching room temperature sensor, which include terminal jack to monitor hardware and software associated with controller.

C. Each room sensor includes setpoint adjustment dial, temperature indicator, and override switch. Override switch overrides night setback mode to normal (day) mode when activated by occupant. Adjustment dial and override switch may be locked out, overridden, or limited through software from central workstation or portable terminal.

D. Each controller independent of other network communications. Controller receives real time data from central workstation or multipurpose controller.

E. Controller utilizes proportional, integral, and derivative (PID) algorithms which is field adjustable.

F. Controllers networked through communications link to the multipurpose controller.Controllers powered from 24 VAC source. Provide dedicated power source. Coordinate with Division 26.

G. Connection to existing DDC control panels via TCP/IP over the existing Ethernet system.

H. Provide software and system integration to seamlessly integrate to the existing server for common system graphics, alarming, paging out of alarms via existing paging system.

2.03 WALL-, SURFACE-, AND DUCT-MOUNT SENSORS

A. Temperature Sensors:
   1. Use thermistor or RTD type temperature sensing elements with characteristics resistant to moisture, vibration, and other conditions consistent with the application without affecting accuracy and life expectancy.
   2. Construct RTD of nickel or platinum with base resistance of 1000 ohms at 70 degrees F.
   3. 100 ohm platinum RTD is acceptable if used with project DDC controllers.
   4. Temperature Sensing Device: Compatible with project DDC controllers.
   5. Performance Characteristics:
      a. RTD:
         1) Room Sensor Accuracy: Plus/minus 0.50 degrees F minimum.
         2) Duct Averaging Accuracy: Plus/minus 0.50 degrees F minimum.
         3) Chilled Water Accuracy: Plus/minus 0.50 degrees F minimum.
         4) All Other Accuracy: Plus/minus 0.75 degrees F minimum.
         5) Range: Minus 40 degrees F through 220 degrees F minimum.
      b. Thermistor:
         1) Accuracy (All): Plus/minus 0.36 degrees F minimum.
         2) Range: Minus 25 degrees F through 122 degrees F minimum.
         3) Heat Dissipation Constant: 2.7 mW per degree C.
      c. Room Temperature Sensors:
         1) Construct for surface or wall box mounting.
      d. Room Temperature Sensors with Integral Digital Display:
         1) Construct for surface or wall box.
         2) Provide a four button keypad with the following capabilities:
            (a) Indication of space and outdoor temperatures.
            (b) Setpoint adjustment to accommodate room setpoint, DDC Input/Output Points List, and Sequence of Operation.
            (c) Display and control fan operation status.
            (d) Manual occupancy override and indication of occupancy status.
            (e) Controller mode status.
            (f) Password enabled setpoint and override modes.

2.04 THERMOSTATS

A. Electric Thermostats:
   1. Type: NEMA DC 3, 24 volts, with setback/setup temperature control.
   2. Service: Cooling only.
   3. Covers: Locking with set point adjustment, with thermometer.

B. Room-Mounted Thermostat Accessories:
   1. Thermostat Covers: Brushed aluminum.
   2. Insulating Bases: For thermostats located on exterior walls.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that systems are ready to receive work.

C. Beginning of installation means installer accepts existing conditions.

D. Sequence work to ensure installation of components is complementary to installation of similar components in other systems.

E. Coordinate installation of system components with installation of mechanical systems equipment such as air handling units and air terminal units.

F. Coordinate installation of system components with installation of mechanical systems equipment such as air handling units and air terminal units.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Conceal tubing. Run exposed only in mechanical rooms, storage rooms and like, in neat manner and properly supported.

C. Check and verify location of thermostats with plans and room details before installation. Locate 48 inches above floor. Align with lighting switches.

D. Provide conduit and electrical wiring in accordance with Section 26 05 83. Electrical material and installation shall be in accordance with appropriate requirements of Division 26.

END OF SECTION

SECTION 23 23 00
HVAC PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Piping.

B. Refrigerant.

1.02 RELATED REQUIREMENTS

A. Section 23 07 19 - HVAC Piping Insulation.

B. Section 23 81 29 - Variable Refrigerant Flow HVAC Systems

1.03 REFERENCE STANDARDS

A. ASHRAE Std 34 - Designation and Safety Classification of Refrigerants.

B. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings.

C. ASME B31.5 - Refrigeration Piping and Heat Transfer Components.

D. ASME B31.9 - Building Services Piping.

E. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation.

1.04 SUBMITTALS

A. Submit the following:
   1. List of piping materials indicating the service it is being used for. Do not submit piping product data.
   2. Product data on mechanical couplings and related components, double wall fuel oil pipe and fittings, and polypropylene waste and vent pipe.
   3. Certificate of completion.

