

# PROJECT MANUAL

For the Construction of:

DPW Project No. 20-232  
Idaho State University  
Custodian Office Remodel-Bldg. 24  
Pocatello, Idaho  
January 2022

Agency Construction Approval ✓

**CONSTRUCTION APPROVAL BY RESPONSIBLE CHIEF OFFICER OF INSTITUTION OR AGENCY**  
(IDAHO CODE 67-5710)

This is to indicate that I or my delegated staff have reviewed the final plans and specifications for:  
2020232 ISU: New Office/Conf Rm Sp, Maint/Weld Shops

DPW Project No.  
2020232

This project incorporates the required program elements within the funding limitations authorized, and authorize the Division of Public Works to proceed with bidding of the project. If acceptable bids are received, I will approve awarding a contract and construction of the facilities in accordance with the plans and specifications.

Agency:  
ISU

Agency Signature Authority:  
Cheryl Hanson

⚠ Please Save before taking approval action.

Approval Approved Due: 1-Feb-2022

Name or Role	Status	Actions
1 Agency - Signature Authority	Approved Cheryl Hanson 24-Jan-2022 10:17 PM MST	
2 Project Manager	Approved John Julian 25-Jan-2022 08:09 AM MST	
3 Project Manager Senior	Approved Marge Kennedy (SR PM) 25-Jan-2022 10:01 AM MST	
4 DPW Administrator	Approved Pat Donaldson 25-Jan-2022 12:29 PM MST	



990 John Adams Parkway, P.O. Box 2212, Idaho Falls, Idaho 83403-2212  
Telephone: (208)522-8779 / Fax: (208)522-8785 / Email: nbw@nbwarchitects.com



Project Manual

for

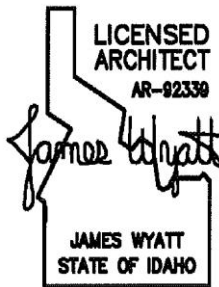
**DPW Project No. 20-232  
Idaho State University  
Custodian Office Remodel-Bldg. 24  
Pocatello, Idaho**

January 2022

Architect's Project No. 19025

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ARCHITECTS:



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

MECHANICAL ENGINEER:

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

ELECTRICAL ENGINEER:

Musgrove Engineering, Inc.  
645 West 25<sup>th</sup> Street  
Idaho Falls, Idaho 83402  
Telephone: (208) 523-2862  
Fax: (208) 523-2864



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## ADVERTISEMENT FOR BIDS

Sealed proposals will be received by Division of Public Works, State of Idaho at 611 Wilson Street, Suite no. 1, Pocatello, Idaho 83201 until [REDACTED], local time, on [REDACTED] for DPW Project No. 20-232 ISU Custodial Office Remodel-Bldg. 24 Relocate Testing Center, Pocatello, Idaho.

A description of the work of this project can be summarized to include but not limited to demolition of existing wood framed partitions, new wood framed partitions with new gypsum board textured and painted, replace doors, lay-in ceilings, flooring, windows, new millwork, replace roofing system. HVAC remodeling and new lighting.

Proposals will be opened and publicly read at the above hour and date.

Plans, specifications, proposal forms and other information are on file for examination at the following locations:

Division of Public Works, 502 N. 4th St., Boise, ID, 83702 (208) 332-1900

Idaho State University, 1776 Science Center Drive, Idaho Falls, Idaho.

Associated General Contractors, 1649 W Shoreline Dr., Ste. 100, Boise, ID 83702 (208) 344-2531

<https://www.idahoagc.org/plan-room>

Blueprint Specialties, 6205 W. Overland Rd., Boise, ID 83709 (208) 377-0294 [www.docuproject.com](http://www.docuproject.com)

(Design Professional), (Address), (Phone)

A bid bond in the amount of 5% of the total bid amount, including any add alternates, is required.

One set of documents may be obtained by licensed general contractors and by licensed mechanical and electrical subcontractors from the Architect (Engineer) for a refundable deposit of \$50.00. Others may obtain documents at cost, non-refundable.

A pre-bid conference will be held at (location) on (date) starting at (time). Bidders are encouraged to attend.

A Public Works Contractors License for the State of Idaho is required to bid on this work.

Estimated Cost: \$439,000

Barry J. Miller, Deputy Administrator  
Division of Public Works

END OF ADVERTISEMENT FOR BIDS

# **INSTRUCTIONS TO BIDDERS**

## **GENERAL PROVISIONS**

**DEFINITIONS:** Capitalized terms used in these Instructions to Bidders (“Instructions”) shall have the meaning given to them in the Division of Public Works’ Fixed Price Construction Contract Between Owner and Contractor.

**HEADINGS:** Headings used in these Instructions are for convenience only.

**REJECTION OF BIDS, WAIVER OF INFORMALITIES OR CANCELLATION:** Prior to the effective date of a contract, the Administrator of the Division of Public Works shall have the right to accept or reject all bids, to waive any minor deviations/informalities or to cancel the bid.

**ORAL INFORMATION:** Questions concerning a bid must be directed in writing to the designated Design Professional (architect or engineer) no less than ten (10) calendar days before bids are due unless provided otherwise via an addendum. Oral information is not binding and any reliance by a bidder on any oral information or representation is at the bidder’s sole risk. Any information given a prospective bidder in response to a written question will be provided to all prospective bidders by an addendum, if such information is necessary for purposes of submitting a bid or if failure to give such information would be prejudicial to uninformed bidders.

**PUBLIC RECORDS:** The Idaho Public Records Law, Title 74, Chapter 1, Idaho Code, allows the open inspection and copying of public records. Public records include any writing containing information relating to the conduct or administration of the public's business prepared, owned, used or retained by a State or local agency regardless of the physical form or character. Unless exempted by the Public Records Law, your bid will be a public record subject to disclosure under the Public Records Law. Any questions regarding the applicability of the Public Records Law should be addressed to your legal counsel prior to submission.

**FORM OF AGREEMENT:** Unless otherwise specified in the bid documents, the agreement between the successful bidder and the Owner (“State of Idaho”) shall be the Division of Public Works’ Fixed Price Construction Contract Between Owner and Contractor.

**PERFORMANCE AND PAYMENT BONDS:** A performance bond and payment bond are required for this Project, each in an amount of not less than one hundred percent (100%) of the Contract Price. The performance and payment bonds shall be AIA Document A312, 1984 or the most recent Edition, or a standard surety form certified approved to be the same as the AIA A312 form and shall be executed by a surety or sureties reasonably acceptable to the Owner and authorized to do business in the State of Idaho. Bonds must be provided within ten (10) calendar days following receipt of a Notice of Intent to Award.

## **BID SUBMISSION PROCESS**

**BID DOCUMENTS:** The bid documents are available from the Design Professional or as provided in the Invitation to Bid or advertisement for bids. The responsibility is on the bidder to use a complete set

of bid documents to prepare its bid and neither the Owner nor the Design Professional shall incur any liability for the bidder's failure to do so. Bidders obtain no ownership interest or any use rights, except to use in preparation of their bid, by issuance of the bid documents.

Bidders and Sub-bidders shall field verify all dimensions pertaining to the Work and shall be responsible for the determination of all quantities of materials required for the completion of the Work. The bidder shall not rely on the scale drawings of the Bidding Documents in his determination of required materials quantities. No allowance shall be made for Bidder's failure to field-verify dimensions.

If a deposit is required, the deposit will be returned to a bidder returning the complete bid documents in good condition no more than twenty (20) days after a Notice of Intent is issued and the amount of any deposit returned may be reduced if the bid documents returned are not complete or are damaged. A bidder awarded a Contract may also keep the bid documents and any deposit will be returned.

**ADDENDA:** In the event it becomes necessary to revise any part of the bid documents, addenda will be issued. Information given to one bidder will be available to all other bidders if such information is necessary for purposes of submitting a bid or if failure to give such information would be prejudicial to uninformed bidders. It is the bidder's responsibility to check for addenda prior to submitting a bid. A bidder is required to acknowledge receipt of all addenda by identifying the addenda numbers in the space provided on the bid proposal form. Failure to do so may result in the bid being declared non-responsive. No addenda will be issued less than four (4) calendar days before the closing date unless the bid closing date is extended.

**REVIEW:** It is the bidder's responsibility to review the bid documents and compare them as needed, including with regard to any other work that is or may be under construction that might affect the bidder or its work, to examine the site and local conditions and to report, in writing, any questions, errors, inconsistencies or ambiguities to the Design Professional.

All manufacturers of roofing systems, including those specifically named or listed as "approved" in the specifications, as well as those not specifically named or listed as "approved" shall submit to the Architect a fully executed MANUFACTURER'S CERTIFICATION from the manufacturer's authorized representative certifying that the manufacturer's representative has received the bidding documents for the project, that required guarantees can and will be issued for the specific installation, and that all specifications and detail as written and as shown are appropriate or that alternate specifications and/or details enclosed with the signed statement must be used, noting all exceptions, and listing approved applicators. THIS COMPLETED FORM SHALL BE RECEIVED BY THE ARCHITECT NO LATER THAN SEVEN (7) DAYS PRIOR TO THE DATE FOR RECEIPT OF BIDS.

THE MANUFACTURER'S CERTIFICATION FORM included in the Project Manual following these Instructions to Bidders shall be used for this purpose. Additional copies of this form may be obtained from the Architect.

The Roofing Manufacturer shall include all information required to complete the form.

**PRODUCTS SPECIFIED AND PROPOSED SUBSTITUTIONS:** Materials, products or equipment, if specified by name or manufacturer, establish the standard of quality required and that must be met by any proposed substitution. Requests for substitutions must be made in writing to the Design Professional no less than ten (10) calendar days prior to the bid closing unless provided otherwise via an addendum. Such requests must provide detailed information to allow the Design Professional to

determine if the proposed substitution is acceptable, including drawings or performance or test data and a detailed statement of how the substitution would change any other part of the Work. It is the bidder's obligation to satisfy this requirement and the Design Professional's decision shall be final. To be allowed, substitutions must be approved in an addendum to the bid documents.

All requests for approval of roofing materials not specifically named or listed as "approved" in the specifications shall be accompanied by a fully executed ROOFING MATERIALS SUBSTITUTION REQUEST FORM from the manufacturer. THIS COMPLETED FORM SHALL BE RECEIVED BY THE ARCHITECT NO LATER THAN TEN (10) DAYS PRIOR TO THE DATE FOR RECEIPT OF BIDS.

The ROOFING MATERIALS SUBSTITUTION REQUEST FORM included in the Project Manual following these Instructions to Bidders shall be used for this purpose. Additional copies of this FORM may be obtained from the Architect.

**BID FORM:** Bids must be submitted on the bid proposal forms, or copies of forms, furnished by the Owner or the design professional. Bids submitted must contain all original signatures in ink on the following forms:

Bid Proposal Form  
Contractor's Affidavit Concerning Alcohol and Drug-Free Workplace  
Bidder's Acknowledgment Statement  
Bid Bond (bid security)

The person signing the Bid Proposal Form must initial any and all changes appearing on any of the bid forms. If the bidder is a corporation or other legal entity, the bid forms must be signed by an authorized designee. Oral, telephonic, telegraphic, facsimile or other electronically transmitted bid forms and/or signatures will not be considered.

**BID PRICES:** The bid form may require bidders to submit bid prices for one (1) or more items on various bases, including lump sum base bid, lump sum bid alternate prices, unit prices or any combination thereof. Bid amounts shall be expressed in words and numbers. The amount in words shall prevail if there is a discrepancy.

**ALTERNATES:** If the solicitation includes alternate bid items or unit prices, failure to bid on the alternates or unit prices may disqualify the bid. If bidding on an alternate does not change the base bid, indicate by "No Change." If bidding on all items is not required by the Contract Documents, bidders must affirmatively indicate that they are not bidding on those items.

**TIME FOR SUBMISSION:** Bids must be submitted on or before the time specified in the advertisement for bids. Any bid submitted late will be rejected.

**SEALED ENVELOPE:** Bids shall be submitted in a sealed envelope with the following clearly printed on the outside of the envelope: the Project number and Project name; the name and address of the bidder; and a statement, such as "BID ENCLOSED" to indicate that it is a bid.

**MAILED BIDS:** When bids are mailed or shipped, the sealed envelope containing the bid shall be enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED" on the face thereof. If mailed, the mailing envelope shall be addressed as follows:

Division of Public Works  
611 Wilson Street, Suite 1  
Pocatello, Idaho 83404

It is the bidder's responsibility to ensure that its bid is delivered to the place designated for receipt on or before the specified closing time. The Owner assumes no responsibility for delays in the delivery of mail by the U.S. Post Office or private couriers. Bidders should be advised the intra-state mail system may increase delivery time from arrival at Central Postal to the place designated for receipt and should plan accordingly. **LATE SUBMISSIONS WILL BE REJECTED, WILL NOT BE OPENED AND WILL BE RETURNED TO THE BIDDER. NO DEVIATIONS WILL BE ALLOWED.**

**BID CLOSING DECLARED:** Immediately prior to the bid opening, the Owner's representative will declare the official bid closing. Any part of a bid not received prior to the bid closing declared by the designated representative will not be considered and will be returned to the bidder unopened. All bids shall be taken under advisement.

**DRUG-FREE WORKPLACE:** Along with its bid, the bidder shall submit an affidavit certifying compliance with Title 72, Chapter 17, Idaho Code, requiring the Contractor and its subcontractors at the time of bid to provide a drug-free workplace program and to maintain such program throughout the duration of the Contract. The form of affidavit is attached.

**ILLEGAL ALIENS:** Bidder shall warrant that the bidder does not knowingly hire or engage any illegal aliens or persons not authorized to work in the United States; bidder shall take steps to verify that it does not hire or engage any illegal aliens or persons not authorized to work in the United States; and that any misrepresentation in this regard or any employment of persons not authorized to work in the United States constitutes a material breach and shall be cause for the imposition of monetary penalties and/or termination of any Contract resulting from this bid.

**LEGAL RESIDENCY REQUIREMENT:** By submitting a bid, the bidder attests, under penalty of perjury, that he (the bidder) is a United States citizen or legal permanent resident or that it is otherwise lawfully present in the United States pursuant to federal law. Prior to being issued a contract, the bidder will be required to submit proof of lawful presence in the United States in accordance with §67-7903, Idaho Code.

**BIDDER'S ACKNOWLEDGEMENT STATEMENT:** The attached Bidder's Acknowledgement Statement must be completed and included or the bid may be found non-responsive.

**PUBLIC WORKS CONTRACTOR'S LICENSE:** This Project is not financed in whole or in part by federal funds. Bids will be accepted from those Contractors only (prime contractors, subcontractors and/or specialty contractors) who, prior to the bid opening, hold current licenses as public works contractors in the State of Idaho.

**IDAHO LABOR REQUIREMENTS:** This Project is subject to the provisions of Sections 44-1001 and 44-1002, Idaho Code, dealing with labor preference.

**IDAHO PREFERENCE LAW:** Section 67-2348, Idaho Code, requires the Division of Public Works to apply a preference in determining which Contractor submitted the lowest responsible bid. If the Contractor who submitted the lowest dollar bid is domiciled in a state with a preference law that

penalizes Idaho domiciled contractors, the Division of Public Works must apply the preference law (percentage amount) of that domiciliary state to that Contractor's bid.

**NAMING OF SUBCONTRACTORS:** Section 67-2310, Idaho Code, requires general (prime) Contractors to include in their bid the name of the subcontractors who shall, in the event the Contractor secures the Contract, subcontract the plumbing, HVAC, and electrical work under the general (prime) Contract. Failure to name subcontractors as required by this section shall render any bid submitted by a general (prime) Contractor nonresponsive and void. Subcontractors named in accordance with the provisions of this section must possess an appropriate license or certificate of competency issued by the State of Idaho covering the Contractor work classification in which the subcontractor is named.

The Division of Public Works interprets Section 67-2310, Idaho Code, to mean three (3) separate areas of work: plumbing work, HVAC, and electrical work. The Division of Public Works also requires that the general (prime) Contractor name the entity that will perform the Work, including if the entity is a subcontractor, a sub-subcontractor or the general (prime) Contractor submitting the bid. Failure to complete the Bid Proposal in full shall render a bid nonresponsive and void.

With regard to possessing an appropriate license or certificate of competency, all subcontractors listed by the general (prime) Contractor must have at the time of the bid opening a current license in the appropriate category (class, type and specialty category) as issued by the Public Works Contractors State License Board. In addition, plumbing, HVAC and electrical subcontractors shall have at the time of the bid opening a valid plumbing contractor's license, HVAC contractor's license or electrical contractor's license, respectively, as issued by the Idaho Division of Building Safety.

In determining if the above listed subcontractors are required on the Project, the Division of Public Works will refer to the plans and specifications. If doubt exists prior to bid closing, potential bidders should contact the Division of Public Works and the Design Professional who prepared the plans and specifications will be requested to make the determination. If plumbing, HVAC or electrical work are not shown on the plans and specifications but are discovered by the bidder prior to the date of bid opening, then the bidder must request clarification from the Design Professional. Absent such clarification, Work will be considered incidental, and naming of a subcontractor will not be required.

## **BID SECURITY**

**AMOUNT AND FORM OF SECURITY:** To be considered, bids must be accompanied by an acceptable bid security in an amount not less than five percent (5%) of the total amount of the bid, including additive alternates. The security may be in the form of a bond or a certified or cashier's check. A standard surety bid bond form meeting all the conditions of AIA Document A310 is acceptable and, if used, must include a certified and current copy of the power of attorney if the bond is executed by the attorney-in-fact on behalf of the surety.

**FORFEITURE:** A successful bidder who fails to sign the Contract for the Work or furnish the required bonds within ten (10) calendar days following the receipt of notice of intent to award a Contract is subject to forfeiture in accordance with Section 54-1904E, Idaho Code.

**RETENTION OF SECURITY:** Bid security shall be retained for no more than forty-five (45) calendar days after the opening of bids, so long as the bidder has not been notified of the acceptance of the bid.

## **BID WITHDRAWAL**

**PRIOR TO BID CLOSING:** If a bid has been submitted, it may be withdrawn in person by a bidder's authorized representative before the opening of the bids. A bidder's representative will be required to show identification and sign on a bid summary sheet before it will be released. After bid closing, no bid may be withdrawn except in strict accordance with these Instructions or applicable law.

## **BID MODIFICATION**

**PRIOR TO BID CLOSING:** If a bid has been submitted, it may be modified by the submission of a written document contained in a separate sealed envelope marked "Bid Modification from [Name of Bidder] for DPW Project No: 20-232; ISU Custodian Office Remodel-Bldg. 24, Pocatello, Idaho." **THE DOCUMENT MODIFYING THE BID MUST BE SIGNED IN INK BY AN AUTHORIZED REPRESENTATIVE OF THE SUBMITTING BIDDER. THE DIVISION OF PUBLIC WORKS RESERVES THE RIGHT TO REQUIRE PRESENTATION OF EVIDENCE SATISFACTORY TO IT TO ESTABLISH THE AUTHORITY TO ACT ON BEHALF OF THE SUBMITTING BIDDER. NO OTHER FORM OF MODIFICATION (INCLUDING TELEPHONE, FACSIMILE OR ELECTRONIC MAIL) WILL BE ACCEPTED. AFTER BID CLOSING, NO BID MAY BE MODIFIED EXCEPT IN STRICT ACCORDANCE WITH THESE INSTRUCTIONS OR APPLICABLE LAW.**

## **RELIEF FROM BIDS**

**CONDITIONS FOR RELIEF:** Relief from bids is subject to Sections 54-1904B through 54-1904E, Idaho Code. In the event a bidder discovers a mistake in its bid following the bid opening and wishes to withdraw its bid, the bidder shall establish to the satisfaction of the Owner, pursuant to Section 54-1904C, Idaho Code, that a clerical or mathematical mistake was made; the bidder gave the public entity (Owner) written notice within five (5) calendar days after the opening of the bid of the mistake, specifying in the notice in detail how the mistake occurred; and the mistake was material.

**DETERMINATION:** If the Owner determines that the bidder has satisfied the requirements of Section 54-1904C, Idaho Code, to entitle it to relief from a bid because of a mistake, it shall prepare a report in writing to document the facts establishing the existence of each required element. The report shall be available for inspection as a public record and shall be filed with the public entity soliciting bids. A bidder claiming a mistake and satisfying all the required conditions of Section 54-1904C, Idaho Code, shall be entitled to relief from the bid and have any bid security returned by the Owner. Bidders not satisfying the conditions of Section 54-1904C, Idaho Code shall be subject to forfeiture in accordance with Section 54-1904B, Idaho Code. A bidder who claims a mistake or who forfeits its bid security shall be prohibited from participating in any re-bidding of that project on which the mistake was claimed, or security forfeited and the Owner may award the Contract to the next lowest responsive and responsible bidder.

## **BIDDER'S REPRESENTATIONS**



**REPRESENTATIONS UPON SUBMITTING A BID:** By submitting its bid, a bidder represents and warrants the following:

1. The person signing the bid is authorized to bind the bidder;
2. It has all required licenses, permits or other authorizations necessary to submit its bid;
3. It has taken steps necessary to ascertain the nature and location of the Work and has investigated and satisfied itself as to the general and local conditions which can affect the Work or its cost, including but not limited to: (i) conditions bearing upon transportation, disposal, handling and storage of materials; (ii) the availability of labor, water, natural gas, electric power and roads; (iii) uncertainties of weather, river stages or similar physical conditions at the site; (iv) the conformation and conditions of the ground; and (v) the character of equipment and facilities needed preliminary to and during the Work;
4. It has satisfied itself as to character, quality and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including exploratory work done by the Owner as well as from the drawings and specifications provided as part of the bid package, and that any failure of the bidder to take such actions will not relieve the bidder from responsibility for estimating properly the difficulty and cost of successfully performing the Work;
5. It has received, read and reviewed the Contract, has submitted any questions in writing regarding the same and has received an answer to such questions;
6. Its bid is based upon the requirements of the Contract without exception;
7. It is in compliance with Title 72, Chapter 17, Idaho Code, regarding a drug-free workplace and has included the required affidavit regarding the same;
8. Its bid is in compliance with employment of persons authorized to work in the United States;
9. It will retain bid security and hold and honor all base bid prices for forty-five (45) calendar days from the date of bid opening, and cannot be withdrawn after the bid opening;
10. Its bid prices shown for each item on the bid proposal form include all labor, material, equipment, overhead and compensation to complete all of the Work for that item; and
11. It has included in its bid amount Idaho sales and/or use taxes on all materials and equipment and all other taxes imposed by law.

## **BID AWARD**

**AWARD METHOD:** Public works construction contracts for the State of Idaho are awarded to the "lowest responsible and responsive bidder." The low bidder, for purposes of award, shall be the responsible and responsive bidder offering the low aggregate amount for the base bid item, plus any additive or deductive bid alternates selected by the Owner, and within funds available as determined by the Owner. Award is also subject to the requirements of Idaho Code, including without limitation: Title 67, Chapter 57; Title 67, Chapter 23; Title 54, Chapter 19; and Title 44, Chapter 10. It is the bidder's responsibility to conform to **ALL** applicable federal, state and local statutes or other applicable legal requirements. The information provided herein is intended to assist bidders in meeting applicable requirements but is not exhaustive and the Owner will not be responsible for any failure by any bidder to meet applicable requirements.

**DETERMINATION OF RESPONSIBILITY:** The Owner reserves the right to make reasonable inquiry about or from the submitting bidder or from third parties to determine the responsibility of a submitting bidder. Such inquiry may include, but not be limited to, inquiry regarding experience and expertise related to the Project, manpower and other resources, financial stability, credit ratings, references,

potential subcontractors and past performance. The unreasonable failure of a submitting bidder to promptly supply any requested information may result in a finding of non-responsibility.