B. Manufacturer's Installation Instructions: Indicate support, connection requirements, and isolation for servicing.

C. Project Record Documents: Record exact locations of equipment and refrigeration accessories on record drawings.

D. Maintenance Data: Include instructions for changing cartridges, assembly views, spare parts lists.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing the type of work specified in this section, with minimum 3 years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store piping and specialties in shipping containers with labeling in place.

B. Protect piping and specialties from entry of contaminating material by leaving end caps and plugs in place until installation.

C. Dehydrate and charge components such as piping and receivers, seal prior to shipment, until connected into system.

PART 2 PRODUCTS

2.01 SYSTEM DESCRIPTION

A. Where more than one piping system material is specified ensure system components are compatible and joined to ensure integrity of system is not jeopardized. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.

B. Provide pipe hangers and supports in accordance with ASME B31.5 unless indicated otherwise.

2.02 REGULATORY REQUIREMENTS

A. Comply with ASME B31.9 for installation of piping system.

2.03 PIPING

A. Copper Pipe: Hard drawn copper tubing, Class L, ASTM B88

B. Fittings:
   1. Wrought copper, 150 psi; ANSI B16.22 for soldered joints, ANSI B16.50 for brazed joints; Chase, Revere, Mueller or approved equal.

C. Service:
   1. Refrigerant piping (Type L, hard drawn, ACR cleaned).
   2. Coil condensate drains and traps, and other miscellaneous drains.

D. Pipe Supports and Anchors:
   1. Provide hangers and supports that comply with MSS SP-58.
      a. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
   2. Hangers for Pipe Sizes 1/2 to 1-1/2 Inch: Malleable iron adjustable swivel, split ring.
   3. Hangers for Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
   4. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
   5. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
   6. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.
   7. Inserts: Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

2.04 UNIONS

A. Steel Pipe: 150 psi malleable iron, brass to iron seat, ground joint, black or galvanized to match pipe.

B. Copper Tubing: 200 psi WOG bronze, ground joint, solder type.

C. Dielectric Fittings:
   1. Use non-conducting dielectric connections whenever jointing dissimilar metals.
   2. Suitable for the pressure and temperature to be encountered.

2.05 SOLDERING AND BRAZING

A. Brazed Joints:
   1. Applied locations:
      a. Below grade piping.
      b. Above grade piping larger than 2 inches for the following services:
         1) Heating water
         2) Chilled water
         3) Condenser water
         4) Heat recovery water
      c. Refrigerant piping. Braze in accordance with Copper Development Association Copper Tube Handbook using BCUP series filler material.
   2. Soldered Joints:
      a. Wrought Copper Pipe Fittings
      b. Valves, Cast Fittings, or Bronze Fittings
      c. Applied locations: Above grade piping 2 inches and smaller for the following services:
         1) Heating water
         2) Chilled water
         3) Condenser water
         4) Heat recovery water
         5) Industrial cold water
         6) Trap priming lines
   3. Valves, Cast Fittings, or Bronze Fittings

2.06 REFRIGERANT

A. Refrigerant: Use only refrigerants that have ozone depletion potential (ODP) of zero and global warming potential (GWP) of less than 50.

B. Refrigerant: R410-a as defined in ASHRAE Std 34.

PART 3 EXECUTION

3.01 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain-end ferrous pipe.

B. Remove scale and dirt on inside and outside before assembly.

C. Prepare piping connections to equipment with flanges or unions.

3.02 INSTALLATION

A. Install refrigeration specialties in accordance with manufacturer's instructions.

B. Route piping in orderly manner, with plumbing parallel to building structure, and maintain gradient.

C. Install piping to conserve building space and avoid interference with use of space.

D. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

E. Pipe Hangers and Supports:
   1. Install in accordance with ASME B31.5.
   2. Support horizontal piping as indicated.
   3. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
   4. Place hangers within 12 inches of each horizontal elbow.

END OF SECTION

SECTION 23 31 00
HVAC DUCTS AND CASINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal ducts.

B. Flexible ducts.

1.02 RELATED REQUIREMENTS

A. Section 23 05 48 - Vibration and Seismic Controls for HVAC.

B. Section 23 07 13 - Duct Insulation: External insulation and duct liner.

C. Section 23 33 00 - Air Duct Accessories.

D. Section 23 33 19 - Duct Silencers.

E. Section 23 36 00 - Air Terminal Units.

F. Section 23 37 00 - Air Outlets and Inlets: Fabric air distribution devices.

1.03 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.

B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

D. ICC (IMC) - International Mechanical Code.

E. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems.

F. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible.

G. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors.

1.04 SUBMITTALS

A. Product Data: Provide data for duct materials.

B. Shop Drawings: Indicate duct fitting types, gauges, sizes, welds, and configuration.

C. Project Record Documents: Record actual locations of ducts and duct fittings. Record changes in fitting location and type. Show additional fittings used.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience, and approved by manufacturer.

B. Installer Qualifications: Company specializing in performing the type of work specified in this section, with minimum three years of documented experience.

1.06 FIELD CONDITIONS

A. Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.

B. Maintain temperatures within acceptable range during and after installation of duct sealants.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Provide UL Class 1 ductwork, fittings, hangers, supports, and appurtenances in accordance with NFPA 90A and SMACNA (DCS) guidelines unless stated otherwise.

B. Provide metal duct unless otherwise indicated. Fibrous glass duct can be substituted at the Contractor's option.

C. Acoustical Treatment: Provide sound-absorbing liners and sectional silencers for metal-based ducts in compliance with Section 23 33 19.

D. Seismic Restraint: Fabricate in compliance with ICC (IMC) requirements; see Section 23 05 48.

E. Duct Shape and Material in accordance with Allowed Static Pressure Range:
   1. Round: Plus or minus 2 in-wc of galvanized steel.
   2. Rectangular: Plus or minus 1/2 in-wc of galvanized steel.
   3. Flexible Duct (Fabric and wire): Plus or minus 1/2 in-wc; see Section 23 37 00.

F. Duct Sealing and Leakage in accordance with Static Pressure Class:
   1. Duct Pressure Class and Material for Common Mechanical Ventilation Applications:
      a. Supply Air: 1/2 in-wc pressure class, galvanized steel.
      b. Return and Relief Air: 1/2 in-wc pressure class, galvanized steel.
      c. General Exhaust Air: 1/2 in-wc pressure class, galvanized steel.
      d. Transfer-air and Sound Booths: 1/2 in-wc pressure class, fibrous glass.
   2. Low Pressure Service: Up to 2 in-wc:
      a. Seal: Class C, apply to seal off transverse joints.
      b. Leakage:
         1) Rectangular: Class 24 or 24 cfm/100 sq ft.
         2) Round: Class 12 or 12 cfm/100 sq ft.
   3. Low Pressure Service: From 2 in-wc to 3 in-wc:
      a. Seal: Class B, apply sealing of transverse joints and longitudinal seams.
      b. Leakage:
         1) Rectangular: Class 12 or 12 cfm/100 sq ft.
         2) Round: Class 6 or 6 cfm/100 sq ft.
   4. Medium and High Pressure Service: Above 3 in-wc:
      a. Seal: Class A, apply sealing of transverse joints, longitudinal seams, and duct wall penetrations.
      b. Leakage:
         1) Rectangular: Class 6 or 6 cfm/100 sq ft.
         2) Round: Class 3 or 3 cfm/100 sq ft.

G. Duct Fabrication Requirements:
   1. Duct and Fitting Fabrication and Support: SMACNA (DCS) including specifics for continuously welded round and oval duct fittings.
   2. Use reinforced and sealed sheet-metal materials at recommended gauges for indicated operating pressures or pressure class.
   3. Construct tees, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows must be used, provide airfoil turning vanes of perforated metal with glass fiber insulation.
   4. Provide turning vanes of perforated metal with glass fiber insulation when acoustical lining is indicated.
   5. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
   6. Provide turning vanes of perforated metal with glass fiber insulation when an acoustical lining is required.
   7. Where ducts are connected to exterior wall louvers and duct outlet is smaller than louver frame, provide blank-out panels sealing louver area around duct. Use same material as duct, painted black on exterior side; seal to louver frame and duct.

2.02 METAL DUCTS

2.03 METAL DUCTS

A. Material Requirements:

1. Galvanized Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M FS Type B, with G60/Z180 coating.

B. Rectangular Metal Duct:
   1. Rectangular Double Wall Insulated: Rectangular spiral lock seam duct with galvanized steel outer wall, perforated galvanized steel inner wall; fitting with the solid inner wall.
      a. Insulation:
         1) Thickness: 1 inch.
         2) Material: Air.

C. Round Metal Ducts:
   1. Round Double Wall Insulated Duct: Round spiral lock seam duct with galvanized steel outer wall, perforated galvanized steel inner wall; fitting with the solid inner wall.
      a. Insulation:
         1) Thickness: 1 inch.
         2) Material: Air.
   2. Round Connection System: Interlocking duct connection system in accordance with SMACNA (DCS).

D. Round Spiral Duct:
   1. Round spiral lock seam duct with galvanized steel outer wall.

E. Connectors, Fittings, Sealants, and Miscellaneous:
   1. Fittings: Manufacture with solid inner wall of perforated galvanized steel.
   2. Joint Sealers and Sealants: Non-hardening, water resistant, mildew and mold resistant.
      a. Type: Heavy mastic or liquid used alone or with tape, suitable for joint configuration and compatible with substrates, and recommended by manufacturer for pressure class of ducts.
      b. Surface Burning Characteristics: Flame spread index of zero and smoke developed index of zero, when tested in accordance with ASTM E84.
   3. Gasket Tape:
      a. Provide butyl rubber gasket tape for a flexible seal between transfer duct connector (TDC), transverse duct flange (TDF), applied flange connections, and angle ring connections.
   4. Hanger Rod: ASTM A36/A36M; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.