**NOTICE OF EFFECTIVENESS:** No Contract is effective until the authorized Owner's official has signed the Contract and the Notice to Proceed has been issued. The bidder shall not provide any goods or render services until the Contract has been signed by the Administrator of the Division of Public Works and the Contract has become effective. Furthermore, the Owner is in no way responsible for reimbursing the bidder for goods provided or services rendered prior to the signature of the authorized Division of Public Work's official and the arrival of the Notice to Proceed.

**INCURRING COSTS:** The Owner is not liable for any cost incurred by bidders prior to the Notice to Proceed.

**PRIOR ACCEPTANCE OF DEFECTIVE BIDS OR PROPOSALS:** The Owner generally will not completely review or analyze bids that appear to fail to comply with the requirements of the bid documents, nor will the Owner generally investigate the references or qualifications of those who submit such bids. Therefore, any acknowledgment that the selection is complete shall not operate as a representation by the Owner that an unsuccessful bid was responsive, complete, sufficient or lawful in any respect.

**POST-AWARD SUBMITTALS:** Upon receipt of a Notice of Intent to Award, the apparent low responsive and responsible bidder shall provide documentation required in such Notice. Such Notice of Intent to Award shall generally require the bidder to return to the Owner, within ten (10) days of receipt, a signed Contract, all required bonds, proof of insurance and documentation required by the Idaho State Tax Commission (report and affidavit).

**OWNER'S RIGHT TO REJECT:** Prior to execution of the Contract, the Owner or Design Professional shall provide written notice of any reasonable objection to any person or entity proposed by the bidder. Upon receipt of such notice, the bidder may withdraw its bid, without forfeiture, or propose a substitute and identify any change in any bid amount caused by such substitution. The Owner may accept or reject the substitution or the adjusted price. If the Owner rejects the substitution or the adjusted price, it will return the bidder's bid guarantee.

## ***END OF INSTRUCTIONS***

**MANUFACTURER'S CERTIFICATION**

The undersigned roofing manufacturer hereby certifies that he has reviewed the drawings, specifications and conditions of the site and the terms of the roofing guarantee included in the specification and find them acceptable, and if the manufacturer's materials are installed on the project in accordance with the drawings and specifications and upon inspection by the manufacturer's technical representative, manufacturer will issue the guarantee in the form specified.

DATED THIS \_\_\_\_\_ DAY OF \_\_\_\_\_ 20\_\_

\_\_\_\_\_  
(MANUFACTURER)

\_\_\_\_\_  
(AUTHORIZED REPRESENTATIVE)

**EXCEPTIONS:** Subject to the following exceptions and or modification, (attach any details or added verbiage that is required) the undersigned roofing manufacturer will certify to the conditions stated above:

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

DATED THIS \_\_\_\_\_ Day of \_\_\_\_\_ 20\_\_

\_\_\_\_\_  
(MANUFACTURER)

\_\_\_\_\_  
(AUTHORIZED REPRESENTATIVE)

**APPROVED APPLICATORS:** The following roofing contractors are approved applicators of the roofing system specified (or approved) and as manufactured by the above named manufacturer:

NAME	ADDRESS
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

**ROOFING MATERIALS SUBSTITUTION REQUEST FORM**

(Submit not less than ten (10) days prior to bid date)

DPW Project No. \_\_\_\_\_

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TO: (Architect)

We hereby submit for your consideration the following products in lieu of those specified for the above referenced project:

<u>MATERIAL SUBSTITUTION</u>	<u>SPECIFIED</u>	<u>PROPOSED</u>
Vapor Barrier	_____	_____
Roof Insulation	_____	_____
Roofing Membrane	_____	_____
Surfacing	_____	_____

Description of Proposed Components: \_\_\_\_\_

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Differences between specified and proposed components including type of insulation, method of anchoring, details, surfacing, application methods, etc. \_\_\_\_\_

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Attach complete technical data, including manufacturer's published specifications, standard details, laboratory tests and certifications, material samples and similar information to fully describe the products and methods of application.

If changes are required in specifications, drawings or details, provide revised specifications and details for consideration.

Answer the following:

1. Does proposed substitution affect details or dimensions shown on the drawings?  
\_\_\_\_\_ YES \_\_\_\_\_ NO
2. Will proposed substitution meet specified Underwriters Laboratory and ICBO ratings?  
\_\_\_\_\_ YES \_\_\_\_\_ NO
3. Is insulation and roofing method of attachment listed with Factory Mutual against wind loss?  
\_\_\_\_\_ YES \_\_\_\_\_ NO
4. Are all components of the roofing system (vapor barrier, insulation, fasteners, membrane components, flashings and surfacing) manufactured by or acceptable to the roofing manufacturer?  
\_\_\_\_\_ YES \_\_\_\_\_ NO
5. Will the manufacturer's authorized representative sign the Manufacturer's Certification included in the specification?  
\_\_\_\_\_ YES \_\_\_\_\_ NO

The undersigned manufacturer's representative states that the above information is true and correct, and that the proposed materials function, appearance and quality are equivalent or superior to the specified materials.

\_\_\_\_\_  
(Manufacturer)

\_\_\_\_\_  
(Manufacturer's Representative)

\_\_\_\_\_  
(Address)

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Date)

END OF ROOFING MATERIALS SUBSTITUTION REQUEST FORM

## BID PROPOSAL

**TO:** STATE OF IDAHO  
DIVISION OF PUBLIC WORKS

To Whom it May Concern:

The Bidder, in compliance with your Invitation for Bids for the construction of DPW Project No. 20-232 ISU – Custodian Office Remodel-Bldg. 24, Pocatello, Idaho, having examined the bidding and Contract Documents and the site of the proposed Work, and being familiar with all of the conditions surrounding the construction of the proposed Project, including the availability of materials and labor, hereby proposes to furnish all labor, materials and supplies and to provide the service and insurance in accordance with the Contract Documents, within the time set forth therein, and at the prices stated below. These prices are to cover all expenses incurred in performing the Work required under the Contract Documents.

Bidder hereby agrees to commence Work under this Contract on a date to be specified in the written "Notice to Proceed" of the Owner and to substantially complete the Project within 180 consecutive calendar days thereafter, as stipulated in the specifications. Bidder further agrees to pay as liquidated damages, the sum of \$500.00 for each consecutive calendar day after the established substantial completion date or adjusted date as established by change order.

Bidder acknowledges receipt of Addenda No. \_\_\_\_\_.  
(List all Addenda)

**BASE PROPOSAL:** Bidder agrees to perform all of the base proposal Work described in the specifications and shown on the plans for the sum of:

\_\_\_\_\_ Dollars (\$\_\_\_\_\_)  
*(Amount shall be shown in both words and figures. In case of discrepancy, the amount shown in words will govern.)*

### **ALTERNATE NO. 1: Additional Windows**

Add the sum of \_\_\_\_\_ Dollars (\$\_\_\_\_\_)  
*(Amount shall be shown in both words and figures. In case of discrepancy, the amount shown in words will govern.)*

Bidder understands that the Owner reserves the right to reject any or all bids and to waive any informality in the bidding.

The bidder agrees that this bid shall be good for a period of forty-five (45) calendar days after the scheduled opening time for receiving bids.

Upon receipt of written Notice of Intent to Award of this bid, Bidder will execute the formal Contract within ten (10) calendar days and deliver a Surety Bond or Bonds as required by paragraph "Performance and Payment Bonds" first page (ITB-1) of the Instructions to Bidders.

The bid security in the amount of five percent (5%) of the bid amount is to become the property of the Owner, in the event the Contract and bond are not executed within the time set forth, as liquidated damages for the delay and additional expense to the Owner caused thereby.

The names and addresses of the entities who will perform the Work identified below, subject to approval of Owner and Architect, if Undersigned is awarded the Contract, are as follows:

Plumbing (PWCL Category 15400)

(Name) \_\_\_\_\_

(Address) \_\_\_\_\_

Idaho Public Works Contractors License No. \_\_\_\_\_

Idaho Plumbing Contractors License No. \_\_\_\_\_

Heating, Ventilating & Air Conditioning (PWCL Category 15700-HVAC)

(Name) \_\_\_\_\_

(Address) \_\_\_\_\_

Idaho Public Works Contractors License No. \_\_\_\_\_

Idaho HVAC Contractors License No. \_\_\_\_\_

Electrical (PWCL Category 16000)

(Name) \_\_\_\_\_

(Address) \_\_\_\_\_

Idaho Public Works Contractors License No. \_\_\_\_\_

Idaho Electrical Contractors License No. \_\_\_\_\_

**FAILURE TO NAME A PROPERLY LICENSED SUBCONTRACTOR IN EACH OF THE ABOVE CATEGORIES WILL RENDER THE BID UNRESPONSIVE AND VOID.**

Should the listing of subcontractors change due to selection of alternates or other similar circumstances, attach explanation.

Bidder warrants that bid has been prepared and that any contract resulting from acceptance of this bid is subject to the Fixed Price Construction Contract.

The undersigned notifies that it is of this date duly licensed as an Idaho Public Works Contractor and further that it possesses Idaho Public Works Contractor's License No. \_\_\_\_\_ and is domiciled in the State of \_\_\_\_\_.

Dated this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_.  
(date) (month) (year)

Respectfully submitted by:

\_\_\_\_\_  
(Contractor's Name- Typed)

SEAL

(Seal - if bid is by a corporation)

\_\_\_\_\_  
(Street or PO Address)

---

(City, State and zip code)

---

(Authorized Signature)

---

(Title)

---

(Telephone Number)

---

(FAX Number)

---

(Email Address)

**Have you remembered to include bid security (bid bond or a certified or cashier's check), Contractor's Affidavit Concerning Alcohol and Drug-Free Workplace and a signed copy of the Bidder's Acknowledgment Statement with your bid?**



**Execute and Submit with Bid**

**CONTRACTOR'S AFFIDAVIT  
CONCERNING ALCOHOL AND DRUG-FREE WORKPLACE**

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

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

Pursuant to the Section 72-1717, Idaho Code, I, the undersigned, being duly sworn, depose and certify that \_\_\_\_\_ is in compliance with the provisions of Section 72-1717, Idaho Code; that \_\_\_\_\_ provides a drug-free workplace program that complies with the provisions of Title 72, Chapter 17, Idaho Code, and will maintain such program throughout the life of a state construction contract; and that \_\_\_\_\_ shall subcontract Work only to subcontractors meeting the requirements of Section 72-1717(1)(a), Idaho Code.

\_\_\_\_\_  
Name of Contractor

\_\_\_\_\_  
Address

\_\_\_\_\_  
City and State

By: \_\_\_\_\_  
(Signature)

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

\_\_\_\_\_  
NOTARY PUBLIC  
Residing at: \_\_\_\_\_  
Commission expires: \_\_\_\_\_

**FAILURE TO EXECUTE THIS AFFIDAVIT AND SUBMIT IT ALONG WITH YOUR BID SHALL MAKE YOUR BID NON-RESPONSIVE.**

## ***Execute and Submit with Bid***

### **BIDDER'S ACKNOWLEDGMENT STATEMENT**

**NOTE: THE INFORMATION CONTAINED HEREIN IS A SUMMARY OF VITAL CONTRACT PROVISIONS AND DOES NOT CHANGE THE CONTRACT DOCUMENTS THAT WILL GOVERN THIS PROJECT.**

Division of Public Works Project No. 20-232 ISU – Custodial Office Remodel-Bldg. 24, Pocatello, Idaho.

By submitting a bid for this Project, the undersigned bidder agrees that, if awarded the Contract for construction, Contractor will conform to all conditions and requirements of the Contract, including but not limited to:

- Contractor agrees to comply with conditions pertaining to Sections 44-1001 and 44-1002, Idaho Code, requiring the employment of ninety-five percent (95%) bona fide Idaho residents and providing for a preference in the employment of bona fide Idaho residents and regarding the employment of persons not authorized to work in the United States.
- Contractor will substantially complete the Work within the time stated in the Contract Documents, or as modified by Change Order(s).
- If the Contractor fails to substantially complete the Project within the time stated in the Contract Documents, or as modified by Change Order, the Contractor agrees that the Owner may deduct from the Contract amount liquidated damages in the amount per calendar day, indicated in the Contract Documents, times the number of calendar days until the Project is Substantially Complete, as defined in the Contract Documents and as determined by the Design Professional.
- The Contractor agrees that the amount allowed for overhead and profit on any Change Order is limited to the amounts indicated in subparagraph 16.3.11 of the Fixed Price Construction Contract Between Owner and Contractor.
  1. For total changes, the amount allowed for overhead, profit, bonds and insurance for the Contractor and all subcontractors of any tier combined shall not exceed fifteen percent (15%) of direct costs; or
  2. The Contractor will determine the amount of overhead and profit to be apportioned between the Contractor and its subcontractor of allowable amounts of overhead, profit, bonds, and insurance.
- The Contractor agrees that Change Orders are governed by the Fixed Price Construction Contract Between Owner and Contractor General Conditions of the Contract for Construction including as follows:
  1. By the execution of a Change Order, the Contractor agrees and acknowledges that it has had sufficient time and opportunity to examine the change in Work which is the subject of the Change Order and that it has undertaken all reasonable efforts to discover and disclose any concealed or unknown conditions which may, to any extent, affect the Contractor's ability to perform in accordance with the Change Order. Aside from those matters specifically set forth in the Change Order, the Owner shall not be obligated to make any adjustments to either the Contract Sum or Contract Time by reason of any conditions affecting the change in Work addressed by the

Change Order that could have reasonably been discovered or disclosed by the Contractor's examination.

2. Any Change Order fully executed by the Owner, Contractor and Design Professional, including but not limited to, a Change Order arising by reason of the parties' mutual agreement or by mediation, shall constitute a final and full settlement of all matters relating to or affected by the change in the Work, including but not limited to, all direct and consequential costs associated with such change and any and all adjustments to the Contract Price and Contract Time. In the event a Change Order increases the Contract Price, the Contractor shall include the Work covered by such Change Order in the Application for Payment as if such Work was originally part of the Project and Contract Documents.

- **Certification Concerning Boycott of Israel.** Pursuant to Idaho Code section 67-2346, if payments under the Contract exceed one hundred thousand dollars (\$100,000) and Contractor employs ten or more persons, Contractor certifies that it is not currently engaged in, and will not for the duration of the Contract engage in, a boycott of goods or services from Israel or territories under its control. The terms in this section defined in Idaho Code section 67-2346 shall have the meaning defined therein.

**FAILURE TO EXECUTE THIS ACKNOWLEDGMENT MAY MAKE YOUR BID NON-RESPONSIVE.**

I, \_\_\_\_\_, being duly authorized to bind the  
(type or print name of individual)

bidder, \_\_\_\_\_, does hereby certify that I have fully read  
(type or print name of company)

and understand this document and that it highlights certain parts of the Contract that will be entered between the parties and that will govern this Project.

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

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

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

**END OF BIDDER'S ACKNOWLEDGMENT STATEMENT**

**DIVISION OF PUBLIC WORKS  
FIXED PRICE CONSTRUCTION CONTRACT  
BETWEEN OWNER AND CONTRACTOR**

**DPW PROJECT NO. 20-232  
Idaho State University  
Custodial Office Remodel-Bldg. 24  
Pocatello, Idaho**

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**FIXED PRICE CONSTRUCTION CONTRACT  
BETWEEN OWNER AND CONTRACTOR**

THIS FIXED PRICE CONSTRUCTION CONTRACT BETWEEN OWNER AND CONTRACTOR (the "Contract") is by and between the State of Idaho, Department of Administration, Division of Public Works ("DPW" or the "Owner") and insert name of contractor (the "Contractor") and is for the construction of the project (the "Project") identified as DPW Project No. 20-232, as more fully described in Exhibit A, and incorporated herein by reference. This Contract shall be effective on \_\_\_\_\_ (day) of \_\_\_\_\_ (month), 20\_\_ (year), when executed by both parties.

In consideration of the mutual promises, covenants, and agreements stated herein, and for other good and valuable consideration, the sufficiency of which is hereby acknowledged, the Owner and the Contractor agree:

**ARTICLE 1  
CONTRACT DOCUMENTS**

**1.1** The Contract Documents consist of this Contract, the drawings and specifications for the Project (the "Drawings and Specifications") identified in Exhibit C and any Addenda thereto issued prior to execution of this Contract, written amendments signed by both the Owner and the Contractor, Change Orders signed by both the Owner and the Contractor, Construction Change Directives and any written orders by the Design Professional for minor changes in the Work (the "Contract Documents"). Documents not included or expressly contemplated in this Article 1 do not, and shall not, form any part of the Contract Documents.

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

**ARTICLE 2  
REPRESENTATIONS AND WARRANTIES OF THE CONTRACTOR**

In order to induce the Owner to execute this Contract and recognizing that the Owner is relying thereon, the Contractor, by executing this Contract, makes the following express representations to the Owner:

**2.1** The Contractor is fully qualified to act as the Contractor for the Project and has, and shall maintain, any and all licenses, permits or other authorizations necessary to act as the Contractor for, and to construct, the Project.

**2.2** The Contractor has become familiar with the Project site and the local conditions under which the Project is to be constructed and operated particularly in correlation to the requirements of the Contract.

**2.3** The Contractor has received, reviewed, compared, studied and carefully examined all of the documents which make up the Contract Documents, including the Drawings and Specifications, and any Addenda, and has found them in all respects to be complete, accurate, adequate, consistent, coordinated and sufficient for construction. Such review, comparison, study and examination shall be a warranty that the contractor believes that the documents are complete and the Project is buildable as described except as reported.

**2.4** The Contractor warrants that the Contract Time is a reasonable period for performing the Work.

**2.5** The Contractor warrants to the Owner and Design Professional that all labor furnished on this Project shall be competent to perform the tasks undertaken; materials and equipment furnished under the Contract will be new and of high quality unless otherwise required or permitted by the Contract Documents; that the Work will be complete, of high quality and free from defects not inherent in the quality required or permitted; and that the Work will strictly conform to the requirements of the Contract Documents. Any Work not strictly conforming to these requirements, including substitutions not properly approved and authorized, shall be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse by Owner or its representatives, modifications not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and

normal usage. If required by the Owner, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. This warranty shall survive the completion of the Contract and final payment to the Contractor.

- 2.6 Certification Concerning Boycott of Israel.** Pursuant to Idaho Code section 67-2346, if payments under the Contract exceed one hundred thousand dollars (\$100,000) and Contractor employs ten or more persons, Contractor certifies that it is not currently engaged in, and will not for the duration of the Contract engage in, a boycott of goods or services from Israel or territories under its control. The terms in this section defined in Idaho Code section 67-2346 shall have the meaning defined therein.

### **ARTICLE 3 INTENT AND INTERPRETATION**

With respect to the intent and interpretation of this Contract, the Owner and the Contractor agree as follows:

**3.1** This Contract constitutes the entire and exclusive agreement between the parties with reference to the Project, and supersedes any and all prior discussions, communications, representations, understandings, negotiations or agreements. This Contract also supersedes any bid documents.

**3.2** The intent of the Contract is to include all items necessary for the proper execution and completion of the Project and anything that may be required, implied, or inferred by the documents which make up this Contract, or any one or more of them, shall be provided by the Contractor for the Fixed Price Contract Amount. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all.

**3.3** Nothing contained in this Contract shall create, nor be interpreted to create privity or any other relationship whatsoever between the Owner and any person or entity except the Contractor; provided, however, that the Design Professional is entitled to performance and enforcement of obligations under the Contract intended or necessary to facilitate its duties. Any reference to the Owner, the Contractor or the Design Professional shall be deemed to include authorized representatives.

**3.4** When a word, term or phrase is used in this Contract, it shall be interpreted or construed first as defined herein; second, if not defined, according to its generally accepted meaning in the construction industry; and third, if there is no generally accepted meaning in the construction industry, according to its common and customary usage.

**3.5** The words "include," "includes," or "including," as used in this Contract, shall be deemed to be followed by the phrase "without limitation."

**3.6** The specification herein of any act, failure, refusal, omission, event, occurrence or condition as constituting a material breach of this Contract shall not imply that any other, non-specified act, failure, refusal, omission, event, occurrence or condition shall be deemed not to constitute a material breach of this Contract.

**3.7** The Contractor shall have a continuing duty to read, examine, review, compare and contrast each of the documents which make up this Contract, shop drawings and other submittals, and shall give timely written notice to the Owner and the Design Professional of any conflict, ambiguity, error or omission which the Contractor may find with respect to these documents before proceeding with the affected Work.

**3.8** The express or implied approval by the Owner or the Design Professional of any shop drawings or other submittals shall not relieve the Contractor of the continuing duties imposed hereby, nor shall any such approval be evidence of the Contractor's compliance with this Contract. The Owner has requested that the Design Professional prepare documents for the Project, including the Drawings and Specifications for the Project, which are accurate, adequate, consistent, coordinated and sufficient for construction. **HOWEVER, THE OWNER MAKES NO REPRESENTATION OR WARRANTY OF ANY NATURE WHATSOEVER TO THE CONTRACTOR CONCERNING SUCH DOCUMENTS.** The Contractor again hereby acknowledges and represents that it has received, reviewed and carefully examined such documents; has found them to be complete, accurate, adequate, consistent, coordinated and sufficient for construction; and that the Contractor has not, does not and will not rely upon any representations or warranties by the Owner concerning such documents, as no such representations or warranties have been or are hereby made.



**3.9** In the event of any conflict among any of the documents which make up this Contract, the Design Professional shall interpret the documents, and the interpretation shall be binding on both the Owner and Contractor; provided, however, that this does not change the Owner's right to make decisions regarding Claims in accordance with Article 13 and Article 14. If no interpretation is provided by the Design Professional, the most stringent requirement in the Contract Documents will apply.

#### **ARTICLE 4 OWNERSHIP OF DOCUMENTS**

**4.1** Unless otherwise agreed by the Design Professional and its consultants, the party that prepared the drawings, specifications and other documents is the author of such with all copyright, common law, statutory and other reserved rights. The Contractor may retain one (1) record set of the Drawings and Specifications and other documents but shall not own or claim any copyright in them.

The Drawings and Specifications and other documents, and any copies, are to be used solely for this Project, and not on any other project, or additions to this Project outside this Contract, without written consent of the Owner, the Design Professional and the Design Professional's consultants; provided, however, that copies may be made of applicable portions as necessary for completion of the Work. Such copies shall include any copyright notice on the Drawings and Specifications and other documents.

Submission to or use by a regulatory body related to this Project is an acceptable use.

#### **ARTICLE 5 CONTRACTOR'S PERFORMANCE**

The Contractor shall perform all of the Work required, implied or reasonably inferable from this Contract, including the following:

**5.1** Construction of the Project.

**5.2** The furnishing of any required surety bonds and insurance.

**5.3** The provision or furnishing, and prompt payment therefore, of labor, supervision, services, materials, supplies, equipment, fixtures, appliances, facilities, tools, transportation, storage, power, fuel, heat, light, cooling or other utilities required for construction and all necessary permits, including any required elevator permits, required for the construction of the Project. Construction projects for the State of Idaho require a building permit issued by the Division of Building Safety.

**5.4** The creation and submission of a detailed and comprehensive set of marked up blue or black-lined record drawings. Said record drawings shall be submitted to and approved by the Design Professional as a condition precedent to final payment to the Contractor.

#### **ARTICLE 6 TIME FOR CONTRACTOR'S PERFORMANCE**

**6.1** The Contractor shall commence the performance of this Contract in accordance with the "Notice to Proceed" (Exhibit F) issued by the Owner and shall diligently continue its performance to and until final completion of the Project. The Contractor shall accomplish Substantial Completion of the Project on or before the time indicated in Exhibit A. The period of time, including any adjustments made under this Contract, for the Contractor to reach Substantial Completion is the "Contract Time."