2.04 FLEXIBLE DUCTS

A. Flexible Ducts: UL 181, Class 1, polyethylene film, mechanically fastened and rolled using galvanized steel to form spiral helix.
   1. Insulation: R6 insulation with polyethylene vapor barrier film.
   2. Pressure Rating: 10 in-wc positive and 5 in-wc negative.
   3. Maximum Velocity: 5500 fpm.
   4. Temperature Range: Minus 20 degrees F to 250 degrees F.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install, support, and seal ducts in accordance with SMACNA (DCS).

B. Install products following the manufacturer's instructions.

C. During construction, provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering the ductwork system.

D. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.

E. Flexible Ducts: Connect to metal ducts with draw bands.

F. Duct sizes indicated are precise inside dimensions. For lined ducts, maintain sizes inside lining.

G. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

H. Use crimp joints with or without bead for joining round duct sizes 8 inch and smaller with a crimp in the direction of airflow.

I. Use double nuts and lock washers on threaded rod supports.

J. Connect diffusers or light troffer boots to low-pressure ducts directly or with 5 feet maximum length of flexible duct held in place with strap or clamp.

K. Duct Accessories, Terminal Units, Inlets, and Outlets: Interconnect as indicated in Sections 23 33 00, 23 36 00, and 23 37 00.

L. Duct Insulation: Provide duct insulation. See Section 23 07 13.

3.02 CLEANING

A. Clean duct systems with high-power vacuum machines. Protect equipment that could be harmed by excessive dirt with filters or bypass during cleaning. Provide adequate access to the ductwork for cleaning purposes.

END OF SECTION

SECTION 23 33 00
AIR DUCT ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Duct access doors.

B. Duct test holes.

C. Flexible duct connectors.

D. Volume control dampers.

1.02 RELATED REQUIREMENTS

A. Section 23 05 48 - Vibration and Seismic Controls for HVAC.

B. Section 23 31 00 - HVAC Ducts and Casings.

C. Section 23 36 00 - Air Terminal Units: Pressure regulating damper assemblies.

1.03 REFERENCE STANDARDS

A. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems.

B. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible.

1.04 SUBMITTALS

A. Product Data: Provide for shop-fabricated assemblies including volume control dampers, duct access doors, duct test holes, and hardware used. Include electrical characteristics and connection requirements.

B. Project Record Drawings: Record actual locations of access doors and test holes.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect dampers from damage to operating linkages and blades.

PART 2 PRODUCTS

2.01 DUCT ACCESS DOORS

A. Fabricate in accordance with SMACNA (DCS) and as indicated.

2.02 DUCT TEST HOLES

A. Temporary Test Holes: Cut or drill in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.

B. Permanent Test Holes: Factory fabricated, air tight flanged fittings with screw cap. Provide extended neck fittings to clear insulation.

2.03 FLEXIBLE DUCT CONNECTORS

A. Fabricate in accordance with SMACNA (DCS) and as indicated.

B. Flexible Duct Connections: Fabric crimped into metal edging strip.

1. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 30 oz/sq yd.
    a. Net Fabric Width: Approximately 2 inches wide.
2. Metal: 3 inches wide, 24 gauge, 0.0239 inch thick galvanized steel.

C. Maximum Installed Length: 60 inches.

2.04 VOLUME CONTROL DAMPERS

A. Single Blade Dampers:

1. Fabricate for duct sizes up to 6 by 30 inch.

2. Blade: 24 gauge, 0.0239 inch, minimum.

B. Quadrants:
   1. Provide locking, indicating quadrant regulators on single and multi-blade dampers.
   2. On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.
   3. Where rod lengths exceed 30 inches provide regulator at both ends.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA (DCS). See Section 23 31 00 for duct construction and pressure class.

B. Provide duct test holes where indicated and required for testing and balancing purposes.

C. Provide balancing dampers at points on supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Install minimum two duct widths from duct take-off.

D. Provide balancing dampers on duct take-off to diffusers, grilles, and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly.

END OF SECTION

SECTION 23 33 19
DUCT SILENCERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Air transfer silencers.

B. Cross-talk silencers.

1.02 RELATED REQUIREMENTS

A. Section 23 31 00 - HVAC Ducts and Casings: Connections to silencers.

B. Section 23 33 00 - Air Duct Accessories: Flexible duct connections.

1.03 REFERENCE STANDARDS

A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

B. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide catalog information indicating, materials, dimensional data, pressure losses, and acoustical performance.

C. Manufacturer's Installation Instructions: Indicate installation procedures necessary to maintain integrity of sound isolation.

D. Project Record Documents: Record actual locations of cross-talk silencers, acoustic housings, ductwork lagging, and air transfer silencers.

1.05 QUALITY ASSURANCE

A. Design application of duct silencers under direct supervision of a Professional Engineer experienced in design of this work and licensed the State in which the Project is located.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

A. Comply with applicable codes for sound levels between wall partitions.

2.02 AIR TRANSFER SILENCERS

A. Description: Duct sections with sheet metal outer casing, sound absorbing fill material, and inner casing of perforated sheet metal; incorporating interior baffles of similar construction. Fabricate in accordance with SMACNA (DCS) HVAC Duct Construction Standards.

B. Materials:

1. Outer Casing: Minimum 22 gauge, 0.0299 inch thick galvanized steel with mastic filled lock formed seams, 3 inch long, 11 gauge, 0.1196 inch slip joint on both ends.
2. Inner Casing and Splitters: Minimum 24 gauge, 0.0239 inch thick perforated galvanized steel.
3. Fill: Glass fiber or mineral wool of minimum 4 lb/cu ft density.
4. Fill Liner: Bonded glass fiber matting.

2.03 CROSS-TALK SILENCERS

A. Description: Duct sections with sheet metal outer casing, sound absorbing fill material, and inner casing of perforated sheet metal; incorporating interior baffles of similar construction. Fabricate in accordance with SMACNA (DCS) HVAC Duct Construction Standards.

B. Materials:

1. Outer Casing: Minimum 22 gauge, 0.0299 inch thick galvanized steel with mastic filled lock formed seams, 3 inch long, 11 gauge, 0.1196 inch slip joint on both ends.
2. Inner Casing and Splitters: Minimum 24 gauge, 0.0239 inch thick perforated galvanized steel.
3. Fill: Glass fiber or mineral wool of minimum 4 lb/cu ft density.

4. Fill Liner: Bonded glass fiber matting.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install cross-talk silencers above ceiling.

END OF SECTION

SECTION 23 36 00
AIR TERMINAL UNITS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Single-duct terminal units.
   1. Variable-volume units.

B. Controls for terminal units.

1.02 RELATED REQUIREMENTS

A. Section 23 05 48 - Vibration and Seismic Controls for HVAC.

B. Section 23 09 13 - Instrumentation and Control Devices for HVAC: Thermostats and actuators.

C. Section 23 31 00 - HVAC Ducts and Casings.

D. Section 23 33 00 - Air Duct Accessories.

E. Section 23 37 00 - Air Outlets and Inlets.

1.03 REFERENCE STANDARDS

A. AHRI 880 (I-P) - Performance Rating of Air Terminals.

B. ASTM A492 - Standard Specification for Stainless Steel Rope Wire.

C. ASTM A603 - Standard Specification for Metallic-Coated Steel Structural Wire Rope.

D. SMACNA (SRM) - Seismic Restraint Manual Guidelines for Mechanical Systems.

1.04 SUBMITTALS

A. Product Data: Provide data indicating configuration, general assembly, and materials used in fabrication. Include catalog performance ratings that indicate airflow, static pressure, and NC designation. Include electrical characteristics and connection requirements.

B. Manufacturer's Installation Instructions: Indicate support and hanging details, installation instructions, recommendations, and service clearances required.

C. Project Record Documents: Record actual locations of units and locations of access doors required for access of valving.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

PART 2 PRODUCTS

2.01 SINGLE-DUCT, VARIABLE-VOLUME UNITS

A. Manufacturers:
   1. Price Industries, Inc: www.priceindustries.com/#sle.

B. Basis of Design: Price Industries, Inc: www.priceindustries.com/#sle.
   1. Single-Duct Terminal Unit: SDV, (direct digital controls).

C. General:
   1. Factory-assembled, AHRI 880 (I-P) rated and bearing the AHRI seal, air volume control terminal with damper assembly, flow sensor, externally mounted volume controller, duct collars, and all required features.
   2. Control box bearing identification, including but not necessarily limited to nominal cfm, maximum and minimum factory-set airflow limits, coil type and coil (right or left hand) connection, where applicable.

D. Unit Casing:
   1. Minimum 22 gauge, 0.0299 inch galvanized steel.
   2. Air Inlet Collar: Provide round, suitable for standard flexible duct sizes.
   3. Unit Discharge: Rectangular, with slip-and-drive connections.

4. Acceptable Liners:
    a. Liner not to contain pentabrominated diphenyl ether (CAS #32534-81-9) or octabrominated diphenyl ether.

E. Damper Assembly:
1. Heavy-gauge, galvanized steel, or extruded aluminum construction with solid steel, nickel-plated shaft pivoting on HDPE, self-lubricating bearings.
2. Provide integral position indicator or alternative method for indicating damper position over full range of 90 degrees.
3. Incorporate low leak damper blades for tight airflow shutoff.