**6.2** The Contractor may be assessed by and be responsible to the Owner for the amount indicated in Exhibit A per day for each and every calendar day of unexcused delay in achieving Substantial Completion beyond the date set forth for Substantial Completion. Any sums owed hereunder by the Contractor shall be payable not as a penalty

but as liquidated damages, representing an estimate of delay damages likely to be sustained by the Owner estimated at the time of this Contract. When the Owner reasonably believes that Substantial Completion will be inexcusably delayed, the Owner shall be entitled, but not required, to withhold from any amounts otherwise due the Contractor an amount then believed by the Owner to be adequate to recover liquidated damages applicable to such delays. If and when the Contractor overcomes the delay in achieving Substantial Completion, or any part thereof, for which the Owner has withheld payment, the Owner shall promptly release to the Contractor those funds withheld, but no longer applicable, as liquidated damages. The Owner's right to liquidated damages is not, and shall not be deemed to be, an exclusive remedy for delay and the Owner shall retain all remedies at law or in equity for delay or other breach.

**6.3** The term "Substantial Completion," as used herein, shall mean that point at which, as certified in writing by the Design Professional, or if there is no Design Professional, as certified by the Owner, the entire Project is at a level of completion in strict compliance with the Contract Documents, such that the Owner or its designee can enjoy beneficial use or occupancy and can use or operate it in all respects for its intended purpose. If, in the reasonable determination of the Owner, receipt of operation and maintenance manuals or completion of training is necessary for such beneficial use or occupancy, then there shall be no Substantial Completion until such manuals are provided or such training is completed. Partial use or occupancy of the Project shall not result in the Project being deemed substantially complete, or accepted as substantially complete, and such partial use or occupancy shall not be evidence of Substantial Completion. The Project shall not be deemed accepted until it is finally complete.

.1 The following are prerequisites for Substantial Completion of any roofing:

.1 All roofing materials complete, in place, and watertight.

.2 All flashings and counter-flashings complete, in place and watertight, with all anchors, connections, and sealants, etc. installed.

.3 All roofing accessories required by the Contract Documents complete, in place, and operable together with all anchors, fastening devices, etc.

.4 All excess materials, debris, equipment, tools, etc. removed from site and roof surface cleaned of all debris.

.5 All roof drains and piping cleaned and fully functional.

.6 All mechanical and electrical equipment connected and fully operable.

**6.4** Any request by the Contractor for an extension of the Contract Time must be made in accordance with, and is subject to, Article 13 and Article 14 related to Claims.

**6.5** The Owner shall have no liability of any kind to the Contractor if a schedule or other document submitted by the Contractor shows an intention to complete the Work prior to the scheduled completion date and for any reason other than Owner caused delay, the Contractor is not able to achieve such early completion.

## ARTICLE 7

### FIXED PRICE AND CONTRACT PAYMENTS

**7.1** The Owner shall pay, and the Contractor shall accept, as full and complete payment for the Contractor's timely performance of its obligations hereunder, the Fixed Price Contract Amount indicated in Exhibit A. The Fixed Price Contract Amount shall not be modified except as provided in this Contract.

**7.2** Prior to approval of the contract, the Contractor shall prepare and present to the Owner and the Design Professional the Contractor's Schedule of Values apportioning the Fixed Price Contract Amount among the different elements of the Project for purposes of periodic and final payment. The Contractor's Schedule of Values shall be presented in the Owner's web-based construction management software. The Contractor shall not imbalance its Schedule of Values nor artificially inflate any element thereof. The violation of this provision by the Contractor shall constitute a material breach of this Contract. The Contractor's Schedule of Values will be utilized for the Contractor's requests for payment but shall only be so utilized after it has been approved in writing by the Design Professional.

**7.3** The Owner shall pay the Fixed Price Contract Amount to the Contractor in accordance with the procedures set forth in this Article. The Contractor shall submit a Contractor's Request for Payment, on or before the day of each month indicated in Exhibit A or otherwise agreed to, after commencement of performance, but no more frequently than once monthly. Said payment request shall be on made in the Owner's web-based construction management software, and shall include whatever supporting information as may be required by the Design Professional, the Owner or both. Therein, the Contractor may request payment for one hundred percent (100%) of the Work satisfactorily completed to the date of the Contractor's Request for Payment, less five percent (5%) retainage, based on the Fixed Price Contract Amount allocated on the Schedule of Values. The Contractor's Request for Payment may include only: properly provided labor, materials or equipment properly incorporated into the Project, and time and materials or equipment necessary for the Project or that will be incorporated into the Project and are properly stored at the Project site (or elsewhere if off-site storage is approved in writing by the Owner). The Contractor's Request for Payment must exclude the total amount of previous payments received from the Owner. Any payment on account of stored materials or equipment will be subject to the Contractor providing written proof that the Owner has title to such materials or equipment and that they are fully insured against loss or damage. Each such Contractor's Request for Payment shall be signed by the Contractor and its submission shall constitute the Contractor's affirmative representation that the quantity of Work has reached the level for which payment is requested; that the Work has been properly installed or performed in strict compliance with the Contract; that all Work for which the Owner has previously paid is free and clear of any lien, claim or other encumbrance of any person whatsoever; and that the Contractor knows of no reason why payment should not be made as requested. As a condition precedent to payment, the Contractor shall, if required by the Owner, furnish to the Owner properly executed waivers or releases, in a form acceptable to the Owner, from all subcontractors, materialmen, suppliers or others having any claims or alleged claims, wherein said subcontractors, materialmen, suppliers or others shall acknowledge receipt of all sums due pursuant to all prior Contractor's Requests for Payment, and waive and relinquish any rights or other claims relating to the Project or Project site. The submission by the Contractor of the Contractor's Request for Payment also constitutes the Contractor's affirmative representation that, upon payment of the Contractor's Request for Payment submitted, title to all Work included in such payment shall be vested in the Owner.

Thereafter, the Design Professional shall review the Contractor's Request for Payment and may also review the Work at the Project site or elsewhere to determine whether the quantity and quality of the Work are as represented in the Contractor's Request for Payment and as required by this Contract. The Design Professional shall approve in writing the amount which, in the opinion of the Design Professional, is properly owing to the Contractor and such approval is required before the Owner shall have any payment obligation. The Design Professional may withhold such approval, in whole or in part, as necessary to protect the Owner if it reasonably believes that the quantity or quality of the Work is not as represented in the Contractor's Request for Payment or is not in strict conformance to the Contract Documents.

**7.4** The Owner shall make payment to the Contractor no more than twenty-one (21) days following receipt by the Owner of the Design Professional's written approval of each Contractor's Request for Payment. The amount of each such payment shall be the amount approved for payment by the Design Professional less such amounts, if any, otherwise owing by the Contractor to the Owner or which the Owner shall have the right to withhold as authorized by this Contract. The Design Professional's approval of the Contractor's Request for Payment shall not preclude the Owner from the exercise of any of its rights it may have in this Contract, at law or in equity, as set forth in Paragraph 7.8 hereinafter.

**7.5** Off-site storage will not be approved at locations more than thirty (30) miles from the Project site or outside the State of Idaho and any payment for any off-site storage is subject to the following:

- .1** The Contractor must provide at least thirty (30) days' advance written notice of its request to store off-site. Such notice must include a description of the type, quantities, locations and values of materials involved for the next billing cycle. All invoices must indicate the type, quantities and value of materials or equipment for which payment is requested;
- .2** All materials stored off-site must be segregated and clearly marked with the DPW Project number and as being the "Property of the State of Idaho;"
- .3** The Design Professional and/or the Owner's Field Representative must have unrestricted access to the stored materials during all business hours and may physically inventory all invoiced materials and equipment and may physically inspect the storage conditions;

**.4** The Contractor must provide written Consent of Surety to off-site storage of materials and equipment and to payment for such materials and equipment prior to incorporation in the Work. Consent must be from the Surety. Consent of local broker or agent is not acceptable;

**.5** The Contractor must maintain and must provide to the Design Professional, upon request, a current log of stored materials and equipment, which reflects when materials and equipment are used or added; and

**.6** The Contractor must obtain and maintain all risk property insurance at replacement cost, with the State of Idaho listed as loss payee on all materials and equipment stored off-site and in transit.

**7.6** When payment is received from the Owner, the Contractor shall immediately pay all subcontractors, materialmen, laborer and suppliers the amounts they are due for the Work covered by such payment. The Contractor shall not withhold from a subcontractor or supplier more than the percentage withheld from a payment certificate for the subcontractor's or supplier's portion of the Work. In the event the Owner becomes informed that the Contractor has not paid a subcontractor, materialmen, laborer or supplier as provided herein, the Owner shall have the right, but not the duty, to issue future checks and payment to the Contractor of amounts otherwise due hereunder naming the Contractor and any such subcontractor, materialmen, laborer or supplier as joint payees. Such joint check procedure, if employed by the Owner, shall create no rights in favor of any person or entity beyond the right of the named payees to payment of the check and shall not be deemed to commit the Owner to repeat the procedure in the future.

**7.7** Payment to the Contractor, utilization of the Project for any purpose by the Owner, or any other act or omission by the Owner shall not be interpreted or construed as an acceptance of any Work of the Contractor not strictly in compliance with this Contract.

**7.8** The Owner shall have and be entitled to the right to refuse to make any payment, including by reducing payment under any Contractor's Request for Payment, and, if necessary, may demand the return of a portion or all of an amount previously paid to the Contractor for reasons that include the following:

**.1** The quality of the Contractor's work, in whole or part, is not in strict accordance with the requirements of this Contract or identified defective work, including punch list work, is not remedied as required by the Contract Documents;

**.2** The quantity of the Contractor's work, in whole or in part, is not as represented in the Contractor's Request for Payment or otherwise;

**.3** The Contractor's rate of progress is such that, in the Owner's opinion, Substantial Completion or final completion, or both, may be inexcusably delayed or that the Owner will incur additional costs or expense related to repeated Substantial Completion or final completion inspections through no fault of the Owner;

**.4** The Owner reasonably believes that the Contractor has failed to use Contract funds, previously paid the Contractor by the Owner, to pay Contractor's project-related obligations, including subcontractors, laborers and material and equipment suppliers;

**.5** There are claims made or it seems reasonably likely that claims will be made, against the Owner;

**.6** The Contractor has caused a loss or damage to the Owner, the Design Professional or another contractor;

**.7** The Owner reasonably believes that the Project cannot be completed for the unpaid balance of the Fixed Price Contract Amount or the Owner reasonably believes that the Project cannot be completed within the Contract Time and that the unpaid balance of the Fixed Price Contract Amount would be inadequate to cover the cost of actual or liquidated damages for the anticipated delay;

**.8** The Contractor fails or refuses to perform any of its obligations to the Owner; or

**.9** The Contractor fails to pay taxes as required by Title 63, Chapter 15, Idaho Code.

In the event that the Owner makes written demand upon the Contractor for amounts previously paid by the Owner as contemplated in Paragraph 7.8, the Contractor shall promptly comply with such demand.

**7.9** If the Owner, without cause, fails to pay the Contractor any amounts due and payable thirty (30) days after those amounts are due pursuant to Paragraph 7.4, the Contractor shall have the right to cease the Work until receipt of proper payment. Contractor must first provide written notice to the Owner of the Contractor's intent to cease the Work ten (10) days prior to stopping the Work under this Paragraph. If any amounts remain unpaid after fifty-one (51) days after the Design Professional approves the Contractor's Request for Payment under Paragraph 7.4, interest at the rate of four percent (4%) per annum shall accrue on those unpaid amounts.

**7.10** When Contractor considers Substantial Completion has been achieved, the Contractor shall notify the Owner and the Design Professional in writing and shall furnish to the Design Professional a listing of those matters yet to be finished. The Design Professional will thereupon conduct an inspection to confirm that the Work is, in fact, substantially complete. Upon its confirmation that the Contractor's work is substantially complete, the Design Professional will so notify the Owner and Contractor in writing and will therein set forth the date of Substantial Completion. The Owner and the Contractor must accept the date of Substantial Completion in writing. Guarantees and warranties required by this Contract shall commence on the date of Substantial Completion. At the Contractor's Request for Payment following Substantial Completion, the Owner shall pay the Contractor an amount sufficient to increase total payments to the Contractor to ninety-five percent (95%) of the Fixed Price Contract Amount, less any liquidated damages, less the reasonable costs as determined by the Design Professional for completing all incomplete work, correcting and bringing into conformance all defective and nonconforming work, and handling any outstanding or potential claims. If the Design Professional determines that the Contractor has made or is making satisfactory progress on any uncompleted portions of the Work, the Owner may, at its discretion, release a portion of the retainage to the Contractor prior to the actual final completion of the conditions set forth in Paragraph 7.13. It is the intent of the parties that the Project will be accepted only in total (at Substantial Completion and final completion) and not in phases unless provided for in Exhibit A. Any acceptance other than in total shall require written agreement of Owner and Design Professional.

**7.11** When Contractor considers the Project is at final completion, it shall notify the Owner and the Design Professional thereof in writing. Thereupon, the Design Professional will perform a final inspection of the Project. If the Design Professional confirms that the Project is complete in full accordance with the Contract Documents and that the Contractor has performed all of its obligations to the Owner, the Design Professional will furnish a final approval for payment to the Owner certifying to the Owner that the Project is complete and the Contractor is entitled to the remainder of the unpaid Fixed Price Contract Amount, less any amount withheld pursuant to this Contract.

**7.12** If the Contractor fails to achieve final completion within a reasonable number of days as established by the Design Professional from the date of Substantial Completion, the Contractor may be assessed and be responsible to the Owner for fifty percent (50%) of the daily amount of liquidated damages as established pursuant to Paragraph 6.2 and Exhibit A, per day for each and every calendar day of unexcused delay in achieving final completion beyond the date established for final completion of the Work. Any sums due and payable hereunder by the Contractor shall be payable not as a penalty but as liquidated damages representing an estimate of delay damages likely to be sustained by the Owner, estimated at or before the time of executing this Contract. When the Owner reasonably believes that final completion will be inexcusably delayed, the Owner may withhold from any amounts otherwise due the Contractor an amount then believed by the Owner to be adequate to recover liquidated damages applicable to such delays. If and when the Contractor overcomes the delay in achieving final completion, or any part thereof, for which the Owner has withheld payment, the Owner shall promptly release to the Contractor those funds withheld, but no longer applicable, as liquidated damages. The Owner's right to liquidated damages is not, and shall not be deemed to be, an exclusive remedy for delay and the Owner shall retain all remedies at law or in equity for delay or other breach.

**7.13** As a condition precedent to final payment, the Contractor must furnish the Owner, in the form and manner required by Owner, and with a copy to the Design Professional of the following:

- .1** An affidavit that all of the Contractor's obligations to subcontractors, laborers, equipment or material suppliers or other third parties in connection with the Project have been paid or otherwise satisfied;
- .2** A release by the Contractor of all Claims it has or might have against the Owner or the Owner's property (DPW's form, Exhibit H);
- .3** Contractor's Affidavit of Debts and Claims (AIA Document G706);
- .4** Consent of Surety to final payment (AIA Document G707);

.5 Confirmation of all required training, product warranties, operating manuals, instruction manuals and other record documents, drawings and things customarily required of the Contractor; and

.6 A Public Works Contract Tax Release issued by the Idaho Tax Commission (See "Request for Tax Release" form, Exhibit G, to be submitted by Contractor to the Idaho Tax Commission).

7.14 The Owner shall, subject to its rights set forth in this Contract, make final payment of all sums due the Contractor within thirty (30) days of the Design Professional's execution of a final approval for payment and receipt of documentation required by Paragraph 7.13, whichever is received later.

## **ARTICLE 8 INFORMATION AND MATERIAL SUPPLIED BY THE OWNER**

8.1 The Administrator of DPW or his designee shall be the sole representative of the State of Idaho. The Design Professional shall have authority to bind Owner only as specifically set forth in this Contract.

8.2 The Owner will assign a Project Manager and a Field Representative to represent the Owner, identified in Exhibit B. The Owner's Field Representative's duties, responsibilities and limitations of authority are in accordance with DPW's policies and procedures.

8.3 The Owner shall furnish to the Contractor, prior to the execution of this Contract, any and all written and tangible material in its possession concerning conditions below ground at the site of the Project. Such written and tangible material is furnished to the Contractor only in order to make complete disclosure of such material as being in the possession of the Owner and for no other purpose. By furnishing such material, the Owner does not represent, warrant or guarantee its accuracy, either in whole in part, implicitly or explicitly.

8.4 The Owner will secure and pay for all required easements, the plan check fee required by the Division of Building Safety, conditional use permits and any other permits and fees specifically indicated in the Contract Documents to be secured and paid for by the Owner.

8.5 The Owner will provide the Contractor one (1) copy of this complete Contract and the number of sets of Drawings and Project Manuals (including Specifications) as indicated in Exhibit A. The Contractor may purchase additional copies, at its expense, from the Design Professional.

## **ARTICLE 9 STOP WORK ORDER**

9.1 In the event the Contractor fails or refuses to perform the Work as required or fails or refuses to correct nonconforming Work, the Owner may instruct the Contractor to stop Work in whole or in part. Upon receipt of such instruction, the Contractor shall immediately stop as instructed by the Owner and shall not proceed further until the cause for the Owner's instructions has been corrected, no longer exists or the Owner instructs that the Work may resume. In the event the Owner issues such instructions to stop, and in the further event that the Contractor fails and refuses within seven (7) days of receipt of same to provide adequate assurance to the Owner that the cause of such instructions will be eliminated or corrected, then the Owner shall have the right, but not the obligation, to carry out the Work with its own forces or with the forces of another contractor, and the Contractor shall be fully responsible and liable for the costs of performing such Work by the Owner. Without limiting what else might constitute nonconforming Work, the existence of a gross safety violation or other situation or condition that creates, or could imminently create, a threat of serious harm to persons or property, shall constitute nonconforming Work and any order to stop the Work issued for such reason shall not be considered an interference with the Contractor's performance of the Work or its means and methods. The rights set forth herein are in addition to, and without prejudice to, any other rights or remedies the Owner may have against the Contractor.

9.2 Any order to stop the Work issued pursuant to Paragraph 9.1 shall not be used to justify any Claim by the Contractor for additional time or money.

## **ARTICLE 10 DUTIES, OBLIGATIONS AND RESPONSIBILITIES OF THE CONTRACTOR**

In addition to any and all other duties, obligations and responsibilities of the Contractor set forth in this Contract, the Contractor shall have and perform the following duties, obligations and responsibilities to the Owner:

**10.1** The Contractor's continuing duties set forth in Paragraph 3.7 are by reference hereby incorporated in this Paragraph 10.1. The Contractor shall not perform Work without adequate plans and specifications or, as appropriate, approved shop drawings or other submittals. If the Contractor performs Work knowing or believing it involves an error, inconsistency or omission in the Contract without first providing written notice to the Design Professional and Owner, the Contractor shall be responsible for such Work and shall pay the cost of correcting same.

**10.2** The Contractor shall take field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to the Contractor with the Contract Documents before commencing Work. Errors, inconsistencies or omissions discovered shall be reported to the Design Professional, the Owner and the Owner's Field Representative immediately. Such examination, review and comparison shall be a warranty that the Contract Documents are complete and the Project is buildable as described except as reported. Reported errors, inconsistencies or omissions will constitute a request for an interpretation by the Design Professional and may constitute a claim pursuant to Article 13 hereof where appropriate.

**10.3** The Contractor shall ensure that all Work shall strictly conform to the requirements of this Contract.

**10.4** The Work shall be strictly supervised, the Contractor bearing full responsibility for any and all acts or omissions of those engaged in the Work on behalf of the Contractor.

**10.5** All labor furnished on this Project shall be competent to perform the tasks undertaken; materials and equipment furnished under the Contract will be new and of high quality unless otherwise required or permitted by the Contract Documents; the Work will be complete, of high quality and free from defects not inherent in the quality required or permitted; and the Work will strictly conform to the requirements of the Contract Documents. Any Work not strictly conforming to these requirements, including substitutions not properly approved and authorized, shall be considered defective.

**10.6** Except as provided in Paragraph 8.4, the Contractor shall secure or provide and pay for all licenses, permits required by the Idaho Division of Building Safety, governmental approvals and inspections, connections for outside services for the use of municipal or private property for storage of materials, parking, utility services, temporary obstructions, enclosures or opening and patching of streets, and for all other facilities and services necessary for proper execution and completion of the Project.

**10.7** The Contractor shall comply with and give notices required by laws, ordinances, rules, regulations and lawful orders of public authorities bearing on performance of the Work.

**10.8** The Contractor shall employ and maintain at the Project site only competent supervisory personnel. Key supervisory personnel assigned by the Contractor to this Project are as listed in Exhibit B.

**10.9** The Contractor shall employ a competent superintendent and necessary assistants, as needed, to oversee execution of the Work. The superintendent shall be in attendance at the Project site during the progress of the Work. The superintendent and any project manager, if the Contractor utilizes a project manager, shall be reviewed and must be approved by the Design Professional and Owner, and neither shall be changed except with the consent of the Design Professional and Owner, unless the superintendent and/or project manager cease to be employed by the Contractor. Under this circumstance, any new superintendent or new project manager must be satisfactory to the Design Professional and Owner. Such approval shall not be unreasonably withheld. The superintendent and any project manager shall represent the Contractor and all communications given to the superintendent or project manager are deemed given to the Contractor.

**10.10** So long as the individuals named above remain actively employed or retained by the Contractor, they shall perform the functions indicated next to their names unless the Owner agrees to the contrary in writing. In the event one or more individuals not listed in Paragraph 10.9 subsequently assumes one or more of those functions listed in Paragraph 10.9, the Contractor shall be bound by the provisions of this paragraph as though such individuals had been listed in Paragraph 10.9.

**10.11** The Contractor shall provide to the Owner and the Design Professional a milestone schedule for completing the Work within the Contract Time. Such schedule shall be in a form specified in Division 1 of the Specifications and be acceptable to the Owner and to the Design Professional. The schedule must be submitted to and accepted by the Design Professional prior to the first request for payment unless required earlier by Division 1 of the Specifications. The Contractor's milestone schedule must be updated as required by the Design Professional and/or the Owner to reflect conditions encountered and shall apply to the total Project. The Contractor's revisions to the schedule shall not constitute a waiver of the requirement to complete the Project in the time allowed by the Contract, unless additional time for performance has been allowed pursuant to a Change Order. Any changes in milestone begin or end dates must be furnished to the Owner and the Design Professional. Strict compliance with the requirements of this Paragraph shall be a condition precedent to the payment to the Contractor and failure by the Contractor to strictly comply with said requirements shall constitute a material breach of this Contract.

**10.12** Unless otherwise provided in the Construction Documents, on all projects where the Fixed Price Contract Amount is over \$1,000,000, the Contractor shall schedule and perform the Work in accordance with a Critical Path Method ("CPM") to indicate the rate of progress and practical order of the Project. The purpose of this scheduling requirement is to assure adequate planning, coordination and execution of the Work. The schedule shall indicate the dates for starting and completing major work activities, project events, major equipment, material and equipment submittals and delivery of major items. Project activities having critical time restraints on action, required by the Owner, shall be shown as scheduled milestones. The Contractor's schedule shall demonstrate the order, interdependence and sequence of activities. Critical paths shall be highlighted or distinguished. The schedule shall include all the dates specified in the Contract for Substantial Completion and final completion of the Work. The time limit set forth in the Contract for Substantial Completion and final completion must govern; the schedule must be adjusted to meet these dates. Schedule float shall belong to the Project. The Contractor shall submit to the Owner and Design Professional a CPM schedule within three (3) weeks after award of the Contract and maintain such schedule on a current basis in accordance with the Contract Documents.