F. Controls:
1. Terminal Unit Controls:
    a. Provide accessories for field interfaced controller including ball valve and thermostat.
    b. Factory ship DDC controller including airflow sensor, integral airflow transmitter, integral damper actuator, and duct-mounted temperature sensor.
    c. Sequence of Operation: Zone temperature control with airflow and coil discharge monitoring.
2. DDC (Direct-Digital Controls):
    a. Bi-directional Damper Actuator: 24 volt, powered closed, spring return open.
    b. Microprocessor-Based Controller: Air volume controller, pressure-independent with electronic airflow transducers, factory-calibrated maximum and minimum CFMs.
        1) Occupied and unoccupied operating mode.
        2) Remote reset of temperature or CFM set points.
        3) Proportional, plus integral control of room temperature.
        4) Monitoring and adjusting with portable terminal.
    c. Room Sensor:
        1) Compatible with temperature controls specified.
        2) Wall-mounted, system powered, with temperature set-point adjustment including connection access for portable operator terminal.

2.02 CONTROLS FOR TERMINAL UNITS

A. Electric, Line Voltage:

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that conditions are suitable for installation.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install the inlets of air terminal units and air flow sensors a minimum of four duct diameters from elbows, transitions, and duct takeoffs.

C. See drawings for the size(s) and duct location(s) of the air terminal units.

D. Provide ceiling access doors or locate units above easily removable ceiling components.

E. Support units individually from structure with wire rope complying with ASTM A492 and ASTM A603 in accordance with SMACNA (SRM). See Section 23 0548.

F. Do not support from ductwork.

G. Connect to ductwork in accordance with Section 23 31 00.

H. Verify that electric power is available and of the correct characteristics.

END OF SECTION

SECTION 23 37 00
AIR OUTLETS AND INLETS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Diffusers:
   1. Perforated ceiling diffusers.

B. Rectangular ceiling diffusers.

C. Registers/grilles:
   1. Ceiling-mounted, egg crate exhaust and return register/grilles.
   2. Ceiling-mounted, exhaust and return register/grilles.
   3. Ceiling-mounted, supply register/grilles.

1.02 REFERENCE STANDARDS

A. ASHRAE Std 70 - Method of Testing the Performance of Air Outlets and Air Inlets.

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

C. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems.

D. NFPA 90B - Standard for the Installation of Warm Air Heating and Air-Conditioning Systems.

E. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible.

F. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials.

G. UL 2518 - Standard for Safety Air Dispersion Systems.

1.03 SUBMITTALS

A. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.

B. Project Record Documents: Record actual locations of air outlets and inlets.

1.04 QUALITY ASSURANCE

A. Test and rate air outlet and inlet performance in accordance with ASHRAE Std 70.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Greenheck

B. Price Industries: www.price-hvac.com/#sle.

C. Titus, a brand of Air Distribution Technologies: www.titus-hvac.com/#sle.

2.02 RECTANGULAR CEILING DIFFUSERS

A. Type: Provide square formed multi-louvered ceiling diffusers constructed to maintain 360 degree discharge air pattern.

B. Connections: As indicated on drawings.

C. Frame: Provide surface mount and snap-in type.

D. Fabrication: Steel with baked enamel finish.

E. Color: As selected by Architect from manufacturer's standard range.

2.03 PERFORATED FACE CEILING RETURN GRILLES

A. Type: Perforated face.

B. Frame: Surface mount type.

C. Fabrication: Steel with steel frame and baked enamel finish.

D. Color: As selected by Architect from manufacturer's standard range.

2.04 CEILING SUPPLY REGISTERS/GRILLES

A. Type: Streamlined and individually adjustable curved blades to discharge air along face of grille, two-way deflection.

B. Frame: 1-1/4 inch margin with countersunk screw mounting and gasket.

C. Construction: Made of aluminum extrusions with factory enamel finish.

D. Color: As selected by Architect from manufacturer's standard range.

E. Damper (if required): Integral, gang-operated, opposed blade type with removable key operator, operable from face.

2.05 CEILING EXHAUST AND RETURN REGISTERS/GRILLES

A. Type: Streamlined blades, 3/4 inch minimum depth, 3/4 inch maximum spacing, with blades set at 45 degrees, vertical face.

B. Frame: 1-1/4 inch margin with countersunk screw mounting.

C. Fabrication: Steel with 20 gauge, 0.0359 inch minimum frames and 22 gauge, 0.0299 inch minimum blades, steel and aluminum with 20 gauge, 0.0359 inch minimum frame, or aluminum extrusions, with factory baked enamel finish.

D. Color: To be selected by Architect from manufacturer's standard range.

E. Damper (if required): Integral, gang-operated, opposed blade type with removable key operator, operable from face where not individually connected to exhaust fans.