**10.13** Once a month, or at intervals as required by the Design Professional, the Contractor shall advise the Owner and the Design Professional of the status of the Work (in duplicate) on the current milestone schedule. If any project milestone dates are not met on schedule, the Contractor shall immediately advise the Owner and Design Professional in writing of the proposed action to bring the Work on schedule. The Contractor shall also submit a detailed short term schedule, as required by Division 1 of the Specifications, each month. This short term schedule shall include a description of current and anticipated problem areas, delaying factors and their impact, and explanation of corrective action taken or proposed. If the Work is behind schedule, the Contractor shall indicate what measures it will take to put the Work back on schedule.

**10.14** If the Work is not progressing through no fault of the Owner or the Design Professional, as shown on the milestone schedule, as determined by the Design Professional, and the Owner and the Design Professional do not believe the Contractor's proposed action to bring the Work on schedule is adequate, then the Contractor shall be deemed in default under this Contract and the progress of the Work shall be deemed unsatisfactory. In such event, the Owner, at its discretion, may require the Contractor to work such additional time over regular hours, including Saturdays, Sundays and holidays, without additional cost to the Owner to bring the Work on schedule.

**10.15** The Contractor shall keep an updated copy of the Drawings and Project Manual (including Specifications) and Addenda at the site. Additionally, the Contractor shall keep a current submittal schedule and a copy of approved shop drawings and other submittals. All of these items shall be available to the Owner and the Design Professional at all regular business hours. Upon final completion of the Work, all of these items must be updated by the Contractor and provided to the Design Professional and shall become the property of the Owner.

**10.16** The Contractor shall carefully review and inspect for compliance with the Contract Documents, the shop drawings and other submittals (including product data and samples) required by the Contract Documents and shall submit to the Design Professional only submittals approved in accordance with this section. Such review and submittal shall be done promptly and in a sequence that will not delay its Work under this Contract or the activities of the Owner or of separate contractors. Shop drawings and other submittals from the Contractor do not constitute a part of the Contract. The Contractor shall not do any work requiring shop drawings or other submittals unless the Design Professional has verified compliance in writing. All Work requiring verified shop drawings or other submittals shall be done in strict compliance with such approved documents. However, verification of compliance by the Design Professional shall not be evidence that Work installed pursuant thereto conforms with the requirements of this Contract. The Design Professional shall have no duty to review submittals that are not Contractor approved, partial



submittals or incomplete submittals. The Contractor shall maintain a submittal log which shall include, at a minimum, the date of each submittal, the date of any re-submittal, the date of any approval or rejection and the reason for any rejection.

**10.17** The Contractor shall maintain the Project site in a reasonably clean condition during performance of the Work. Upon final completion, the Contractor shall thoroughly clean the Project site of all debris, trash and excess materials or equipment.

**10.18** At all times relevant to this Contract, the Owner and the Design Professional shall have a right to enter the Project site and the Contractor shall allow the Owner and/or the Design Professional to review or inspect the work without formality or other procedure.

**10.19** The presence or duties of the Design Professional's or the Owner's personnel or representatives at the construction site, does not make any of them responsible for those duties that belong to the Contractor or other entities and does not relieve the Contractor or any other entities of their obligations, duties and responsibilities, including any obligation or requirement to have or to implement any health or safety plans or precautions. Except as provided in Paragraph 10.9, Design Professional's and Owner's personnel have no authority to exercise any control over any Contractor or other entities or their employees in connection with their work or any health or safety precautions and have no duty for inspecting, noting, observing, correcting or reporting on health or safety deficiencies of the Contractor or other entities or any other persons at the site except their own personnel. The presence of Design Professional's or Owner's personnel at a construction site is for the purpose of providing to Owner a greater degree of confidence that the completed Work will conform to the Contract Documents and that the integrity of the design concept as reflected in the Contract Documents has been implemented and preserved by the Contractor. For this Contract only, construction sites include places of manufacture for materials incorporated into the construction Work and Contractor includes manufacturers of materials incorporated into the construction Work.

## **ARTICLE 11 INDEMNITY**

**11.1** The Contractor shall defend, indemnify and hold harmless the Owner, Design Professional, and their employees, officers and agents harmless from any and all claims, liabilities, damages, losses, costs and expenses of every type whatsoever, including attorney fees and expenses, arising out of or resulting from the Contractor's work, acts or omissions under or related to the Contract Documents, to the extent caused by the Contractor, or anyone for whose acts the Contractor may be liable, regardless of whether such liability, claim, damage, loss, cost or expense is caused in part by the Owner.

**11.2** The limits of any insurance of the Contractor shall not be, and shall not be deemed to be, a limitation of the Contractor's defense and indemnity obligations contained in this Article.

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

## **ARTICLE 12 THE DESIGN PROFESSIONAL**

The Design Professional for this Project is identified in Exhibit B, incorporated herein by reference, along with any authorized representatives and any limitations of responsibility. For the purpose of this Contract, the "Design Professional" means the properly licensed architect, properly registered professional engineer or other professional licensed in the State of Idaho who prepared the Drawings and Specifications for this Project. If the employment of the Design Professional is terminated, the Owner may retain a replacement professional, and the role of the replacement professional shall be the same as the role of the Design Professional. Unless otherwise directed by the Owner in writing, the Design Professional will perform those duties and discharge those responsibilities allocated to the Design Professional in this Contract. The duties, obligations and responsibilities of the Design Professional shall be for contract administration and include the following:

**12.1** Unless otherwise directed by the Owner in writing, the Design Professional shall not act as the Owner's agent.

**12.2** Unless otherwise directed by the Owner in writing, the Owner and the Contractor shall communicate with each other through the Design Professional.

**12.3** When requested by the Owner or Contractor in writing, the Design Professional shall within seven (7) days render written interpretations necessary for the proper execution or progress of the Work or shall provide a written explanation as to why more time is needed and provide a date by which it will be provided.

**12.4** The Design Professional shall draft proposed change authorization(s).

**12.5** The Design Professional shall review and verify compliance or respond otherwise as necessary concerning shop drawings or other submittals received from the Contractor.

**12.6** The Design Professional shall be authorized to refuse to accept Work that is defective or otherwise fails to comply with the requirements of this Contract. If the Design Professional deems it appropriate, the Design Professional may, with the Owner's consent, require extra inspections or testing of the Work for compliance with the requirements of this Contract.

**12.7** The Design Professional shall review the Contractor's Request for Payment and shall verify in writing those amounts which, in the opinion of the Design Professional, are properly owing to the Contractor as provided in this Contract.

**12.8** The Design Professional shall, upon written request from the Contractor, perform Substantial Completion and final completion inspections contemplated by Article 6.

**12.9** The Design Professional may require the Contractor to make changes which do not involve a change in the Fixed Price Contract Amount or in the Contract Time consistent with the intent of this Contract. Such changes shall be given to the Contractor in writing under signature of the Design Professional, with a copy to the Owner, and may be in the form of a supplemental instruction.

**12.10** The Design Professional shall review and evaluate Claims and take other actions related to Claims in accordance with Articles 13 and 14.

**12.11** The duties, obligations and responsibilities of the Contractor under this Contract shall in no manner whatsoever be changed, altered, discharged, released or satisfied by any duty, obligation or responsibility of the Design Professional. The Contractor is not a third-party beneficiary of any Contract by and between the Owner and the Design Professional. It is expressly acknowledged and agreed that the duties of the Contractor to the Owner are independent of, and are not diminished by, any duties of the Design Professional to the Owner.

## **ARTICLE 13**

### **CLAIMS**

**13.1** For purposes of this Contract, a "Claim" means a demand by the Contractor to the Owner, or by the Owner to the Contractor, for a change in the Fixed Price Contract Amount, an extension of the Contract Time, an adjustment to or interpretation of the Contract terms, or other relief with respect to the terms of the Contract, which demand the Contractor or Owner asserts is required or allowed under the Contract Documents and which the Contractor and the Owner have previously discussed and failed to agree upon.

**13.2** For the Claim to be considered, it must meet the following requirements:

**.1** The Claim must be in writing;

**.2** The Claim by the Contractor must be signed by an authorized representative of the Contractor, and the Claim by the Owner must be signed by an authorized representative of the Owner;

- .3 The Claim by the Contractor must be provided to the Owner and to the Design Professional and the Claim by the Owner must be provided to the Contractor and to the Design Professional;
- .4 The Claim must be made no later than ten (10) days after the event or first appearance of the circumstance giving rise to the Claim;
- .5 The Claim must describe in detail all known facts and circumstances that the Contractor or Owner asserts support the Claim;
- .6 The Claim must refer to the provision(s) of the Contract Documents that the Contractor or Owner asserts support the Claim;
- .7 The Contractor or Owner must provide all documentation or other information to substantiate the Claim; and
- .8 The Contractor or Owner must continue its performance under this Contract pending the resolution of any Claim; provided, however, that the Contractor shall not perform any additional or changed work not otherwise authorized in accordance with the Contract Documents.

**13.3** The failure by the Contractor to meet any of the requirements of Paragraph 13.2 shall constitute a complete waiver by the Contractor of any rights arising from or related to the Claim. Similarly, the failure by the Owner to meet any of the requirements of Paragraph 13.2 shall constitute a complete waiver by the Owner of any rights arising from or related to the Claim.

**13.4** If the Claim is made based on concealed or unknown site conditions, the following shall apply in addition to all other provisions applicable to the Claim:

- .1 The condition must have been previously concealed and unknown or of a type not ordinarily encountered in the general geographic location of the Project and must not have been reasonably susceptible to discovery; and
- .2 The Contractor shall notify the Design Professional and the Owner of the condition and shall not disturb the condition until the Design Professional and Owner have observed it or have waived in writing the right to observe it.

**13.5** If the Claim by the Contractor is for an increase in the Fixed Price Contract Amount, the following shall apply in addition to all other provisions applicable to the Claim:

- .1 Any increase in the Fixed Price Contract Amount shall be strictly limited to the direct costs incurred by the Contractor and shall not include any other costs, indirect or other, including any costs for or related to lost productivity, profit, home office overhead and any other overhead, legal fees, claim preparation, any matter previously resolved by a change order, equipment costs, costs related to the services of a project manager unless the project manager was required full time by the Owner or the Contract Documents, any costs associated with the failure to complete the Work early or in advance of the date required by the Contract Documents, it being specifically agreed to by the parties that there is no intention to have the Eichleay or other similar formula applicable to this Contract nor shall this Contract be deemed to be subject to any such formula; and
- .2 The Owner shall have no liability for, and the Fixed Price Contract Amount shall not be increased related to, any claims of third parties, including subcontractors, unless and until the liability of the Contractor for such has been established in a court of competent jurisdiction and any such liability of the Owner shall be limited in the same manner as described in subparagraph 13.5.1.

**13.6** If the Claim by the Owner is for a change in the Fixed Price Contract Amount, all other applicable provisions to the Claim apply.

**13.7** If the Claim by the Contractor is for an extension of the Contract Time, the following shall apply in addition to all other provisions applicable to the Claim:

- .1 The Contractor has been delayed in its performance by an act or omission of the Owner and through no fault of the Contractor;
- .2 The Contractor has been delayed in its performance by unusually severe weather that could not reasonably have been anticipated or by another event not within its reasonable control;
- .3 At the time it occurs or during its occurrence, the delay will preclude completion of the Project in the time required by the Contract Documents; and
- .4 Any extension of the Contract Time shall be the Contractor's sole and exclusive remedy for any delay except a delay caused by the active interference of the Owner with the Contractor's performance which active interference continues after written notice to the Owner. The Owner's exercise of any of its rights or remedies under this Contract, including ordering changes in the Work, directing suspension, rescheduling or correction of the Work, do not constitute active interference.

**13.8** If a Claim is made based on an error, inconsistency or omission in the Contract that was reasonably susceptible to discovery by the Contractor and was not reported in accordance with Paragraph 2.3, that Claim shall be denied.

## **ARTICLE 14 RESOLUTION OF CLAIMS**

**14.1** All Claims made in accordance with Article 13 shall be reviewed and evaluated by the Design Professional. If the Claim is not made in strict accordance with Article 13, it shall be rejected as waived. Any failure by the Design Professional to reject the Claim for failure to meet the requirements of Article 13 is not binding on the Owner and the Owner may reject the Claim for such failure.

**14.2** No later than seven (7) days from receipt of the Claim by the Design Professional, it shall:

- .1 Make a written request to the Contractor or Owner for more data to support the Claim;
- .2 Attempt to facilitate resolution of the Claim through informal negotiations; or
- .3 If the Claim is by the Contractor, make a written recommendation to the Owner, with a copy to the Contractor, that the Owner reject or approve all or part of the Claim and state the reasons for the Design Professional's recommendation. If the Claim is by the Owner, make a written recommendation to the Contractor, with a copy to the Owner, that the Contractor reject or approve all or part of the Claim and state the reasons for the Design Professional's recommendation.

**14.3** If the Design Professional requests more data from the Contractor or the Owner under subparagraph 14.2.1, the Contractor or Owner shall respond no later than seven (7) days from receipt of such request, and provide additional data, provide a date certain by which additional data will be provided, or state that it will not provide additional data. Upon receipt of data, if any, in accordance with this section, the Design Professional will complete the evaluation of the Claim. Failure to respond at all or failure to provide data by the date specified in the response to the request shall result in the Claim being evaluated based on the information in the Design Professional's possession.

**14.4** In evaluating the Claim, the Design Professional may consult with the Contractor, the Owner or other persons with knowledge or expertise that may assist the Design Professional in its evaluation.

**14.5** No later than fourteen (14) days after receipt by the Owner of the Design Professional's recommendation regarding the Contractor's Claim, the Owner shall, in writing, notify the Contractor and the Design Professional of its decision regarding the Claim. No later than fourteen (14) days after receipt by the Contractor of the Design Professional's recommendation regarding the Owner's Claim, the Contractor shall, in writing, notify the Owner and the Design Professional of its decision regarding the Claim.

**14.6** The Owner's decision regarding the Contractor's Claim is binding on the Owner and the Contractor but is subject to mediation in accordance with this Contract, and the Contractor's decision regarding the Owner's Claim is binding on the Owner and the Contractor but is subject to mediation in accordance with this Contract.

## **ARTICLE 15 SUBCONTRACTORS**

**15.1** A document in the form of Exhibit E shall be completed and submitted upon execution of this Contract and those subcontractors named therein shall match those subcontractors named in the Contractor's bid unless otherwise agreed to in writing by the Owner. Also upon execution of this Contract by the Contractor, the Contractor shall identify to the Owner and the Design Professional, in writing, those parties intended as subcontractors on the Project not otherwise named in Exhibit E. The Owner shall, in writing, state any objections the Owner may have to one or more of such subcontractors. The Contractor shall not enter into a subcontract with an intended subcontractor with reference to whom the Owner objects. All subcontracts shall afford the Contractor rights against the subcontractor which correspond to those rights afforded to the Owner against the Contractor herein, including those rights of Contract Termination as set forth in this Contract. All subcontractors shall, throughout the duration of this Contract, be properly licensed as Idaho Public Works Contractors.

**15.2** The Contractor conditionally assigns each of its subcontracts related to the Project to the Owner. All subcontracts between the Contractor and the subcontractors shall obligate the subcontractor to such conditional assignment. Upon a Termination by the Owner for cause under Paragraph 20.1, the Owner may accept such conditional assignment by written notification to the applicable subcontractor and to the Contractor. Such acceptance is subject to the rights of the Surety, if any, relating to the Contract.

## **ARTICLE 16 CHANGES IN THE WORK**

### **16.1** General

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

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

### **16.2** Change Orders

**.1** A "Change Order" is a written instrument prepared by the Design Professional and signed by the Owner, Contractor and Design Professional, stating their agreement upon: a change in the work, any adjustment in the Fixed Price Contract Amount and any adjustment in the Contract Time;

**.2** Methods used in determining adjustments to the Fixed Price Contract Amount may include those listed in subparagraph 16.3.4;

**.3** The amount allowed for overhead and profit on any Change Order is limited to the amounts indicated in subparagraph 16.3.11;

**.4** Any Change Order prepared, including those arising by reason of the parties' mutual agreement or by mediation, shall constitute a final and full settlement of all matters relating to or affected by the change in the Work, including all direct, indirect and consequential costs associated with such change and any and all adjustments to the Fixed Price Contract Amount and Contract Time. In the event a Change Order increases the Fixed Price Contract Amount, the Contractor shall include the Work covered by such Change Order in the Contractor's Request for Payment as if such Work were originally part of the Project and Contract Documents; and

.5 By the execution of a Change Order, the Contractor agrees and acknowledges that it has had sufficient time and opportunity to examine the change in Work which is the subject of the Change Order and that it has undertaken all reasonable efforts to discover and disclose any concealed or unknown conditions which may to any extent affect the Contractor's ability to perform in accordance with the Change Order. Aside from those matters specifically set forth in the Change Order, the Owner shall not be obligated to make any adjustments to either the Fixed Price Contract Amount or Contract Time by reason of any conditions affecting the change in Work addressed by the Change Order, which could have reasonably been discovered or disclosed by the Contractor's examination.

### 16.3 Construction Change Directive (CCD)

.1 A "Construction Change Directive" is a written order prepared by the Design Professional and signed by the Owner and Design Professional directing a change in the Work prior to agreement on adjustment, if any, in the Fixed Price Contract Amount or Contract Time or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract, consisting of additions, deletions or other revisions, the Fixed Price Contract Amount and Contract Time being adjusted accordingly;

.2 A Construction Change Directive, within limitations, may also be used to incorporate minor changes in the Work agreed to by the Design Professional's representative, the Owner's Field Representative and the Contractor's superintendent or project manager. The limits of these representatives' authority with regard to Construction Change Directives shall be documented in writing by the Design Professional, Owner and Contractor;

.3 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order;

.4 If the Construction Change Directive provides for an adjustment to the Fixed Price Contract Amount, the adjustment shall be based on one (1) of the following methods:

.1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;

.2 Unit prices stated in the Contract Documents or subsequently agreed upon;

.3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or

.4 As provided in subparagraph 16.3.7;

.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Design Professional in writing within forty-eight (48) hours of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Fixed Price Contract Amount or Contract Time;

.6 A Construction Change Directive signed by the Contractor indicates the agreement of the Contractor therewith, including adjustment in Fixed Price Contract Amount and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be incorporated into a future Change Order;

.7 If the Contractor does not respond promptly or disagrees with the method for adjustments in the Fixed Price Contract Amount or Contract Time, the method and the adjustment shall be determined by the Design Professional on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Fixed Price Contract Amount, an allowance for overhead and profit in accordance with subparagraph 16.3.11. In such case of an increase in Fixed Price Contract Amount, and also under subparagraph 16.3.4, the Contractor shall keep and present, in such form as the Design Professional may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this subsection shall be limited to the following:

- .1 Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom and workers' compensation insurance;
- .2 Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- .4 Costs of permit fees and sales, use or similar taxes related to the Work; and
- .5 Additional costs of supervision and field office personnel directly attributable to the change;
- .8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change which results in a net decrease in the Fixed Price Contract Amount shall be for the actual net cost of the decrease, confirmed by the Design Professional. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change;
- .9 Pending final determination of the total cost of a Construction Change Directive to the Owner, amounts not in dispute for such changes in the Work shall be included in the Contractor's Request for Payment accompanied by a Change Order indicating the parties' agreement with part or all of such costs;
- .10 When the Owner and Contractor agree with the determination by the Design Professional concerning the adjustments in the Fixed Price Contract Amount and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and shall be recorded by preparation and execution of an appropriate Change Order; and
- .11 For purposes of subparagraphs 16.2.3 and 16.3.7, the allowance for combined overhead, profit, bonds and insurance shall be limited as follows, unless otherwise provided in the Contract Documents:
  - .1 For changes, the amount allowed for overhead, profit, bonds and insurance for the Contractor and all subcontractors of any tier combined shall not exceed fifteen percent (15%) of direct costs; or
  - .2 The Contractor will determine the apportionment between the Contractor and its subcontractors of allowable amounts of overhead, profit, bonds and insurance.

**16.4** The Design Professional will have authority to order minor changes in the Work not involving adjustment in the Fixed Price Contract Amount or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes shall be effected by written order and shall be binding on the Owner and Contractor. The Contractor shall carry out such written orders promptly.

## **ARTICLE 17**

### **DISCOVERING AND CORRECTING DEFECTIVE OR INCOMPLETE WORK**

**17.1** If the Contractor covers, conceals or obscures its Work in violation of this Contract or in violation of a directive or request from the Owner or the Design Professional, such Work shall be uncovered and displayed for the Owner's or Design Professional's inspection upon request and shall be reworked at no cost in time or money to the Owner.

**17.2** If any of the Work is covered, concealed or obscured in a manner not addressed by Paragraph 17.1, it shall, if directed by the Owner or the Design Professional, be uncovered and displayed for the Owner's or Design Professional's inspection. If the uncovered Work conforms strictly with this Contract, the costs incurred by the Contractor to uncover and subsequently replace such Work shall be borne by the Owner. Otherwise, such costs shall be borne by the Contractor.

**17.3** The Contractor shall, at no cost in time or money to the Owner, promptly correct Work (fabricated, installed or completed) rejected by the Owner or by the Design Professional as defective or that fails to conform to this Contract

whether discovered before or after Substantial Completion. Additionally, the Contractor shall reimburse the Owner for all testing, inspections and other expenses incurred as a result thereof.

**17.4** In addition to any other warranty obligations in this Contract, the Contractor shall be specifically obligated to correct, upon written direction from the Owner, any and all defective or nonconforming Work for a period of twelve (12) months following Substantial Completion.

**17.5** The Owner may, but shall in no event be required to, choose to accept defective or nonconforming Work. In such event, the Fixed Price Contract Amount shall be reduced by the lesser of: (i) the reasonable costs of removing and correcting the defective or nonconforming Work; or (ii) the difference between the fair market value of the Project as constructed and the fair market value of the Project had it not been constructed in such a manner as to include defective or nonconforming Work. If the remaining portion of the unpaid Fixed Price Contract Amount, if any, is insufficient to compensate the Owner for the acceptance of defective or nonconforming Work, the Contractor shall, upon written demand from the Owner, pay the Owner such remaining compensation for accepting defective or nonconforming work.

## **ARTICLE 18 TERMINATION BY THE CONTRACTOR**

**18.1** The Contractor may terminate the Contract if the Work is stopped for a period of ninety (90) consecutive days through no act or fault of the Contractor or a subcontractor, sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

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

**18.2** In such event, the Contractor shall be entitled to recover from the Owner as though the Owner had terminated the Contractor's performance under this Contract pursuant to Paragraph 20.3.

## **ARTICLE 19 OWNER'S RIGHT TO SUSPEND CONTRACTOR'S PERFORMANCE**

**19.1** The Owner may, at any time and without cause, order the Contractor, in writing, to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine. If the Owner directs any such suspension, the Contractor must immediately comply with same.

**19.2** In the event the Owner directs a suspension of performance under this Article, and such suspension is through no fault of the Contractor, the Fixed Price Contract Amount and Contract Time shall be adjusted for increases in the cost and time caused by such suspension, delay or interruption to cover the Contractor's reasonable costs, actually incurred and paid, of:

- .1** Demobilization and remobilization, including such costs paid to subcontractors;
- .2** Preserving and protecting Work in place;
- .3** Storage of materials or equipment purchased for the Project, including insurance thereon; and
- .4** Performing in a later, or during a longer, time frame than that provided by this Contract.

**19.3** The adjustment of the Fixed Price Contract Amount shall include an amount for a reasonable profit. The adjustment of the Fixed Price Contract Amount shall not include any amount not otherwise allowed under this Contract, including any limitations applicable to Claims. The Contractor shall provide supporting documentation related to any increase upon request of the Owner. No adjustment shall be made to the extent:



.1 That performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or

.2 That an equitable adjustment is made or denied under another provision of the Contract.

## **ARTICLE 20 TERMINATION BY THE OWNER**

The Owner may terminate this Contract in accordance with the following terms and conditions:

**20.1** If the Contractor does not perform the Work, or any part thereof, in accordance with the Contract Documents, or in a timely manner; does not supply adequate labor, supervisory personnel, or proper equipment or materials; fails to pay subcontractors; fails to timely discharge its obligations for labor, equipment, and materials; proceeds to disobey applicable law; or otherwise breaches this Contract, then the Owner, in addition to any other rights it may have against the Contractor, may terminate the Contract and assume control of the Project site and of all materials and equipment at the site and may complete the Work. In such case, the Contractor shall not be paid further until the Work is complete. Upon such Termination, the Owner may, subject to any superior rights of the Surety, take possession of the site and of all materials, equipment, tools and construction equipment and machinery thereon owned by the Contractor; accept assignment of those subcontracts conditionally assigned under Paragraph 15.2; and finish the Work by whatever reasonable method the Owner may deem expedient.

**20.2** When the Owner terminates the Contract for cause as provided in Paragraph 20.1, the Contractor shall not be entitled to receive further payment until the Work is finished and shall only be entitled to payment for Work satisfactorily performed by the Contractor in accordance with the Contract Documents. If the costs of finishing the Work, including compensation for the Design Professional's services and expenses made necessary thereby, exceed the unpaid balance, the Contractor shall pay the difference to the Owner. This obligation for payment shall survive termination of the Contract. The Contractor shall also terminate outstanding orders and subcontracts. The Contractor shall settle the liabilities and claims arising out of the termination of subcontracts and orders. In the event the employment of the Contractor is terminated by the Owner for cause pursuant to Paragraph 20.1 and it is subsequently determined by a court of competent jurisdiction that such termination was without cause, such termination shall thereupon be deemed a Termination under Paragraph 20.3 and the provisions of Paragraph 20.3 shall apply.

**20.3** The Owner may, at any time and for any reason, terminate this Contract. The Owner shall give no less than seven (7) days' written notice of such Termination to the Contractor specifying when termination becomes effective. The Contractor shall incur no further obligations in connection with the Work and the Contractor shall stop Work when such Termination becomes effective. The Contractor shall also terminate outstanding orders and subcontracts. The Contractor shall settle the liabilities and claims arising out of the termination of subcontracts and orders. The Owner may direct the Contractor to assign the Contractor's right, title and interest under termination orders or subcontracts to the Owner or its designee. The Contractor shall transfer title and deliver to the Owner such completed or partially completed Work and materials, equipment, parts, fixtures, information and Contract rights as the Contractor has. When terminated pursuant to this section, the following shall apply:

.1 The Contractor shall submit a Termination Claim to the Owner and the Design Professional specifying the amounts claimed due because of the Termination, together with costs, pricing or other supporting data required by the Owner or the Design Professional. Failure by the Contractor to file a Termination Claim within ninety (90) days from the effective date of termination shall be deemed a complete waiver by the Contractor of any right to any payment;

.2 Before or after receipt of the Termination Claim, the Owner and the Contractor may agree to the compensation, if any, due to the Contractor hereunder; and

.3 If the Contractor has filed the Termination Claim but the Contractor and the Owner do not agree on an amount due to the Contractor, the Owner shall pay the Contractor the following amounts:

.1 Unpaid Contract prices for labor, materials, equipment and other services provided or perfected prior to termination and acceptable to or accepted by the Owner;

**.2** Reasonable costs incurred in preparing to perform the terminated portion of the Work, and in terminating the Contractor's performance, plus a fair and reasonable allowance for direct job-site overhead and profit related to such preparation (such profit shall not include anticipated profit or consequential damages); provided, however, that if it appears that the Contractor would have not profited or would have sustained a loss if the entire Contract would have been completed, no profit shall be allowed or included and the amount of compensation shall be reduced to reflect the anticipated loss, if any; and

**.3** Reasonable costs of settling and paying claims arising out of the Termination of subcontracts or orders pursuant to this Paragraph 20.3.

**20.4** Costs described in subparagraphs 20.3.3.2 or 20.3.3.3 above shall not include amounts paid in accordance with other provisions hereof. In no event shall the total sum to be paid the Contractor under subparagraph 20.3.3 exceed the total Fixed Price Contract Amount, as properly adjusted, reduced by the amount of payments previously or otherwise made and by any other deductions permitted under this Contract and shall in no event include duplication of payment.

## **ARTICLE 21 CONTRACTOR'S LIABILITY INSURANCE**

**21.1** The Contractor, subcontractor and sub-subcontractor shall purchase and maintain in full force and effect from a company or companies lawfully authorized to do business in the State of Idaho such insurance as will protect the Contractor, subcontractor and sub-subcontractor from claims set forth below which may arise out of or result from the Contractor's or subcontractor's operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a subcontractor or by anyone directly or indirectly employed by any of them or by anyone for whose acts any of them may be liable:

**.1** Claims under workers' or workmen's compensation, disability benefits and other similar employee benefit acts which are applicable to the work to be performed;

**.2** Claims for damages because of bodily injury, occupational sickness or disease or death of the Contractor's employees;

**.3** Claims for damages because of bodily injury, sickness or disease or death of any person other than the Contractor's employees;

**.4** Claims for damages insured by usual personal injury liability coverage which are sustained: (i) by a person as a result of an offense directly or indirectly related to employment of such person by the Contractor; or (ii) by another person;

**.5** Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting there from;

**.6** Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;

**.7** Claims for bodily injury or property damage arising out of completed operations; and

**.8** Claims involving contractual liability insurance applicable to the Contractor's obligations under Article 11.

**21.2** The insurance required by Paragraph 21.1 above shall be written for not less than limits of liability specified in this Contract or as required by law, whichever is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from date of commencement of the Work until date of final payment and termination of any coverage required to be maintained after final payment. In addition, for any insurance required that is obtained on a claims-made basis, "tail coverage" is required at the completion of the Work for twenty-four (24) months. Continuous claims-made coverage will be acceptable in lieu of "tail coverage" provided the retroactive date is on or before the effective date of this Contract or twenty-four (24) months "prior acts" coverage is provided.

- .1 The insurance required by Paragraph 21.1 above shall be written for not less than the following limits:
- .1 Workers' Compensation and Employer's Liability
    - (a) State Workers Compensation: Statutory
    - (b) Employer's Liability:
      - \$100,000 per Accident
      - \$500,000 Disease, Policy Limit
      - \$100,000 Disease, Each Employee
  - .2 Comprehensive Commercial General Liability and Umbrella Liability Insurance. Contractor shall maintain Commercial General Liability ("CGL") and, if necessary, commercial umbrella insurance with a limit of not less than \$1,000,000 each occurrence. If such CGL insurance contains a general aggregate limit, it shall apply separately to this project location;
 

CGL insurance shall be written on Insurance Services Office ("ISO") occurrence form CG 00 01 12 04 (or a substitute form providing equivalent coverage) and shall cover liability arising from premises, operation, independent contractors, products-completed operations, personal (including employee acts) and advertising injury and liability assumed under an insured contract (including the tort liability of another assumed in a business contract). As applicable, coverage must also include a broad form CGL endorsement if the substitute insurance is a 1973 edition CGL or its equivalent;

Owner shall be included as an additional insured under the CGL, using ISO additional insured endorsement CG 20 10 and CG 20 37 or their equivalent, which endorsement shall include coverage for the Owner with respect to liability arising out of the Work, including completed operations of Contractor, and which coverage shall be maintained in effect for the benefit of Owner for a period of two (2) years following the completion of the work specified in this Contract. Additional insured coverage as required in this subparagraph shall apply as primary insurance with respect to any other insurance or self-insurance programs afforded to the Owner;

    - (a) For the hazards of explosion, collapse, and damage to underground property, commonly referred to as XCU, coverage shall be required if the exposures exist; and

This coverage may be provided by the subcontractor if the Owner and prime Contractor are named as additional insureds;
  - .3 Business Auto and Umbrella Liability Insurance: Contractor shall maintain business, auto liability and, if necessary, commercial umbrella liability insurance with a limit of not less than \$1,000,000 each accident;
 

Such insurance shall cover liability arising out of any auto (including owned, hired, and non-owned autos);

Business auto coverage shall be written on ISO form CA 00 01, CA 00 05, CA 00 12, CA 00 20 or a substitute form providing equivalent liability coverage. If necessary, the policy shall be endorsed to provide contractual liability coverage equivalent to that provided in the 1990 and later editions of CA 00 01;

If hazardous waste will be hauled, Contractor shall obtain pollution liability coverage equivalent to that provided under the ISO pollution liability-broadened coverage for covered autos endorsement (CA 99 48) and the Motor Carrier Act endorsement (MCS 90) shall be attached;
  - .4 If the General Liability coverages are provided by Commercial Liability policies the:
    - .1 General Aggregate shall be not less than \$2,000,000; and
    - .2 Fire legal liability shall be provided in an amount not less than \$100,000 per occurrence; and

**.5** Umbrella Excess Liability. An umbrella policy may be used in combination with other policies to provide the required coverage.

**21.3** The Owner shall be named as additional insured or loss payee, as applicable, on the insurance required in subparagraphs 21.2.1.2, 21.2.1.3 and 21.2.1.5 above, and the insurance shall contain the severability of interest clause as follows:

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

**21.4** The Contractor may include all subcontractors as insureds under the Contractor's policies in lieu of separate policies by each subcontractor. The Contractor must furnish the State of Idaho, Division of Public Works, with the required endorsements or certificates of insurance from each subcontractor which names the subcontractor, its officials, employees and volunteers as insureds.

**21.5** Certificates of Insurance for Workers' Compensation shall be on the standard form. Certificates of Insurance for Commercial or Comprehensive General Liability shall be the most current ACORD Form 25 or 28, must be acceptable to the Owner and shall be filed with the Owner prior to commencement of the Work. The Owner may require proof of coverage by an endorsement. If any of the foregoing insurance coverages are required to remain in force after final payment and are reasonably available, an additional certificate evidencing continuation of such coverage shall be submitted with the final Contractor's Request for Payment as required by Article 7. Information concerning reduction of coverage shall be furnished by the Contractor with reasonable promptness in accordance with the Contractor's information and belief.

## **ARTICLE 22 OWNER'S LIABILITY INSURANCE**

The Owner, at its option, may purchase or maintain insurance for protection against claims which may arise from operations under the Contract.

## **ARTICLE 23 PROPERTY INSURANCE**

**23.1** Unless otherwise provided, the Owner shall purchase or maintain, from a company or companies lawfully authorized to do business in the State of Idaho, property insurance written on a builders risk "all-risk" or equivalent policy form in an amount not less than the initial Fixed Price Contract Amount. Such property insurance shall be maintained until final payment to the Contractor has been made. This insurance shall include interests of the Owner, the Contractor, subcontractors and sub-subcontractors.

**23.2** Property insurance shall be on an "all-risk" or equivalent policy form and shall include, but not necessarily be limited to insurance against the perils of fire (with extended coverage) and mischief, collapse, earthquake, flood, windstorm, temporary buildings and debris removal, including demolition occasioned by enforcement of any applicable legal requirements, and shall cover necessary and reasonable expenses for the Design Professional's expenses required as a result of such insured loss.

**23.3** If the property insurance requires deductibles, the Owner shall pay costs of such deductibles.

**23.4** Boiler and Machinery Insurance. The Owner will purchase and maintain boiler and machinery insurance, which shall specifically cover such insured objects during installation and testing.

**23.5** Loss of Use Insurance. The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of the Owner's property due to fire or other hazards, however caused.

**23.6** Waivers of Subrogation. The Owner and Contractor waive all rights against: (i) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other; and (ii) the Design Professional, Design Professional's consultants, separate contractors, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages to the Work caused by fire or other causes of loss to the extent covered by

property insurance obtained pursuant to this Article or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner. The Owner or Contractor, as appropriate, shall require of the Design Professional, Design Professional's consultants, separate contractors, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged. The Owner does not waive its subrogation rights to the extent of its property insurance on structures or portions of structures that do not comprise the Work.

**23.7** The Contractor authorizes the Owner to negotiate and agree on the value and extent of, and to collect the proceeds payable with respect to, any loss under a policy of insurance carried by the Owner pursuant to any of the provisions of this Article. The Owner shall have full right and authority to compromise any claim, or to enforce any claim by legal action or otherwise, or to release and discharge any insurer, by and on behalf of the Owner and Contractor. The Owner shall provide written notice to Contractor of: (i) its having reached any such settlement or adjustment with an insurer; and (ii) the receipt of any funds pursuant to this Article. Any objection by the Contractor to a settlement or adjustment made under this Article must be made in writing to the Owner within five (5) business days of the notice from the Owner. The Owner and the Contractor agree to attempt to resolve the dispute by mutual agreement.

**23.8** A loss under the Owner's property insurance shall be adjusted by the Owner and made payable to the Owner for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause.

**23.9** The Owner shall deposit proceeds so received, in a manner in which such proceeds can be separately accounted for, which proceeds the Owner shall distribute in accordance with such agreement as the parties in interest may reach. If after such loss no other special agreement is made and unless the Owner terminates the Contract pursuant to Article 20, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 16.

**23.10** The Contractor shall pay subcontractors their shares of the insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require subcontractors to acknowledge the Owner's authority under this Article 23 and make payments to their sub-subcontractors in similar manner.

**23.11** Nothing contained in this Article 23 shall preclude the Contractor from obtaining, solely at its own expense, additional insurance not otherwise required.

## **ARTICLE 24**

### **PERFORMANCE AND PAYMENT BONDS**

**24.1** The Contractor shall furnish separate performance and payment bonds to the Owner. Each bond shall set forth a penal sum in an amount not less than the Fixed Price Contract Amount and shall include a power of attorney attached to each bond. The signature of both the Contractor (principal) and the Surety are required. If the Surety is incorporated, both bonds must have the corporate seal. Each bond furnished by the Contractor shall incorporate by reference the terms of this Contract as fully as though they were set forth verbatim in such bonds. In the event the Fixed Price Contract Amount is adjusted by Change Order executed by the Contractor, the penal sum of both the performance bond and the payment bond shall be deemed increased by like amount. The performance and payment bonds furnished by the Contractor shall be AIA Document A312, or a standard surety form certified approved to be the same as the AIA Document A312, and shall be executed by a Surety, or Sureties, reasonably acceptable to the Owner and authorized to do business in the State of Idaho.

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

**24.3** It is the Contractor's obligation to notify the Surety in the event of changes in the Contract Documents, which in the absence of notification might serve to discharge the Surety's obligations, duties or liability under bonds or the Contract.

## **ARTICLE 25 PROJECT RECORDS**

**25.1** All documents relating in any manner whatsoever to the Project, or any designated portion thereof, which are in the possession of the Contractor or any subcontractor of the Contractor, shall be made available to the Owner or the Design Professional for inspection and copying upon written request. Furthermore, said documents shall be made available, upon request by the Owner, to any state, federal or other regulatory authority and any such authority may review, inspect and copy such records. Said records include all drawings, plans, specifications, submittals, correspondence, minutes, memoranda, tape recordings, videos or other writings or things which document the Project, its design and its construction. Said records expressly include those documents reflecting the cost of construction to the Contractor. The Contractor shall maintain and protect these documents for no less than four (4) years after final completion or termination of the Contract or for any longer period of time as may be required by law or good construction practice.

## **ARTICLE 26 MISCELLANEOUS PROVISIONS**

**26.1** The law is hereby agreed to be the law of the State of Idaho. The parties further agree that venue for any proceeding related to this Contract shall be in Boise, Ada County, Idaho, unless otherwise mutually agreed by the parties.

**26.2** Pursuant to Section 54-1904A, Idaho Code, within thirty (30) days after award of this Contract, the Contractor shall file with the Idaho State Tax Commission, with a copy to the Owner, a signed statement showing the date of Contract award, the names and addresses of the home offices of contracting parties, including all subcontractors, the state of incorporation, the Project Number and a general description of the type and location of the Work, the amount of the prime contracts and all subcontracts and all other relevant information which may be required on forms which may be prescribed by the Idaho State Tax Commission.

**26.3** The Contractor, in consideration of securing the business of erecting or constructing public works in the State of Idaho, recognizing that the business in which it is engaged is of a transitory character, and that in the pursuit thereof, its property used therein may be without the state when taxes, excises or license fees to which it is liable become payable, agrees:

.1 To pay promptly when due all taxes (other than on real property), excises and license fees due to the State of Idaho, its sub-divisions, and municipal and quasi-municipal corporations therein, accrued or accruing during the term of this Contract, whether or not the same shall be payable at the end of such term;

.2 That if the said taxes, excises and license fees are not payable at the end of said term, but liability for the payment thereof exists even though the same constitute liens upon its property, to secure the same to the satisfaction of the respective officers charged with the collection thereof; and

.3 That, in the event of its default in the payment or securing of such taxes, excises and license fees, to consent that the department, officer, board or taxing unit entering into this Contract may withhold from any payment due it hereunder the estimated amount of such accrued and accruing taxes, excises and license fees for the benefit of all taxing units to which said Contractor is liable.

**26.4** Before entering into a Contract, the Contractor shall be authorized to do business in the State of Idaho and shall submit a properly executed Contractor's Affidavit Concerning Taxes (Exhibit D).

**26.5** Pursuant to Section 44-1002, Idaho Code, it is provided that each Contractor "must employ ninety-five percent (95%) bona fide Idaho residents as employees on any job under any such contract except where under such contracts fifty (50) or less persons are employed the contractor may employ ten percent (10%) nonresidents, provided, however, in all cases employers must give preference to the employment of bona fide residents in the performance of said work, and no contract shall be let to any person, firm, association, or corporation refusing to execute an agreement with the above mentioned provisions in it; provided, that, in contracts involving the expenditure of federal aid funds this act shall not be enforced in such a manner as to conflict with or be contrary to the federal

statutes prescribing a labor preference to honorably discharged soldiers, sailors, and marines, prohibiting as unlawful any other preference or discrimination among citizens of the United States." (Ref. Section 44-1001, Idaho Code)

**26.6** The Contractor shall maintain, in compliance with Title 72, Chapter 17, Idaho Code, a drug-free workplace program throughout the duration of this Contract and shall only subcontract work to subcontractors who have programs that comply with Title 72, Chapter 17, Idaho Code.

**26.7** As between the Owner and Contractor as to acts or failures to act, any applicable statute of limitations shall commence to run and any legal cause of action shall be deemed to have accrued in any and all events in accordance with Idaho law.

**26.8** The Contractor and its subcontractors and sub-subcontractors shall comply with all applicable Idaho statutes with specific reference to Idaho Public Works Contractors' licensing laws in the State of Idaho, Title 54, Chapter 19, Idaho Code, as amended.

**26.9** The Contractor shall not knowingly hire or engage any illegal aliens or persons not authorized to work in the United States and take steps to verify that it does not hire or engage any illegal aliens or persons not authorized to work in the United States. Any misrepresentation in this regard or any employment of persons not authorized to work in the United States constitutes a material breach and shall be cause for the imposition of monetary penalties not to exceed five percent (5%) of the Fixed Price Contract Amount per violation and/or Termination of this Contract. The Contractor also acknowledges that, if it is a natural person, it is subject to Title 67, Chapter 79, Idaho Code regarding verification of lawful presence in the United States.

## **ARTICLE 27 EQUAL OPPORTUNITY**

The Contractor shall maintain policies of employment as follows:

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

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

## **ARTICLE 28 SUCCESSORS AND ASSIGNS**

**28.1** Each party binds itself, its successors, assigns, executors, administrators or other representatives to the other party hereto and to successors, assigns, executors, administrators or other representatives of such other party in connection with all terms and conditions of this Contract. The Contractor shall not assign this Contract or any part of it or right or obligation pursuant to it without prior written consent of the Owner. If Contractor attempts to make assignment without consent of Owner, Contractor shall remain legally responsible for all obligations under this Contract.

## **ARTICLE 29 SEVERABILITY**

**29.1** In the event any provision or section of this Contract conflicts with applicable law or is otherwise held to be unenforceable, the remaining provisions shall nevertheless be enforceable and shall be carried into effect.

**ARTICLE 30  
MEDIATION**

**30.1** Contractor Claims for additional cost or time are subject to Article 13, shall be reviewed as provided in accordance with that Article and, as a condition precedent to litigation, are subject to dispute resolution attempts and mediation in accordance with this Article. All other issues and disputes arising from this contract are also subject to dispute resolution attempts & mediation in accordance with this Article, as a condition precedent to litigation.

**30.2** The parties agree that resolution of any dispute or disagreement without formal legal proceedings is to their mutual benefit and to the benefit of the Project.

**30.3** The parties agree to make every reasonable attempt to resolve any issues or disputes informally. The parties further agree that prior to the institution by either of legal or equitable proceedings of any kind, and as a condition precedent thereto, any dispute between the Contractor and the Owner related to the Contract, including a dispute over the Owner's decision regarding a Claim, shall be subject to mediation as follows:

.1 If the issue to be mediated involves only a dispute regarding the Contract Time, no request to mediate shall be made unless liquidated damages have been assessed by the Owner. If the issue to be mediated involves a Claim or other financial dispute, no request to mediate shall be made unless the amount is \$50,000 or more or until there are cumulative Claims or disputes amounting to \$50,000 or more; provided, however, that a mediation request can be made as to any Claim or financial matter at any time after Substantial Completion;

.2 The party seeking mediation shall notify the other party in writing of its mediation request. In such written request, the requesting party must clearly describe the issues it believes are subject to mediation;

.3 Within fifteen (15) days of receipt of the mediation request, the non-requesting party shall respond in writing to the request;

.4 Unless the Owner and the Contractor agree to other rules for mediation, mediation shall be in accordance with the Construction Industry Rules of Arbitration and Mediation Procedures in effect at the time of the mediation;

.5 The parties shall share the mediator's fee and any filing fees equally; provided, however, that if a party makes a written request to the mediator without satisfying the requirements of this section and by doing so incurs any costs or fees, that party shall be solely responsible for the costs or fees;

.6 Unless otherwise mutually agreed to by the parties, the mediation shall be in Boise, Ada County, Idaho;

.7 The parties shall cooperate in arranging the other details of mediation, such as selection of the mediator, mediation dates and times;

.8 The parties agree that all parties necessary to resolve the matter shall be parties to the same mediation proceeding; provided, however, that no subcontractor or sub-subcontractor shall attend the mediation absent advance notice and consent from the Owner;

.9 Agreements reached in mediation shall be enforceable as settlement agreements in any court having proper jurisdiction; and

.10 Unless otherwise agreed in writing, the Contractor shall continue the Work and maintain the approved schedules during any mediation proceedings. If the Contractor continues to perform, the Owner shall continue to make payments in accordance with the Contract Documents.

**30.4** If mediation fails to resolve the dispute, either party may file an action in the courts of Idaho in accordance with the venue provision contained in this Contract.

**ARTICLE 31  
WAIVER OF CONSEQUENTIAL DAMAGES**



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

**.1** Damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation and for loss of management or employee productivity or of the services of such persons.

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

**31.2** This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Articles 18 and 20. Nothing contained in this paragraph shall be deemed to preclude an award of the assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

IN WITNESS WHEREOF, the parties have executed this Contract on the dates set forth below.