2.06 CEILING EGG CRATE EXHAUST AND RETURN GRILLES

A. Type: Egg crate style face consisting of 1/2 by 1/2 by 1/2 inch grid core.

B. Fabrication: Grid core consists of aluminum with mill aluminum finish.

C. Color: To be selected by Architect from manufacturer's standard range.

D. Accessories: Provide 45 degree angled eggcrate or other similar provisions for visual blocking such as angled louver or 90 degree duct elbow.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Check location of outlets and inlets and make necessary adjustments in position to comply with architectural features, symmetry, and lighting arrangement.

C. Install diffusers to ductwork with air tight connection.

D. Provide balancing dampers on duct take-off to diffusers and grilles and registers, despite whether dampers are specified as part of diffuser, or grille and register assembly.

3.02 CLOSEOUT ACTIVITIES

A. Demonstrate operational system to Owner's representative.

B. Instruct Owner's representative to maintain system and use occupant controls or interfaces, as required.

3.03 PROTECTION

A. Protect installed products until completion of project.

B. Replace, repair, or touch-up damaged products before Substantial Completion.

END OF SECTION

SECTION 23 81 29
VARIABLE REFRIGERANT FLOW HVAC SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Refrigerant piping.

B. Refrigerant branch units.

C. Indoor units.

1.02 RELATED REQUIREMENTS

A. Section 23 05 29 - Hangers and Supports for HVAC Piping and Equipment.

B. Section 23 07 19 - HVAC Piping Insulation.

C. Section 23 08 00 - Commissioning of HVAC.

D. Section 23 23 00 - HVAC Piping.

E. Section 25 15 00 - Integrated Automation Software.

1.03 REFERENCE STANDARDS

A. AHRI 210/240 - Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment.

B. AHRI 1230 - Performance Rating of Variable Refrigerant Flow (VRF) Multi-Split Air-Conditioning and Heat Pump Equipment.

C. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures.

D. ASHRAE Std 15 - Safety Standard for Refrigeration Systems.

E. ASHRAE Std 34 - Designation and Safety Classification of Refrigerants.

F. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings.

G. ITS (DIR) - Directory of Listed Products.

H. NFPA 70 - National Electrical Code.

I. UL 1995 - Heating and Cooling Equipment.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Submit manufacturer's standard data sheets showing the following for each item of equipment, marked to correlate to equipment item markings indicated in Contract Documents:

1. Indoor Units:
    a. Output and Input Cooling Capacity: Btu/h.
    b. Output and Input Heating Capacity: Btu/h.
    c. Fan Capacity: Flow in cfm with respective fan curves.
    d. External Static Pressure (ESP): In-wc.
    e. Electrical Data: Complete including motor size.
    f. Maximum Lift of Built-in Condensate Pump.
2. Control Panels: Complete data of controllers, input-output points, and zones.

C. Shop Drawings: Installation drawings custom-made for this project; include as-designed HVAC layouts, locations of equipment items, refrigerant piping sizes and locations, condensate piping sizes and locations, remote sensing devices, control components, electrical connections, control wiring connections. Include:

1. Detailed piping diagrams, with branch balancing devices.
2. Condensate piping routing, size, and pump connections.
3. Detailed power wiring diagrams.
4. Detailed control wiring diagrams.

5. Locations of required access through fixed construction.
6. Drawings required by manufacturer.

D. Design Data:
1. Provide design calculations showing that system will achieve performance specified.
2. Provide design data with respective calculations for respective climate zone in accordance with ASHRAE Std 90.1 I-P, ASHRAE Std 15, and ASHRAE Std 34.

E. Operating and Maintenance Data:
1. Manufacturer's complete standard instructions for each unit of equipment and control panel.
2. Custom-prepared system operation, troubleshooting, and maintenance instructions and recommendations.
3. Identification of replaceable parts and local source of supply.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications:
1. Company that has been manufacturing variable refrigerant volume heat pump equipment for at least 5 years.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, and handle equipment and refrigerant piping according to manufacturer's recommendations.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Daikin: www.daikinac.com/#sle.

B. Basis of Design: : www.daikinac.com/#sle.

C. Existing VRV system is Daikin. New indoor units to be compatible with existing system.

2.02 VARIABLE REFRIGERANT FLOW SYSTEM

A. Minimum System Requirements:
1. System Testing, Capacity Rating, and Performance:
a. AHRI 1230 when cooling capacity is equal or greater than 65,000 Btu/h.
b. AHRI 210/240 when cooling capacity is below 65,000 Btu/h.
2. Safety Certification: Bear UL 1995 tested and ITS (DIR) listed certification label.
3. Outdoor Units: Furnish installation and surface support hardware products in accordance with ASCE 7 for wind restraint.
4. Cooling Mode Interior Performance:
a. Daytime Setpoint: 68 degrees F, plus or minus 2 degrees F.
b. Setpoint Range: 57 degrees F to 77 degrees F.
c. Night Setback: 78 degrees F.
d. Interior Relative Humidity: 20 percent, maximum.
5. Heating Mode Interior Performance:
a. Setpoint: 68 degrees F, plus or minus 2 degrees F.
b. Setpoint Range: 59 to 80 degrees F.
c. Night Setback: 60 degrees F.
d. Minimum Interior Relative Humidity: 10 percent RH.