OWNER

State of Idaho  
Division of Public Works

\_\_\_\_\_  
Date Executed

By: \_\_\_\_\_  
Pat Donaldson, Administrator

CONTRACTOR

\_\_\_\_\_  
(Contractor's Name- Typed)

SEAL

\_\_\_\_\_  
Date Executed

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

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

\_\_\_\_\_  
Title

**EXHIBIT A**

**OWNER'S PROJECT IDENTIFICATION INFORMATION:**

DPW Project No. 20-232  
Project Title: ISU – Custodial Office Remodel-Bldg. 24  
Project Location: Pocatello, Idaho

General Project Description: A description of the work of this project can be summarized to include but not limited to demolition of existing wood framed partitions, new wood framed partitions with new gypsum board textured and painted, replace doors, lay-in ceilings, flooring, windows, new millwork, replace roofing system. HVAC remodeling and new lighting.

**ADDENDA:** Addenda applicable to the Contract and made a part of are as follows:

Addendum No. \_ Dated \_\_\_\_\_  
Addendum No. \_ Dated \_\_\_\_\_  
Addendum No. \_ Dated \_\_\_\_\_

**FIXED PRICE CONTRACT AMOUNT AND ACCEPTED ALTERNATES:**

Base Bid Amount:		\$.00
Alternate No. 1	(Additional Windows _____)	add _____ \$.00
<b>Total Fixed Price Contract Amount</b>	<b>( _____ ) Dollars</b>	<b>\$.00</b>

Contractor's Requests for Payment are to be submitted for Work accomplished through the \_\_\_\_ day of each month as described in Paragraph 7.3.

**\*\*INSERT CONTRACT TIME AND LIQUIDATED DAMAGES IN PARAGRAPHS B AND C BELOW\*\***

**TIME FOR PERFORMANCE AND LIQUIDATED DAMAGES:**

- A. The Contractor shall commence construction of its scope of the Work in accordance with the Notice to Proceed issued by the Owner, and which will become Exhibit F to this Contract.
- B. The Contractor shall accomplish Substantial Completion as defined in Article 6 of the Contract within **One Hundred Twenty (120)** consecutive calendar days from the date authorized to proceed in the Notice to Proceed.
- C. The amount of liquidated damages per day for each and every day of unexcused delay as outlined in Article 6 on the Contract is: **Five Hundred Dollars (\$500.00)**

**\*\*INSERT NUMBER OF DOCUMENTS THAT WILL BE PROVIDED IN THE BLANK BELOW\*\***

**DRAWINGS AND SPECIFICATIONS**

The Owner shall furnish the **Contractor 1 sets of Drawings** and Project Manuals.

**EXHIBIT B**

**ADDRESSES and AUTHORIZED REPRESENTATIVES:** The names, addresses and authorized representatives of the Owner, the Contractor and the Design Professional are:

**OWNER:** State of Idaho  
Division of Public Works  
502 N. 4th Street  
P.O. Box 83720  
Boise, ID 83720-0072  
Pat Donaldson, Administrator

**Project Manager:** John Julian  
Telephone: (208) 332-1904  
E-mail: jogn.julian@adm.idaho.gov  
Fax: (208) 334-4031  
May sign for Owner: Yes [ X ] No [ ]

**Field Representative:** Nathan Powers  
Telephone: (208) 244-3796  
E-mail: Nathan.powers@adm.idaho.gov  
Fax: (208) 334-4031  
May sign for Owner: Yes [ X ] No [ ]

**CONTRACTOR:** \_\_\_\_\_ (company name)  
\_\_\_\_\_ (address)  
\_\_\_\_\_ (city, state, zip)  
\_\_\_\_\_ (telephone and FAX)  
Public Works Contractors License No. \_\_\_\_\_

**Officer:** \_\_\_\_\_ (name and title)  
\_\_\_\_\_ (telephone)  
\_\_\_\_\_ (E-mail)

Contractor's  
**Project Manager:** \_\_\_\_\_ (name)  
\_\_\_\_\_ (telephone and FAX)  
\_\_\_\_\_ (E-mail)  
May sign for Contractor: Yes [ ] No [ ]  
Change Orders: up to: \$\_\_\_\_.00  
Construction Change Authorizations: up to: \$\_\_\_\_.00  
Contractor's Request for Payment

Contractor's  
**Superintendent:** \_\_\_\_\_ (name)  
\_\_\_\_\_ (telephone and FAX)  
\_\_\_\_\_ (E-mail)  
May sign for Contractor: Yes [ ] No [ ]  
Construction Change Authorizations: up to \$\_\_\_\_.00

**DESIGN  
PROFESSIONAL:**

NBW Architects, P.A.  
990 John Adams Parkway  
Idaho Falls, Idaho 83403  
Telephone: 208.522.8779  
Fax: 208.522.8785

Professional's  
Project Manager:

James Wyatt  
Professional License No. AR 92339  
Telephone: 208.522.8779  
Fax: 208.522.8785  
jhw@nbwarchitects.com

Professional's  
Field Representative:

James Wyatt  
Telephone: 208.522.8779  
Fax: 208.522.8785  
jhw@nbwarchitects.com

May sign for Design Professional:

Field Reports	Yes [ X ]	No [ ]
Change Order Proposal Requests	Yes [ X ]	No [ ]
Construction Change Authorization:	Yes [ X ]	No [ ]
Construction Change Order	Yes [ X ]	No [ ]
Design Professional's Supplemental Instructions	Yes [ X ]	No [ ]
Interpretations of the Contract Documents	Yes [ X ]	No [ ]
Contractor's Request for Payment	Yes [ X ]	No [ ]
Acceptance of Substantial Completion	Yes [ X ]	No [ ]
Acceptance of final completion	Yes [ X ]	No [ ]

## EXHIBIT C

### LIST OF DRAWINGS:

#### Architectural

A0.1	Title Sheet and Index
A1.0	Main Floor Demolition Plan
A1.1	Mezzanine Demolition Plan
A1.2	New Main Floor Plan
A1.3	Wall Types
A1.4	New Mezzanine Plan
A2.1	Exterior Elevations
A2.2	Exterior Elevations
A3.1	Wall Sections
A3.2	Wall Sections
A4.1	Door, Window, and Finish Schedule
A5.1	Reflected Ceiling Plans
A6.1	Roof Drainage Plan

#### Plumbing

P1.1	Main Level Plumbing Floor Plan
P2.1	Plumbing Details and Schedules

#### Mechanical

M1.1	Mechanical Plan and Schedules
M2.1	Mechanical Details

#### Electrical

E0.1	Electrical Title Sheet
DE1.1	Main Level Lighting Demolition Plan
DE1.2	Mezzanine Level Lighting Demolition Plan
DE2.1	Main Level Power Demolition Plan
DE2.2	Mezzanine Level Power Demolition Plan
E1.1	Main Level Lighting Installation Plan
E2.1	Main Level Power Installation Plan
E3.1	Main Level Mechanical Power Installation Plan
E4.1	Main Level Special Systems Installation Plan
E5.1	Panel Schedules and Single Line Diagram
E6.1	Electrical Details
E7.1	Lighting Details

### LIST OF SPECIFICATIONS:

#### DIVISION 1 - GENERAL REQUIREMENTS

01 1000	Summary
01 2300	Alternates
01 2500	Substitution Procedures
01 2600	Contract Modification Procedures
01 2900	Payment Procedures
01 3100	Project Management and Coordination

01 3200 Construction Progress Documentation  
01 3300 Submittal Procedures  
01 4000 Quality Requirements  
01 4200 References  
01 5000 Temporary Facilities and Controls  
01 6000 Product Requirements  
01 7300 Execution  
01 7700 Closeout Procedures  
01 7823 Operation and Maintenance Data  
01 7839 Project Record Documents  
01 7900 Demonstration and Training

DIVISION 02 – EXISTING CONDITIONS

02 4119 Selective Demolition

DIVISION 03 – CONCRETE

03 3053 Miscellaneous Cast-In-Place Concrete

DIVISION 04 – MASONRY

04 2200 Concrete Unit Masonry

DIVISION 05 – METAL

05 3100 Steel Decking  
05 5000 Metal Fabrications  
05 5213 Pipe and Tube Railing  
05 7500 Decorative Formed Metal

DIVISION 06 – WOOD, PLASTICS, AND COMPOSITES

06 1053 Miscellaneous Rough Carpentry  
06 2023 Interior Finish Carpentry  
06 4116 Plastic-Laminate-Faced Architectural Cabinets  
06 6400 Plastic Paneling

DIVISION 07 – THERMAL AND MOISTURE PROTECTION

07 0150.19 Preparation for Re-Roofing  
07 2100 Thermal Insulation  
07 5419 Polyvinyl-Chloride (PVC) Roofing  
07 5419.01 5-Year Roofing Warranty  
07 5419.02 Single-Ply Roofing Guaranty – 30 Years  
07 6200 Sheet Metal Flashing and Trim  
07 9200 Joint Sealants

DIVISION 08 – WINDOWS AND DOORS

08 1213 Hollow Metal Frames  
08 1416 Flush Wood Doors  
08 4113 Aluminum-Framed entrances and Storefronts  
08 7100 Door Hardware  
08 8000 Glazing

DIVISION 09 - FINISHES

09 2216 Non-Structural Metal Framing  
09 2900 Gypsum Board  
09 3000 Tiling

09 5113 Acoustical Panel Ceilings  
09 6513 Resilient Base and Accessories  
09 6519 Resilient Tile Flooring  
09 6813 Tile Carpeting  
09 9123 Painting  
09 9300 Staining and Transparent Finishing

DIVISION 10 - SPECIALTIES

10 4413 Fire Extinguisher Cabinets  
10 4416 Fire Extinguishers

DIVISION 12 - FURNISHINGS

12 2113 Horizontal Louver Blinds  
12 3661 Solid Surface Countertops

DIVISION 21 – FIRE SUPPRESSION -NOT USED

DIVISION 22 – PLUMBING

22 0501 Common Plumbing Requirements  
22 0502 Demolition and Repair  
22 0503 Pipe, Pipe Fittings, Pipe Hangers & Valves  
22 0553 Identification for Plumbing Pipes and Equipment  
22 0703 Mechanical Insulation and Fire Stopping  
22 0710 Potable Water Pipe Insulation  
22 0711 Handicapped Fixtures Insulation  
22 0800 Fire Stopping  
22 1116 Domestic Water Piping System (PEX)  
22 1118 Backflow Preventer Valve  
22 1313 Soil, Waste, & Vent Piping Systems  
23 2600 Condensate Drain Piping  
22 4001 Plumbing Fixtures  
22 4703 Handicap Drinking Water Cooling System

DIVISION 23 – HEATING, VENTILATING, AND AIR CONDITIONING

23 0501 Common HVAC Requirements  
23 0502 Demolition and Repair  
23 0553 Identification for HVAC Piping and Equipment  
23 0712 Mechanical Insulation and Fire Stopping  
23 0716 Ductwork Insulation and Fire Stopping  
23 0717 Round Supply Duct Insulation  
23 0718 Duct Lining  
23 0720 Refrigerant Piping Insulation  
23 0768 Steam Supply and Condensate Return Piping Insulation  
23 0800 Fire Stopping  
23 2112 Steam and Condensate Piping  
23 2166 Split System Heat Pump Units  
23 2300 Refrigerant Piping System  
23 2310 Refrigerant Specialties  
23 3114 Low Pressure Steel Ductwork  
23 3713 Air Outlets & Inlets  
23 5540 Electric Radiant Wall Heaters  
23 8820 Steam Fan Coil Units  
23 6213 Air-Cooled Condensing Units

23 7223 Packaged Energy Recovery Ventilation Units

DIVISION 26 - ELECTRICAL

26 0500 Common Work Results for Electrical  
26 0503 Equipment Wiring Connections  
26 0519 Low Voltage Electrical Power Conductors  
26 0526 Grounding and Bonding  
26 0533 Raceway and Boxes for Electrical Systems  
26 0553 Identification for Electrical Systems  
26 2726 Wire Devices  
26 5100 Interior Lighting  
26 5200 Emergency Lighting

DIVISION 27 – COMMUNICATIONS

27 1343 Communication Services Cabling

DIVISION 28 THRU 32 – NOT USED

**EXHIBIT D**



**CONTRACTOR'S AFFIDAVIT CONCERNING TAXES**

STATE OF \_\_\_\_\_)

COUNTY OF \_\_\_\_\_)

Pursuant to the Title 63, Chapter 15, Idaho Code I, the undersigned, being duly sworn, depose and certify that all taxes, excises and license fees due to the State or its taxing units, for which I or my property is liable then due or delinquent, has been paid, or arrangements have been made, before entering into a Contract for construction of any public works in the State of Idaho.

\_\_\_\_\_  
Name of Contractor

\_\_\_\_\_  
Address

\_\_\_\_\_  
City and State SEAL

By:

\_\_\_\_\_  
(Signature)

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

\_\_\_\_\_  
NOTARY PUBLIC

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

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

**EXHIBIT E**

**NAMED SUBCONTRACTORS:**

Pursuant to Section 67-2310, Idaho Code, commonly known as the naming law, the names and addresses of the entities who will perform the plumbing, heating and air conditioning and electrical work were named in the bid and are as follows:

Plumbing (PWCL Category 15400)

(Name) \_\_\_\_\_  
(Address) \_\_\_\_\_

Idaho Public Works Contractors License No. \_\_\_\_\_

Idaho Plumbing Contractors License No. \_\_\_\_\_

Heating Ventilating & Air Conditioning (PWCL Category 15700-HVAC)

(Name) \_\_\_\_\_  
(Address) \_\_\_\_\_

Idaho Public Works Contractors License No. \_\_\_\_\_

Idaho HVAC Contractors License No. \_\_\_\_\_

Electrical (PWCL Category 1600)

(Name) \_\_\_\_\_  
(Address) \_\_\_\_\_

Idaho Public Works Contractors License No. \_\_\_\_\_

Idaho Electrical Contractors License No. \_\_\_\_\_

**EXHIBIT F**

**NOTICE TO PROCEED**

TO CONTRACTOR:

DPW NUMBER: 20-232

CONTRACT DATE:

ARCHITECT:

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

CONTRACT AMOUNT:    \$

DATE OF ISSUANCE:

OWNER:

State of Idaho

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You are hereby notified to commence work on the above referenced contract on/or before                          and are to substantially complete the work within                          consecutive calendar days thereafter; therefore your contract completion date is                          .

The contract provides for the sum of \$                          as liquidated damages for each consecutive calendar day after the above established substantial completion date that the work remains incomplete. Completion date will be established by "Certificate of Substantial Completion."

You are reminded that any changes to the original contract document regarding either cost or completion date must be effected by a change order approved by this department.

Your payment estimates must be submitted on Division of Public Works forms included herein. We will be most happy to assist you in preparing the payment estimate forms.

                    has been appointed Field Representative for this project. Please contact him at 332-                          prior to beginning work. A pre-construction meeting will be held                          , at                          , at                          **(location)**

Sincerely,

PAT DONALDSON  
ADMINISTRATOR

PD:pb

DISTRIBUTION:

Tax Commission  
Division of Building Safety  
Risk Management (w/ Builder's Risk Application, if applicable)  
(Project Manager)  
Fiscal Office                          TAX ID xx-xxxxxxx

**EXHIBIT G**  
**Idaho State Tax Commission**  
**REQUEST FOR TAX RELEASE**

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

**PART I -- AWARDING AGENCY INFORMATION:**

Name of agency		Mailing address	City, state, and ZIP Code
Contact name	Phone number	Email address	

**PART II -- CONTRACTOR INFORMATION:**

Name of contractor		Mailing address	City, state, and ZIP Code
Federal EIN	Contact name	Phone number	Email address

**PART III -- CONSTRUCTION/CONTRACT MANAGER INFORMATION (if applicable):**

Name of business		Mailing address	City, state, and ZIP Code
Federal EIN	Contact name	Phone number	Email address

Send a copy of the approved Tax Release to: Awarding Agency  Contractor  Construction Manager

**NOTE:** We will email all copies unless otherwise requested

**PART IV -- PROJECT INFORMATION:**

Name of project		Location of project	
Description of project			
Project number assigned by awarding agency	Project start date	Project completion date	Final/closing contract amount (includes all change orders)
			\$

Did any government entities supply materials which were installed by this contractor or its subs?: Yes  No

If YES, list these materials and their dollar values. (Attach additional information if needed)

List Materials	List Dollar Values of Materials
	\$
	\$
	\$

Send to: Contract Desk/Sales Tax Audit  
 Idaho State Tax Commission  
 PO Box 36  
 Boise ID 83722-0410  
 Phone: (208) 334-7618 • Fax: (208) 332-6619 • Email: [contractdesk@tax.idaho.gov](mailto:contractdesk@tax.idaho.gov)

**NOTE:** Please allow 30 days to process a Tax Release Request. You must send a complete, signed Form WH-5 Public Works Contract Report to the Idaho State Tax Commission to complete this request.

EXHIBIT H

**RELEASE OF CLAIMS**

(TO BE COMPLETED FOR FINAL PAYMENT)

I, \_\_\_\_\_, do hereby release the State of Idaho from any and all claims of any character whatsoever arising under and by virtue of contract number \_\_\_\_\_ Dated \_\_\_\_\_ as amended, except as herein stated.

Dated \_\_\_\_\_ Contractor \_\_\_\_\_

**EXHIBIT J**

**Conditions Precedent to Final Payment**

Date: \_\_\_\_\_  
DPW Project No. \_\_\_\_\_  
Project Title: \_\_\_\_\_  
Location: \_\_\_\_\_

Send to:  
State of Idaho  
Division of Public Works  
502 N. Fourth Street  
Boise, Idaho 83702

Copy to:  
Design Professional  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Contractor's Responsibilities:**

Per Paragraph 7:13 of the Fixed Price Contract: As a condition precedent to final payment, the Contractor must furnish the owner, in the form and manner required by Owner, to be submitted to the Design Professional for approval, the following:

- Contractor's Final Request for Payment Form has been uploaded to OMS;
- Release of Claims form has been uploaded to OMS (DPW's form, Exhibit H);
- Contractor's Affidavit of Payment of Debts and Claims Form has been uploaded to OMS (AIA G706);
- Consent of Surety to Final Payment has been uploaded to OMS (AIA G707);
- Confirmation of all required training (DPW's Training Confirmation Exhibit K), product warranties, operating manuals, instruction manuals and other record documents, drawings and items customarily required of the Contractor has been uploaded to OMS.
- Public Works Contract Tax Release from the Idaho Tax Commission has been uploaded to OMS;
- Division of Building Safety Letter of Completion/Final Inspection has been uploaded to OMS (as required);
- Project Finalization and Start Up has been uploaded to OMS (as required, Exhibit L);

\_\_\_\_\_  
Contractor's Signature Date

**Design Professional's Approval for Payment:**

- All Documents Required per Paragraph 7.13 of the Fixed Price Contract have been uploaded to OMS.
- All Warranties, Guarantees, etc. have been received, approved and have been uploaded to OMS.
- Contractor's As-Built Drawings, have been received, reviewed, approved and uploaded to OMS in PDF format.
- Final punch list with AE's verification that all items have been completed, has been uploaded to OMS.
- Record Drawings have been completed by AE. All required copies of the Record Documents and electronic media are attached and uploaded to OMS in PDF, and DWG 2010 format. DWG files should be bound in zip folder, or "e-transmit" folder, containing all drawing files with relevant dependencies (i.e. x-refs, images, title blocks, and pen settings). *Record Drawings are a requirement for the AE's final payment; not the Contractor's.*

To the best of my knowledge, information, and belief, and on the basis of my observations and inspections, I certify the Work has been completed in accordance with the terms and conditions of the Contract Documents and that the required documentation required by Paragraph 7.13 of the fixed priced contract has been received. The entire balance, as shown on the attached Final Request for Payment, is due and payable.

\_\_\_\_\_  
Design Professional's Signature Date

EXHIBIT K

STATE OF IDAHO

DIVISION OF PUBLIC WORKS

Training Confirmation Sign-In Sheet

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

Agency: \_\_\_\_\_

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

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

Field Representative: \_\_\_\_\_

Date & Time: \_\_\_\_\_

Name	Company	E-mail	Telephone	Signature

V:\Design and Construction\CONTRACT ADMINISTRATION\Close Out\Training Confirmation Sign In Sheet.xlsx

**EXHIBIT L**

**PROJECT FINALIZATION AND START-UP**

Upon completion of the equipment and systems installation and connections, the contractor shall assemble all equipment factory representative and subcontractors together for system start-up.

These people shall assist in start-up and check out their system(s) and remain at the site until the total system operation is acceptable and understood by the agency's representative(s). The factory representative and system subcontractor shall also give instructions on operation and maintenance of their equipment to the agency's maintenance and/or operation personnel. To prove acceptance of operation and instruction by the agency's representative(s), this written statement of acceptance shall be signed below.

"I, the Contractor, associated factory representative and subcontractors, have started each system and the total system; and have proven their normal operation to the agency's representative(s) and maintenance/operation personnel and have instructed him/them in the operation and maintenance thereof."

\_\_\_\_\_  
Agency's Representative

\_\_\_\_\_  
Contractor

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Date



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## **SECTION 01 1000 - SUMMARY**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Project information.
  - 2. Work covered by contract documents.
  - 3. Work by Owner.
  - 4. Contractor use of site and premises.
  - 5. Work under separate contracts.
  - 6. Protection of building, contents, and grounds.
  - 7. Coordination with occupants.
  - 8. Work restrictions.
  - 9. Permits.
  - 10. Waste disposal.
  - 11. Specification and drawing conventions.
  - 12. General security requirements.
  - 13. Safety and health regulations
  
- B. Related Requirements:
  - 1. Section 01 5000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

#### **1.2 PROJECT INFORMATION**

- A. Project Identification:
  - 1. DPW 20-232: ISU – Custodial Office Remodel-Bldg. 24, Pocatello, Idaho.
  
- B. Owner: State of Idaho, Division of Public Works.
  - 1. Owner's Representative: John Julian, DPW Project Manager, P.O. Box 83720, Boise, Idaho 83720-0072.
  
- C. Field Representative:
  - 1. Representative: Nathan Powers, Telephone: 208-244-3796.
    - a. Coordinate and schedule local construction activities with the Agency Representative.
  
- D. Architect: NBW Architects, P.A., 990 John Adams Parkway, P.O. Box 2212, Idaho Falls, Idaho 83403, Telephone: 208-522-8779. Fax: 208-522-8785.

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

- A. The Work of Project is defined by the Contract Documents and consists of the following:
  - 1. Work of this project includes but not limited to demolition of existing wood framed partitions, new wood framed partitions with new gypsum board textured and painted, replace doors, lay-in ceilings, flooring, windows, new millwork, replace roofing system. HVAC remodeling and new lighting.
  
- B. Type of Contract.
  - 1. Project will be constructed under a single prime contract.

#### **1.4 WORK BY OWNER**

- A. General: Cooperate fully with Owner so work may be carried out smoothly, without interfering with or delaying work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner.
  
- B. Preceding Work: Owner will perform the following construction operations at Project site. Those operations are scheduled to be substantially complete before work under this Contract begins.
  - 1. Moving of furniture and / or equipment in area of work to be completed.

- C. Subsequent Work: Owner will perform the following additional work at site after Substantial Completion. Completion of that work will depend on successful completion of preparatory work under this Contract.
  - 1. Furniture and Owner Furnished Owner Installed (OFOI) Equipment.
- D. Items noted NIC (Not in Contract), will be furnished and installed by the Owner/Agency.

#### **1.5 CONTRACTOR'S USE OF SITE AND PREMISES**

- A. General: Contractor shall have limited use of Project site for construction operations as and as indicated by requirements of this Section.
- B. Work may begin at Notice to Proceed.
- C. Use of the Site: Limit use of the premises to work in areas indicated. Confine operations to areas indicated. Do not disturb portions of the site beyond the areas in which the work is indicated.
  - 1. Owner Occupancy: Contractor shall have full use of building for construction operations during construction period. Contractor's use of building is limited only by Owner's right to perform work or to retain other contractors on portions of Project.
  - 2. Driveways and Entrances: Keep driveways and entrances serving the premises clear and available to the Owner, the Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site. The Contractor shall be responsible for his own on-site storage.
- D. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.
- E. Condition of Existing Grounds: Maintain portions of existing grounds, landscaping, and hardscaping affected by construction operations throughout construction period. Repair damage caused by construction operations.
- F. Behavior and Dress: The Contractor and all Contractors representatives, to include subcontractors, consultants, vendors or other parties hired by the Contractor will maintain professional behavior and wear appropriate attire that always identifies their company while on the job site.

#### **1.6 PROTECTION OF BUILDING, CONTENTS, AND GROUNDS.**

- A. Construction Site Lay-down and Storage:
  - 1. Coordinate exact locations with Agency (ISU) at pre-construction meeting.

#### **1.7 COORDINATION WITH OCCUPANTS**

- A. Partial Owner Occupancy: Owner will occupy the premises during entire construction period, with the exception of areas under construction. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits unless otherwise indicated.
  - 1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and approval of authorities having jurisdiction.
    - a. Notify Owner not less than 72 hours in advance of activities that will affect Owner's operations.

#### **1.8 WORK RESTRICTIONS**

- A. Work Restrictions, General: Comply with restrictions on construction operations.
  - 1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: The Contractor may determine his own hours of work except where interfacing with the Owner which shall be on an 7:00 a.m. to 6:00 p.m. basis.
- C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
  - 1. Notify Owner not less than two days in advance of proposed utility interruptions.

- D. Nonsmoking Building: Smoking is not permitted within the building.
- E. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.
- F. Contractor Parking: Coordinate with Agency.
- G. Maintain cleanliness in areas adjacent to and surrounding the construction area to the satisfaction of the Owner at all times.

#### **1.9 PERMITS**

- A. Contractor to furnish all necessary permits for construction of the Work.

#### **1.10 WASTE DISPOSAL**

- A. The contractor is responsible for any and all demolition and/or removal as necessary and required to fulfill the requirements of the Contract Documents.

#### **1.11 SPECIFICATION AND DRAWING CONVENTIONS**

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
  - 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
  - 2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
  - 1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
  - 2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and/or scheduled on Drawings.

#### **1.12 GENERAL SECURITY REQUIREMENTS**

- A. Limit access to the site to persons involved in the work.
- B. Provide secure storage for materials for which the owner has made payment and which are stored on site.
- C. Secure completed work as required to prevent loss.

#### **1.13 SAFETY AND HEALTH REGULATIONS**

- A. It shall be the Contractor's responsibility to meet all requirements for Department of Labor Bureau of Labor Standards set forth for Safety and Health Regulations for Construction, including OSHA.

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

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

#### **END OF SECTION 01 1000**

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## **SECTION 01 2300 - ALTERNATES**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for alternates.

#### **1.2 DEFINITIONS**

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if the Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
  - 1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
  - 2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternates into the Work. No other adjustments are made to the Contract Sum.

#### **1.3 PROCEDURES**

- A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
  - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Execute accepted alternates under the same conditions as other work of the Contract.
- C. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

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

### **PART 3 - EXECUTION**

#### **3.1 SCHEDULE OF ALTERNATES**

- A. **Alternate No. 1:** Additional Windows as shown as "Alternate Bid" on drawings.

**END OF SECTION 01 2300**



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## SECTION 01 2500 - SUBSTITUTION PROCEDURES

### PART 1 - GENERAL

#### 1.1 SUMMARY

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

#### 1.2 DEFINITIONS

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

#### 1.3 ACTION SUBMITTALS

- A. Substitution Requests: **Submit three copies of each request for consideration.** Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
  - 1. Substitution Request Form: Use CSI Form 13.1A.
  - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
    - a. Statement indicating why specified product or fabrication, or installation cannot be provided, if applicable.
    - b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
    - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
    - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
    - e. Samples, where applicable or requested.
    - f. Certificates and qualification data, where applicable or requested.
    - g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
    - h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
    - i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
    - j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
    - k. Cost information, including a proposal of change, if any, in the Contract Sum.
    - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
    - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
  - 3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

- a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
- b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

#### **1.4 QUALITY ASSURANCE**

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

### **PART 2 - PRODUCTS**

#### **2.1 SUBSTITUTIONS**

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
  1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied:
    - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
    - b. Requested substitution provides sustainable design characteristics that specified product provided.
    - c. Requested substitution will not adversely affect Contractor's construction schedule.
    - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
    - e. Requested substitution is compatible with other portions of the Work.
    - f. Requested substitution has been coordinated with other portions of the Work.
    - g. Requested substitution provides specified warranty.
    - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B. Substitutions for Convenience: Not allowed.

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

**END OF SECTION 01 2500**

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

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

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

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

- A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, through DPW's Projectsmates web-based project management software system.

#### **1.3 PROPOSAL REQUESTS**

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
  - 1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
  - 2. Within time specified in Proposal Request or 10 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
    - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    - c. Include costs of labor and supervision directly attributable to the change.
    - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
    - e. Quotation Form: Contractor will upload proposal request into DPW's Projectsmates web-based project management software system.
- B. Contractor-Initiated Work Change Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change through DPW's Projectsmates web-based software system.
  - 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
  - 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
  - 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
  - 4. Include costs of labor and supervision directly attributable to the change.
  - 5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
  - 6. Comply with requirements in Section 01 2500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
    - a. Work Change Proposal Request Form: Contractor will upload request into DPW's Projectsmates web-based project management software system.

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

- A. On Owner's or his designee's approval of a Work Changes Proposal Request, Architect will issue a Change Order through DPW's Projectsmates web-based project management software system.

**1.5 CONSTRUCTION CHANGE DIRECTIVE**

- A. Construction Change Directive: Architect may issue a Construction Change Directive through DPW's Projectmates web-based software system. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
  - 1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
  
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
  - 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

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

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

**END OF SECTION 01 2600**

## SECTION 01 2900 - PAYMENT PROCEDURES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment on DPW's **Owners web-based management software (OMS)**.

#### 1.2 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
1. Coordinate line items in the schedule of values with items required to be indicated as separate activities in Contractor's construction schedule.
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
1. The Contractor will be given a DPW excel "schedule of values" spreadsheet to fill in the line items that pertain to the Project.
  2. Submit the schedule of values on DPW's excel "schedule of values" template to the Architect, DPW's Project Manager and DPW's Field Representative. The Contractor will be required to submit Schedule of Values with construction bonds prior to contract execution. The schedule of values will be part of the contract. (Ref FPCC).
  3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts where needed.
  4. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
    - a. Differentiate between items stored on-site and items stored off-site.
  5. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
  6. Overhead Costs: Include total cost and proportionate share of general overhead and profit for each line item.
  7. Overhead Costs: Show cost of temporary facilities and other major cost items that are not direct cost of actual work-in-place as separate line items.
  8. Closeout Costs. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.

#### 1.3 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and all payments will be **electronically approved** by the Contractor, Architect, DPW Field Representative, DPW Project Manager, and DPW Senior Field Representative and paid for by Owner via Owners web-based management software.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
1. Electronically upload Application for Payment to the Owners web-based management software by the first day of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.
- C. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.

2. When an application shows completion of an item, submit conditional final or full waivers.
  3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
  4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
  5. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.
- D. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
  2. Schedule of values.
  3. Contractor's construction schedule (preliminary if not final).
  4. Products list (preliminary if not final).
  5. Submittal schedule (preliminary if not final).
  6. Copies of building permits.
  7. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
  8. Initial progress report.
  9. Data needed to acquire Owner's insurance.
- E. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, upload an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
- F. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
  2. Marked up Record Drawings and Specifications.
  3. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
  4. Contractor's Affidavit of Payment of Debts and Claims Form. AIA Document G706.
  5. Consent of Surety to Final Payment. AIA Document G707.
  6. Release of Claims form, Exhibit H. Evidence that claims have been settled.
  7. Confirmation of all required training, product warranties, operating manuals, instruction manuals and other record documents, drawings and items customarily required of the Contractor.
  8. Public Works Contract Tax Release from the Idaho Tax Commission.
  9. 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.
  10. Final liquidated damages settlement statement.
  11. Any and all other items required by DPW under the applicable contract requirements.

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

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

**END OF SECTION 01 2900**

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

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

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

#### **1.2 DEFINITIONS**

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

#### **1.3 INFORMATIONAL SUBMITTALS**

- A. Key Personnel Names: Within seven (7) days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.
  - 1. Post copies of list in project meeting room, in temporary field office. Keep list current at all times.

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

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
  - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
  - 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
  - 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
  - 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
  - 1. Preparation of Contractor's construction schedule.
  - 2. Preparation of the schedule of values.
  - 3. Installation and removal of temporary facilities and controls.
  - 4. Processing of submittals.
  - 5. Progress meetings.
  - 6. Preinstallation conferences.
  - 7. Project closeout activities.
  - 8. Startup and adjustment of systems.



## 1.5 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
    - a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
    - b. Coordinate the addition of trade-specific information to the coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
    - c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
    - d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
    - e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
    - f. Indicate required installation sequences.
    - g. Indicate dimensions shown on Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternative sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
- B. Coordination Drawing Organization: Organize coordination drawings as follows:
1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
  2. Mechanical and Plumbing Work: Show the following:
    - a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
    - b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
  3. Electrical Work: Show the following:
    - a. Runs of vertical and horizontal conduit 1-1/4 inches (32 mm) in diameter and larger.
    - b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
    - c. Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.
    - d. Location of pull boxes and junction boxes, dimensioned from column center lines.
  4. Review: Design Professional will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Design Professional determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Design Professional will so inform Contractor, who shall make changes as directed and resubmit.
  5. Coordination Drawing Prints: Prepare coordination drawing prints according to requirements in Section 013300 "Submittal Procedures."
  6. Review: Architect will review coordination drawings to confirm that in general the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility.
- C. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:
1. File Preparation Format: Same digital data software program, version, and operating system as original Drawings.
  2. File Preparation Format: **DWG**, Version 2013 or later, operating in Microsoft Windows operating system.
  3. File Submittal Format: Submit or post coordination drawing files using format same as file preparation format.
  4. Architect will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.

- a. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
  - b. Digital Data Software Program: Drawings are available in AutoCad DWG format, version 2013 or later.
5. Contractor shall execute a data licensing agreement in the form of Agreement form acceptable to Owner and Architect.

## 1.6 REQUESTS FOR INFORMATION (RFIs)

- A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and upload an RFI in the Owners web-based management software (OMS).
1. Design Professional will approve RFIs with any comments through OMS.
  2. Design Professional shall notify DPW of the Design Professional's Representative who will receive and respond to RFIs.
  3. Contractor to upload RFIs in a prompt manner so as to avoid delays in the work or work of subcontractors.
  4. Contractor and Design Professional can copy any Team members the question and/or response within OMS.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
1. Input information required by OMS. Project number.
  2. RFI subject.
  3. Specification Section number and title and related paragraphs, as appropriate.
  4. Drawing number and detail references, as appropriate.
  5. Field dimensions and conditions, as appropriate.
  6. Contractor's suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
  7. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
- C. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
1. The following RFIs will be returned without action:
    - a. Requests for approval of submittals.
    - b. Requests for approval of substitutions.
    - c. Requests for coordination information already indicated in the Contract Documents.
    - d. Requests for adjustments in the Contract Time or the Contract Sum.
    - e. Requests for interpretation of Architect's actions on submittals.
    - f. Incomplete RFIs or inaccurately prepared RFIs.
  2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
  3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to upload a PCO according to Section 01 2600 "Contract Modification Procedures."
    - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.
- D. RFI Log: Use software log that is part of web-based Project software.
- E. On receipt of Architect's action, review response and notify Architect within seven days if Contractor disagrees with response.
1. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
  2. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

## 1.7 DIGITAL PROJECT MANAGEMENT PROCEDURES

- A. Architect's Data Files Not Available: Architect **will not** provide Architect's CAD drawing digital data files for Contractor's use during construction.

- B. Web-Based Project Software: Use **Owner's** web-based management software site (OMS) for purposes of hosting and managing Project communication and documentation until Final Completion.
  - 1. Web-based Project software site includes, at a minimum, the following features:
    - a. Compilation of Project data, including Contractor, subcontractors, Architect, architect's consultants, Owner, and other entities involved in Project. Include names of individuals and contact information.
    - b. Access control for each entity for each workflow process, to determine entity's digital rights to create, modify, view, and print documents.
    - c. Document workflow planning, allowing customization of workflow between project entities.
    - d. Creation, logging, tracking, and notification for Project communications required in other Specification Sections, including, but not limited to, RFIs, submittals, Minor Changes in the Work, Proposed Change Orders, Construction Change Directives, and Change Orders.
    - e. Track status of each Project communication in real time, and log time and date when responses are provided.
    - f. Procedures for handling PDFs or similar file formats, allowing markups by each entity. Provide security features to lock markups against changes once submitted.
    - g. Processing and tracking of payment applications.
    - h. Processing and tracking of contract modifications.
    - i. Creating and distributing meeting minutes.
    - j. Document management for Drawings, Specifications, and coordination drawings, including revision control.
    - k. Management of construction progress photographs.
    - l. Mobile device compatibility, including smartphones and tablets.
- C. PDF Document Preparation: Where PDFs are required to be submitted to Architect, prepare as follows:
  - 1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
  - 2. Name file with submittal number or other unique identifier, including revision identifier.
  - 3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

## 1.8 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.
- B. Preconstruction Conference: The Owner (DPW) will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner, Agency and Architect.
  - 1. Attendees: Authorized representatives of Owner, Agency, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
  - 2. Minutes: The Design Professional will be responsible for the meeting minutes and will record and distribute via the Owners web-based management software.
- C. Preinstallation or Premanufacturing Conferences: Conduct a conference at Project site before each construction activity that requires coordination with other construction.
  - 1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
  - 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
    - a. Contract Documents.
    - b. Options.
    - c. Related RFIs.
    - d. Related Change Orders.
    - e. Purchases.
    - f. Deliveries.
    - g. Submittals.
    - h. Review of mockups.
    - i. Possible conflicts.
    - j. Compatibility problems.

- k. Time schedules.
  - l. Weather limitations.
  - m. Manufacturer's written instructions.
  - n. Warranty requirements.
  - o. Compatibility of materials.
  - p. Acceptability of substrates.
  - q. Temporary facilities and controls.
  - r. Space and access limitations.
  - s. Regulations of authorities having jurisdiction.
  - t. Testing and inspecting requirements.
  - u. Installation procedures.
  - v. Coordination with other work.
  - w. Required performance results.
  - x. Protection of adjacent work.
  - y. Protection of construction and personnel.
- 3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
  - 4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
  - 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Progress Meetings: Architect will conduct progress meetings at monthly intervals.
- 1. Coordinate dates of meetings with preparation of payment requests.
  - 2. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
  - 3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
    - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
      - 1) Review schedule for next period.
    - b. Review present and future needs of each entity present, including the following:
      - 1) Interface requirements.
      - 2) Sequence of operations.
      - 3) Status of submittals.
      - 4) Deliveries.
      - 5) Off-site fabrication.
      - 6) Access.
      - 7) Site utilization.
      - 8) Temporary facilities and controls.
      - 9) Progress cleaning.
      - 10) Quality and work standards.
      - 11) Status of correction of deficient items.
      - 12) Field observations.
      - 13) Status of RFIs.
      - 14) Status of proposal requests.
      - 15) Pending changes.
      - 16) Status of Change Orders.
      - 17) Pending claims and disputes.
      - 18) Documentation of information for payment requests.
  - 4. Minutes: Design Professional responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
    - a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

DPW Project No. 20-232  
Idaho State University  
Custodial Office Remodel-Bldg. 24  
Pocatello, Idaho

01/2022

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

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

**END OF SECTION 01 3100**

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

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
  - 1. Contractor's construction schedule.
  - 2. Construction schedule updating reports.
  - 3. Daily construction reports.
  - 4. Site condition reports.

#### **1.2 DEFINITIONS**

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

#### **1.3 INFORMATIONAL SUBMITTALS**

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

#### **1.4 COORDINATION**

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

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

## **PART 2 - PRODUCTS**

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

- A. Time Frame: Extend schedule from date established for commencement of the Work to date of final completion.
  1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- B. Activities: Treat each story or separate area as a separate numbered activity for each main element of the Work. Comply with the following:
  1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
  2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
  3. Submittal Review Time: Include review and resubmittal times indicated in Section 01 3300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
  4. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
  5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
  6. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.
- C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
  1. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
  2. Work Restrictions: Show the effect of the following items on the schedule:
    - a. Coordination with existing construction.
    - b. Limitations of continued occupancies.
    - c. Uninterruptible services.
    - d. Partial occupancy before Substantial Completion.
    - e. Use of premises restrictions.
    - f. Provisions for future construction.
    - g. Seasonal variations.
    - h. Environmental control.
  3. Work Stages: Indicate important stages of construction for each major portion of the Work.
- D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion.
- E. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
  1. Unresolved issues.
  2. Unanswered Requests for Information.
  3. Rejected or unreturned submittals.
  4. Notations on returned submittals.
  5. Pending modifications affecting the Work and Contract Time.
- F. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule.
- G. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

## **2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)**

- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's construction schedule within 7 days of date established for commencement of the Work.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
  - 1. For construction activities that require three months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

## **2.3 REPORTS**

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
  - 1. List of subcontractors at Project site.
  - 2. List of separate contractors at Project site.
  - 3. Approximate count of personnel at Project site.
  - 4. Equipment at Project site.
  - 5. Material deliveries.
  - 6. High and low temperatures and general weather conditions, including presence of rain or snow.
  - 7. Accidents.
  - 8. Meetings and significant decisions.
  - 9. Unusual events.
  - 10. Stoppages, delays, shortages, and losses.
  - 11. Meter readings and similar recordings.
  - 12. Emergency procedures.
  - 13. Orders and requests of authorities having jurisdiction.
  - 14. Change Orders received and implemented.
  - 15. Construction Change Directives received and implemented.
  - 16. Services connected and disconnected.
  - 17. Equipment or system tests and startups.
  - 18. Partial completions and occupancies.
  - 19. Substantial Completions authorized.
- B. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

## **PART 3 - EXECUTION**

### **3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE**

- A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
  - 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
  - 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
  - 3. As the Work progresses, indicate final completion percentage for each activity.
- B. Distribution: Distribute copies of approved schedule to Architect Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
  - 1. Post copies in Project meeting rooms and temporary field offices.
  - 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

**END OF SECTION 01 3200**



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

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Submittal schedule requirements.
  - 2. Administrative and procedural requirements for submittals.

#### **1.2 DEFINITIONS**

- A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."
- B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

#### **1.3 SUBMITTAL SCHEDULE**

- A. Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.

#### **1.4 SUBMITTAL FORMATS**

- A. Submittal Information: Include the following information in each submittal:
  - 1. Project name.
  - 2. Date.
  - 3. Name of Architect.
  - 4. Name of Construction Manager.
  - 5. Name of Contractor.
  - 6. Name of firm or entity that prepared submittal.
  - 7. Names of subcontractor, manufacturer, and supplier.
  - 8. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier; and alphanumeric suffix for resubmittals.
  - 9. Category and type of submittal.
  - 10. Submittal purpose and description.
  - 11. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
  - 12. Drawing number and detail references, as appropriate.
  - 13. Indication of full or partial submittal.
  - 14. Location(s) where product is to be installed, as appropriate.
  - 15. Other necessary identification.
  - 16. Remarks.
  - 17. Signature of transmitter.
- B. Options: Identify options requiring selection by Architect.
- C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.
- D. Submittals:

- E. Upload Submittals on Owners web-based management software. Contractor to initiate the process via “Construction Management”, then “Submittal” tab within the website.
- F. PDF Submittals: Upload submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.
- G. Submittals for Web-Based Project Software: Prepare submittals as PDF files, or other format indicated by Project software website.

### **1.5 SUBMITTAL PROCEDURES**

- A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
  - 1. Web-Based Project Software: Prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.
  - 2. Samples: Prepare submittals and deliver to Architect.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
  - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
  - 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
  - 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
  - 1. Initial Review: Allow seven (7) days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
  - 2. Resubmittal Review: Allow seven (7) days for review of each resubmittal.
- D. Resubmittals: Make resubmittals in same form as initial submittal.
- E. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- F. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

### **1.6 SUBMITTAL REQUIREMENTS**

- A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
  - 1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
  - 2. Mark each copy of each submittal to show which products and options are applicable.
  - 3. Include the following information, as applicable:
    - a. Manufacturer's catalog cuts.
    - b. Manufacturer's product specifications.
    - c. Standard color charts.
    - d. Statement of compliance with specified referenced standards.
    - e. Testing by recognized testing agency.
    - f. Application of testing agency labels and seals.
    - g. Notation of coordination requirements.
    - h. Availability and delivery time information.
  - 4. For equipment, include the following in addition to the above, as applicable:

- a. Wiring diagrams that show factory-installed wiring.
  - b. Printed performance curves.
  - c. Operational range diagrams.
  - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
5. Submit Product Data before Shop Drawings, and before or concurrent with Samples.
- B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
    - a. Identification of products.
    - b. Schedules.
    - c. Compliance with specified standards.
    - d. Notation of coordination requirements.
    - e. Notation of dimensions established by field measurement.
    - f. Relationship and attachment to adjoining construction clearly indicated.
    - g. Seal and signature of professional engineer if specified.
- C. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other materials.
1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
  2. Identification: Permanently attach label on unexposed side of Samples that includes the following:
    - a. Project name and submittal number.
    - b. Generic description of Sample.
    - c. Product name and name of manufacturer.
    - d. Sample source.
    - e. Number and title of applicable Specification Section.
    - f. Specification paragraph number and generic name of each item.
  3. Transmittal: Upload PDF transmittal to the Owners web based management software under submittals. Include digital image file illustrating Sample characteristics, and identification information for record.
  4. Web-Based Project Software: Prepare submittals in PDF form, and upload to Owners web-based Project software website. Enter required data in web-based software site to fully identify submittal.
  5. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
    - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
    - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
  6. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
    - a. Number of Samples: Submit two (2) full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
  7. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
    - a. Number of Samples: Submit three (3) sets of Samples. Architect will retain one Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record Sample.
      - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
      - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

- D. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
- E. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
- F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.

#### **1.7 CONTRACTOR'S REVIEW**

- A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before uploading to the Owners web based management software.
- B. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp that is indicated on the web-based submittal. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.
  - 1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval.

#### **1.8 ARCHITECT'S REVIEW**

- A. Action Submittals: Architect will review each submittal, indicate corrections or revisions required within the "Comment" box on the web site.
  - 1. PDF Submittals: Architect will indicate, via markup on each submittal, the appropriate action.
  - 2. Submittals by Web-Based Project Software: Architect will indicate, on Project software website, the appropriate action.
    - a. Actions taken by indication on Project software website have the following meanings:
      - 1) Approved, Pending, Overdue, Complete, or Rejected.
- B. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.
- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be rejected for resubmittal without review.
- E. Architect will return without review submittals received from sources other than Contractor.
- F. Submittals not required by the Contract Documents will be returned by Architect without action.

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

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

#### **END OF SECTION 01 3300**

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

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for quality assurance and quality control.

#### **1.2 DEFINITIONS**

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.
- C. Mockups: Full-size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.
- D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.
- E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- F. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.
- G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
  - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).
- J. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

#### **1.3 DELEGATED-DESIGN SERVICES**

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
  - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

- B. Delegated-Design Services Statement: Submit a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

#### **1.4 CONFLICTING REQUIREMENTS**

- A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

#### **1.5 INFORMATIONAL SUBMITTALS**

- A. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility sent to authorities having jurisdiction before starting work on the following systems:
  - 1. Seismic-force-resisting system, designated seismic system, or component listed in the designated seismic system quality-assurance plan prepared by Architect.
  - 2. Main wind-force-resisting system or a wind-resisting component listed in the wind-force-resisting system quality-assurance plan prepared by Architect.