2.03 REFRIGERANT PIPING

A. Two-Pipe Run: Provide low-pressure vapor and high-pressure vapor gas pipes for each indoor unit selected for seasonal heating or cooling service.

B. Three-Pipe Run: Provide low-pressure vapor, high-pressure vapor gas, and liquid pipes for each indoor unit selected for off-season heating and cooling changeover service.

C. Refrigerant Flow Balancing: Provide refrigerant piping joints and headers specifically designed to ensure proper refrigerant balance and flow for optimum system capacity and performance; T-

style joints are prohibited.

2.04 INDOOR UNITS

A. Manufacturers:

B. Minimum Unit Requirements:
   1. DX Evaporator Coil:
      a. Copper tubes expanded into aluminum fins to form a mechanical bond; waffle louver fin and high heat exchange, rifled bore tube design; factory tested.
      b. 2-, 3-, or 4-row cross fin design with 14 to 17 fins per inch and flare end-connections.
      c. Provide thermistor on liquid and gas lines wired into local controller.
      d. Refrigerant circuits factory-charged with dehydrated air for field charging.
   2. Fan Section:
      a. Variable or three-speed ECM fan with automatic airflow adjustment; external static pressure selectable during commissioning.
      b. Thermally protected, direct-drive motor with statically and dynamically balanced fan blades.
      c. Minimum-adjustable external static pressure 0.32 in-wc; provide for mounting of field-installed ducts.
   3. Local Unit Controls:
      a. Temperature Control: Return air control using thermistor tied to computerized Proportional-Integral-Derivative (PID) control of superheat.
      b. Temperature Zones:
         1) Single Indoor Unit: Set served space(s) as the local temperature zone.
         2) Multiple Indoor Units: For large zones, group and coordinate related indoor units with served spaces as the local temperature zone with each indoor unit as sub-zone.
   4. Return Air Filter:
      a. Manufacturer's standard.
   5. Condensate:
      a. Built-in condensate drain pan with PVC drain connection for drainage.
      b. Units With Built-In Condensate Pumps: Provide condensate safety shutoff and alarm.
      c. Units Without Built-In Condensate Pump: Provide built-in condensate float switch and wiring connections.
   6. Cabinet Insulation: Sound absorbing foamed polystyrene and polyethylene insulation.

C. Ceiling-Concealed Ducted Indoor Units:
   1. Manufacturers:
      a. High Static, Ceiling-Concealed Ducted Indoor Units:
         1) Daikin: www.daikinac.com/#sle.
   2. Type: Ducted unit with DX coil, tubed drain pan, and built-in controls with thermostat remotely coordinated by outdoor air unit to maintain local air temperature setpoint.
   3. Ducted horizontal discharge and side or back-end return; galvanized steel cabinet.
   4. Variable or three-speed ECM fan with automatic airflow adjustment; external static pressure selectable during commissioning.
   5. Return Air Filter: Manufacturer's standard.
   6. Sound Pressure: Measured at low speed at 5 feet below unit.
   7. Provide external static pressure switch adjustable for high efficiency filter operation
   8. Condensate Pump: Built-in, with lift of 9 inches, minimum.
   9. Switchbox accessible from side or bottom.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that required electrical services have been installed and are in the proper locations prior to starting installation.

B. Verify that condensate piping has been installed and is in the proper location prior to starting installation.

C. Notify Architect if conditions for installation are unsatisfactory.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install refrigerant piping in accordance with equipment manufacturer's instructions.

C. Perform wiring in accordance with NFPA 70, National Electric Code (NEC).

D. Coordinate with installers of systems and equipment connecting to this system.

E. Refrigerant Piping: See Section 23 23 00 with Section 23 07 19 for insulation, and Section 23 05 29 for hangers and supports unless following specific manufacturer recommendations.

F. Connect indoor units to condensate piping.

G. Coordinate BAS, BMS, or Integrated Automation linking between local controller(s) and remote front-end interface; see Section 25 1500.

3.03 SYSTEM STARTUP

A. Provide manufacturer's field representative to perform system startup.

B. Prepare and start equipment and system in accordance with manufacturer's instructions and recommendations.

C. Adjust equipment for proper operation within manufacturer's published tolerances.

3.04 CLEANING

A. Clean exposed components of dirt, finger marks, and other disfigurements.

3.05 PROTECTION

A. Protect installed components from subsequent construction operations.

B. Replace exposed components broken or otherwise damaged beyond repair.

END OF SECTION