#### **1.6 QUALITY ASSURANCE**

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project. If other design professionals are indicated in Specification Sections, insert qualifications here.
- F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
  - 1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
- G. Manufacturer's Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

### **1.7 QUALITY CONTROL**

- A. **Manufacturer's Field Services:** Where indicated, engage a manufacturer's representative to observe and inspect the Work. Manufacturer's representative's services include examination of substrates and conditions, verification of materials, inspection of completed portions of the Work, and submittal of written reports.
- B. **Retesting/Reinspecting:** Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- C. **Coordination:** Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
  - 1. Schedule times for tests, inspections, obtaining samples, and similar activities.

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

### **PART 3 - EXECUTION**

#### **3.1 REPAIR AND PROTECTION**

- A. **General:** On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
  - 1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 01 7300 "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

### **END OF SECTION 01 4000**



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## **SECTION 01 4200 - REFERENCES**

### **PART 1 - GENERAL**

#### **1.1 DEFINITIONS**

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

#### **1.2 INDUSTRY STANDARDS**

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

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

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

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

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

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

**END OF SECTION 01 4200**

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

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

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

#### **1.2 USE CHARGES**

- A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Architect, testing agencies, and authorities having jurisdiction.
- B. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
- C. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

#### **1.3 INFORMATIONAL SUBMITTALS**

- A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.
- B. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.
- C. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Include the following:
  - 1. Locations of dust-control partitions at each phase of work.
  - 2. HVAC system isolation schematic drawing.
  - 3. Location of proposed air-filtration system discharge.
  - 4. Waste-handling procedures.
  - 5. Other dust-control measures.
  - 6. Noise control measures.

#### **1.4 QUALITY ASSURANCE**

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.
- C. Accessible Temporary Egress: Comply with applicable provisions in the United States Access Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

## **1.5 PROJECT CONDITIONS**

- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

## **PART 2 - PRODUCTS**

### **2.1 TEMPORARY FACILITIES**

- A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
- B. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Architect, and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:

### **2.2 EQUIPMENT**

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
  - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
  - 2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.
  - 3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return-air grille in system and remove at end of construction.

## **PART 3 - EXECUTION**

### **3.1 TEMPORARY FACILITIES, GENERAL**

- A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
  - 1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work.
  - 2. See other Sections for disposition of salvaged materials that are designated as Owner's property.

### **3.2 INSTALLATION, GENERAL**

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

### **3.3 TEMPORARY UTILITY INSTALLATION**

- A. General: Install temporary service or connect to existing service.
  - 1. Arrange with Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel.
  - 1. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

- C. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
  - 1. Prior to commencing work, isolate the HVAC system in area where work is to be performed according to coordination drawings.
    - a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
    - b. Maintain negative air pressure within work area using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
    - c. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
  - 2. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.

### **3.4 SUPPORT FACILITIES INSTALLATION**

- A. General: Comply with the following:
  - 1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
  - 2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before.
  - 3. Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Traffic Controls: Comply with requirements of authorities having jurisdiction.
  - 1. Protect existing site improvements to remain including curbs, pavement, and utilities.
  - 2. Maintain access for fire-fighting equipment and access to fire hydrants.
- C. Parking: Use designated areas of Owner's existing parking areas for construction personnel.
- D. Waste Disposal Facilities: Comply with requirements specified in Section 01 7419 "Construction Waste Management and Disposal."
- E. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
  - 1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

### **3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION**

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
  - 1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
- C. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.
- D. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- E. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
  - 1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.
  - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.

3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

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

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
  1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
  1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
  2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
  3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period.
  4. Comply with final cleaning requirements specified in Section 01 7700 "Closeout Procedures."

**END OF SECTION 01 5000**

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

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

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

#### **1.2 DEFINITIONS**

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

#### **1.3 ACTION SUBMITTALS**

- A. Comparable Product Request Submittal: Submit request for consideration of each comparable product. Identify basis-of-design product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
  - 1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
  - 2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven (7) days of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within seven (7) days of receipt of request, or seven (7) days of receipt of additional information or documentation, whichever is later.
    - a. Form of Architect's Approval of Submittal: As specified in Section 01 3300 "Submittal Procedures."
    - b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 01 3300 "Submittal Procedures." Show compliance with requirements.

#### **1.4 QUALITY ASSURANCE**

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



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

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
  - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
  - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
  - 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
  - 4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.
- C. Storage:
  - 1. Store products to allow for inspection and measurement of quantity or counting of units.
  - 2. Store materials in a manner that will not endanger Project structure.
  - 3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
  - 4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
  - 5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
  - 6. Protect stored products from damage and liquids from freezing.

## **1.6 PRODUCT WARRANTIES**

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
  - 1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
  - 2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
  - 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
  - 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
  - 3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

## **PART 2 - PRODUCTS**

### **2.1 PRODUCT SELECTION PROCEDURES**

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
  - 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
  - 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
  - 3. Owner reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.
  - 4. Where products are accompanied by the term "as selected," Architect will make selection.

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

## 2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration of Comparable Products: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:

1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant product qualities include attributes such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
2. Evidence that proposed product provides specified warranty.
3. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
4. Samples, if requested.

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

**END OF SECTION 01 6000**

## SECTION 01 7300 - EXECUTION

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
  - 1. Construction layout.
  - 2. Installation of the Work.
  - 3. Cutting and patching.
  - 4. Progress cleaning.
  - 5. Starting and adjusting.
  - 6. Protection of installed construction.
  
- B. Related Requirements:
  - 1. Section 01 1000 "Summary" for limits on use of Project site.
  - 2. Section 01 7700 "Closeout Procedures" for recording of Owner-accepted deviations from indicated lines and levels, replacing defective work, and final cleaning.

#### 1.2 QUALITY ASSURANCE

- A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
  - 1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
  - 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
  - 3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:
    - a. Water, moisture, or vapor barriers.
    - b. Membranes and flashings.
    - c. Exterior curtain-wall construction.
    - d. Sprayed fire-resistive material.
    - e. Equipment supports.
    - f. Piping, ductwork, vessels, and equipment.
    - g. Noise- and vibration-control elements and systems.
  - 4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
  - 5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.
    - a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.
  - 6. Dates: Indicate on the contractor's schedule when cutting and patching will be performed.
  
- B. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

- C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. General: Comply with requirements specified in other Sections.
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
  - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
  - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services; and other utilities.
  - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
  - 1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
  - 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
  - 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

### **3.2 PREPARATION**

- A. Existing Utility Information: Furnish information to local utility and Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 01 3100 "Project Management and Coordination."

### **3.3 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 in occupied spaces and in unoccupied spaces, or as required by authorities having jurisdiction.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- F. Tools and Equipment: Where possible, select tools or equipment that minimize production of excessive noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
  2. Allow for building movement, including thermal expansion and contraction.
  3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- J. Remove and replace damaged, defective, or non-conforming Work.

### **3.4 CUTTING AND PATCHING**

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C. Temporary Support: Provide temporary support of work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 01 1000 "Summary."

- F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.
  
- G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
  - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
  - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
  - 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
  - 4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
  - 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
  - 6. Proceed with patching after construction operations requiring cutting are complete.
  
- H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
  - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
  - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
    - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    - b. Restore damaged pipe covering to its original condition.
  - 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
    - a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
  - 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
  - 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
  
- I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

### **3.5 AGENCY-INSTALLED PRODUCTS**

- A. Site Access: Provide access to Project site for Owner's and Agency construction personnel.
  
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner and Agency construction personnel.
  - 1. Construction Schedule: Inform Owner/Agency of Contractor's preferred construction schedule for Owner/Agency portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner/Agency in a timely manner if changes to schedule are required due to differences in actual construction progress.
  - 2. Preinstallation Conferences: Include Owner/Agency construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner/Agency work. Attend preinstallation conferences conducted by Owner/Agency construction personnel if portions of the Work depend on Owner's construction.

### 3.6 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
  - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
  - 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
  - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
    - a. Use containers intended for holding waste materials of type to be stored.
  - 4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
  - 1. Remove liquid spills promptly.
  - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 01 7419 "Construction Waste Management and Disposal."
- 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 ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

### 3.7 STARTING AND ADJUSTING

- A. Coordinate startup and adjusting of equipment and operating components with requirements in Section 01 9113 "General Commissioning Requirements."
- B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.



- E. Manufacturer's Field Service: Comply with qualification requirements in Section 01 4000 "Quality Requirements."

**3.8 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.
- C. Comply with manufacturer's written instructions for temperature and relative humidity.

**END OF SECTION 01 7300**

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

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Drawings and general provisions of the Contract, including Fixed Price Construction Contract and other Division 01 Specification Sections, apply to this Section.
- B. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
  - 1. Substantial Completion procedures.
  - 2. Final completion procedures.
  - 3. Warranties.
  - 4. Final cleaning.
  - 5. Repair of the Work.
- C. Related Requirements:
  - 1. Section 01 7823 "Operation and Maintenance Data" for additional operation and maintenance manual requirements.
  - 2. Section 01 7839 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
  - 3. Section 01 7900 "Demonstration and Training" for requirements to train the Owner's maintenance personnel to adjust, operate, and maintain products, equipment, and systems.

#### **1.2 ACTION SUBMITTALS**

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

#### **1.3 CLOSEOUT SUBMITTALS**

- A. Certificates of Release: From authorities having jurisdiction.
- B. Idaho Division of Public Works Close-Out requirements, including "Conditions Precedent to Final Payment" list. The "Project Finalization" form is required unless specifications indicate otherwise.
- C. Certificate of Insurance: For continuing coverage.
- D. Field Report: For pest control inspection.

#### **1.4 SUBSTANTIAL COMPLETION PROCEDURES**

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of seven (7) days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
  - 1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
  - 2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.

3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
  4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number.
  5. Submit sustainable design submittals not previously submitted.
  6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
  7. A final report of Special Inspections to be attached to the Substantial Completion. If no Special Inspections are required, Design Professional can initial as such on the Substantial Completion form.
  8. Submit O&M Manuals for compliance with the contract documents.
- C. Procedures Prior to Substantial Completion: Complete the following a minimum of seven (7) days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Advise Owner of pending insurance changeover requirements.
  2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
  3. Complete startup and testing of systems and equipment.
  4. Perform preventive maintenance on equipment used prior to Substantial Completion.
  5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 01 7900 "Demonstration and Training."
  6. Advise Owner of changeover in utility services.
  7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
  8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
  9. Complete final cleaning requirements.
  10. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of ten (10) days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
  2. Results of completed inspection will form the basis of requirements for final completion.

## 1.5 FINAL COMPLETION PROCEDURES

- A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:
1. Upload a final Application for Payment according to Section 01 2900 "Payment Procedures" to DPW's Construction Management Portal.
  2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
  3. Idaho Division of Public Works Close-Out requirements.
- B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will approve/initial punch list after inspection or will notify Contractor of construction that must be completed or corrected before final documents will be signed.

## 1.6 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order.
2. Submit list of incomplete items in the following format:
  - a. MS Excel electronic file. Architect will return annotated file.
  - b. PDF electronic file. Architect will return annotated file.
  - c. Web-based project software upload. Utilize software feature for creating and updating list of incomplete items (punch list).

## **1.7 SUBMITTAL OF PROJECT WARRANTIES**

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Partial Occupancy: Submit properly executed warranties within ten (10) days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
- D. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
  1. Submit on digital media acceptable to Architect and by uploading to web-based project software site.
- E. Warranties in Paper Form:
  1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
  2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
  3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
  4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
- F. Provide additional copies of each warranty to include in operation and maintenance manuals.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

## **PART 3 - EXECUTION**

### **3.1 FINAL CLEANING**

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
  1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

- a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
  - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
  - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
  - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
  - e. Remove snow and ice to provide safe access to building.
  - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
  - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
  - h. Sweep concrete floors broom clean in unoccupied spaces.
  - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
  - j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
  - k. Remove labels that are not permanent.
  - l. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances
  - m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
  - n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
  - o. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
    - 1) Clean HVAC system in compliance with NADCA Standard 1992-01. Provide written report on completion of cleaning.
  - p. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
  - q. Leave Project clean and ready for occupancy.
- C. Pest Control: Comply with pest control requirements in Section 01 5000 "Temporary Facilities and Controls." Prepare written report.
- D. Construction Waste Disposal: Comply with waste disposal requirements in Section 01 7419 "Construction Waste Management and Disposal."

### 3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations, as well as any damage to surrounding areas. Repair includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition before requesting inspection for determination of Substantial Completion.
1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
  2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.
    - a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
  3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
  4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
- B. Repair, or remove and replace, defective construction.

**END OF SECTION 01 7700**

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

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

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

#### **1.2 CLOSEOUT SUBMITTALS**

- A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
1. Architect will comment on whether content of operation and maintenance submittals is acceptable.
  2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B. Format: Submit operation and maintenance manuals in the following format:
1. Submit on digital media acceptable to Architect and by uploading to web-based project software site. Enable reviewer comments on draft submittals.
  2. Submit three paper copies. Architect will return two copies.
- C. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 7 (seven) days before commencing demonstration and training. Architect will return copy with comments.
1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's comments and prior to commencing demonstration and training.
- D. Comply with Section 01 7700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

#### **1.3 FORMAT OF OPERATION AND MAINTENANCE MANUALS**

- A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
  2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.
- B. Manuals, Paper Copy: Submit manuals in the form of hard-copy, bound and labeled volumes.
1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
  2. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
    - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
    - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

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

- A. Organization of Manuals: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
  - 1. Title page.
  - 2. Table of contents.
  - 3. Manual contents.
- B. Title Page: Include the following information:
  - 1. Subject matter included in manual.
  - 2. Name and address of Project.
  - 3. Name and address of Owner.
  - 4. Date of submittal.
  - 5. Name and contact information for Contractor.
  - 6. Name and contact information for Construction Manager.
  - 7. Name and contact information for Architect.
  - 8. Name and contact information for Commissioning Authority.
  - 9. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
  - 10. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

#### **1.5 EMERGENCY MANUALS**

- A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- B. Content: Organize manual into a separate section for each of the following:
  - 1. Type of emergency.
  - 2. Emergency instructions.
  - 3. Emergency procedures.
- C. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
  - 1. Fire.
  - 2. Flood.
  - 3. Gas leak.
  - 4. Water leak.
  - 5. Power failure.
  - 6. Water outage.
  - 7. System, subsystem, or equipment failure.
  - 8. Chemical release or spill.
- D. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

- E. Emergency Procedures: Include the following, as applicable:
  - 1. Instructions on stopping.
  - 2. Shutdown instructions for each type of emergency.
  - 3. Operating instructions for conditions outside normal operating limits.
  - 4. Required sequences for electric or electronic systems.
  - 5. Special operating instructions and procedures.

## 1.6 SYSTEMS AND EQUIPMENT OPERATION MANUALS

- A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.
- B. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
  - 1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
  - 2. Performance and design criteria if Contractor has delegated design responsibility.
  - 3. Operating standards.
  - 4. Operating procedures.
  - 5. Operating logs.
  - 6. Wiring diagrams.
  - 7. Control diagrams.
  - 8. Piped system diagrams.
  - 9. Precautions against improper use.
  - 10. License requirements including inspection and renewal dates.
- C. Descriptions: Include the following:
  - 1. Product name and model number. Use designations for products indicated on Contract Documents.
  - 2. Manufacturer's name.
  - 3. Equipment identification with serial number of each component.
  - 4. Equipment function.
  - 5. Operating characteristics.
  - 6. Limiting conditions.
  - 7. Performance curves.
  - 8. Engineering data and tests.
  - 9. Complete nomenclature and number of replacement parts.
- D. Operating Procedures: Include the following, as applicable:
  - 1. Startup procedures.
  - 2. Equipment or system break-in procedures.
  - 3. Routine and normal operating instructions.
  - 4. Regulation and control procedures.
  - 5. Instructions on stopping.
  - 6. Normal shutdown instructions.
  - 7. Seasonal and weekend operating instructions.
  - 8. Required sequences for electric or electronic systems.
  - 9. Special operating instructions and procedures.
- E. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- F. Piped Systems: Diagram piping as installed, and identify color coding where required for identification.

## 1.7 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

- A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.



- B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds, as described below.
- C. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:
  - 1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
    - a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
  - 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
  - 3. Identification and nomenclature of parts and components.
  - 4. List of items recommended to be stocked as spare parts.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
  - 1. Test and inspection instructions.
  - 2. Troubleshooting guide.
  - 3. Precautions against improper maintenance.
  - 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  - 5. Aligning, adjusting, and checking instructions.
  - 6. Demonstration and training video recording, if available.
- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
  - 1. Include procedures to follow and required notifications for warranty claims.
- H. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.

## **1.8 PRODUCT MAINTENANCE MANUALS**

- A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- C. Product Information: Include the following, as applicable:
  - 1. Product name and model number.
  - 2. Manufacturer's name.
  - 3. Color, pattern, and texture.
  - 4. Material and chemical composition.
  - 5. Reordering information for specially manufactured products.
- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
  - 1. Inspection procedures.
  - 2. Types of cleaning agents to be used and methods of cleaning.

3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

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

1. Include procedures to follow and required notifications for warranty claims.

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

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

**END OF SECTION 01 7823**

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

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

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

#### **1.2 CLOSEOUT SUBMITTALS**

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

### **PART 2 - PRODUCTS**

#### **2.1 RECORD DRAWINGS**

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

#### **2.2 RECORD SPECIFICATIONS**

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

- B. Format: Submit record Specifications as paper copy and scanned PDF electronic file(s) of marked-up paper copy of Specifications.

### **2.3 RECORD PRODUCT DATA**

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

### **2.4 MISCELLANEOUS RECORD SUBMITTALS**

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

## **PART 3 - EXECUTION**

### **3.1 RECORDING AND MAINTENANCE**

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.
- B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's reference during normal working hours.

**END OF SECTION 01 7839**

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

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
  - 1. Instruction in operation and maintenance of systems, subsystems, and equipment.

#### **1.2 INFORMATIONAL SUBMITTALS**

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

#### **1.3 CLOSEOUT SUBMITTALS**

- A. Demonstration and Training Video Recordings: Submit one copy (1) within seven (7) days of end of each training module.
  - 1. At completion of training, submit complete training manual(s) for Owner's use prepared in same paper and PDF file format required for operation and maintenance manuals specified in Section 01 7823 "Operation and Maintenance Data."

#### **1.4 QUALITY ASSURANCE**

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

#### **1.5 COORDINATION**

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data have been reviewed and approved by Architect.

#### **1.6 INSTRUCTION PROGRAM**

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:

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

**1.7 PREPARATION**

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

**1.8 INSTRUCTION**

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
- B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
- C. Scheduling: Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
  - 1. Schedule training with Owner with at least ten (10) days' advance notice.
- D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.
- E. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a demonstration performance-based test.
- F. Cleanup: Collect used and leftover educational materials and remove from Project. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

**PART 2 - PRODUCTS**

**PART 3 - EXECUTION**

**END OF SECTION 01 7900**



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DIVISION 02 – EXISTING CONDITIONS

024119     SELECTIVE DEMOLITION

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## **SECTION 02 4119 - SELECTIVE DEMOLITION**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Demolition and removal of selected portions of building or structure.
  - 2. Salvage of existing items to be reused or recycled.

#### **1.2 MATERIALS OWNERSHIP**

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
  - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

#### **1.3 INFORMATIONAL SUBMITTALS**

- A. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for dust control and, for noise control. Indicate proposed locations and construction of barriers.
- B. Schedule of selective demolition activities with starting and ending dates for each activity.
- C. Predemolition photographs or video.

#### **1.4 CLOSEOUT SUBMITTALS**

- A. Inventory of items that have been removed and salvaged.

#### **1.5 FIELD CONDITIONS**

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
  - 1. Hazardous materials will be removed by Owner before start of the Work.
  - 2. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- E. Storage or sale of removed items or materials on-site is not permitted.
- F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
  - 1. Maintain fire-protection facilities in service during selective demolition operations.
- G. Arrange selective demolition schedule so as not to interfere with Owner's operations.

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

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Inventory and record the condition of items to be removed and salvaged.

**3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS**

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
  - 1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
  - 2. Arrange to shut off utilities with utility companies.
  - 3. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
  - 4. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.
    - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
    - b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
    - c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
    - d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
    - e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
    - f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
    - g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

**3.3 PROTECTION**

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
- B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
- C. Remove temporary barricades and protections where hazards no longer exist.

**3.4 SELECTIVE DEMOLITION**

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
  - 1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
  - 2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.

3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
  4. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
  5. Dispose of demolished items and materials promptly.
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- C. Removed and Salvaged Items:
1. Clean salvaged items.
  2. Pack or crate items after cleaning. Identify contents of containers.
  3. Store items in a secure area until delivery to Owner.
  4. Transport items to Owner's storage area designated by Owner.
  5. Protect items from damage during transport and storage.
- D. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse.
  2. Pack or crate items after cleaning and repairing. Identify contents of containers.
  3. Protect items from damage during transport and storage.
  4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

### **3.5 CLEANING**

- A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.
1. Do not allow demolished materials to accumulate on-site.
  2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
  3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
  4. Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."
- B. Burning: Do not burn demolished materials.
- C. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

**END OF SECTION 02 4119**

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**DIVISION 03 - CONCRETE**

033053 MISCELLANEOUS CAST-IN-PLACE CONCRETE



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## **SECTION 03 3053 - MISCELLANEOUS CAST-IN-PLACE CONCRETE**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

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

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Design Mixtures: For each concrete mixture.

#### **1.3 QUALITY ASSURANCE**

- A. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

### **PART 2 - PRODUCTS**

#### **2.1 CONCRETE, GENERAL**

- A. Comply with ACI 301.
- B. Comply with ACI 117.

#### **2.2 STEEL REINFORCEMENT**

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- B. Plain-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, plain, fabricated from as-drawn steel wire into flat sheets.

#### **2.3 CONCRETE MATERIALS**

- A. Cementitious Materials:
  - 1. Portland Cement: ASTM C 150/C 150M, Type I.
  - 2. Fly Ash: ASTM C 618, Class C or F.
  - 3. Slag Cement: ASTM C 989/C 989M, Grade 100 or 120.
- B. Normal-Weight Aggregate: ASTM C 33/C 33M, 1-inch nominal maximum aggregate size.
- C. Air-Entraining Admixture: ASTM C 260/C 260M.
- D. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
  - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
  - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
  - 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
  - 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
  - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
  - 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

- E. Water: ASTM C 94/C 94M.

## **2.4 RELATED MATERIALS**

- A. Vapor Retarder: Plastic sheet, ASTM E 1745, Class A or B.
- B. Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber, or ASTM D 1752, cork or self-expanding cork.

## **2.5 CURING MATERIALS**

- A. Evaporation Retarder: Waterborne, monomolecular film forming; manufactured for application to fresh concrete.
- B. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth or cotton mats.
- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

## **2.6 CONCRETE MIXTURES**

- A. Normal-Weight Concrete:
  - 1. Minimum Compressive Strength: 3000 psi at 28 days.
  - 2. Maximum W/C Ratio: 0.45.
  - 3. Cementitious Materials: Use fly ash, pozzolan, slag cement, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 40 percent.
  - 4. Slump Limit: 4 inches, plus or minus 1 inch.
  - 5. Air Content: Maintain within range permitted by ACI 301. Do not allow air content of trowel-finished floor slabs to exceed 3 percent.

## **2.7 CONCRETE MIXING**

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.
  - 1. When air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

## **PART 3 - EXECUTION**

### **3.1 FORMWORK INSTALLATION**

- A. Design, construct, erect, brace, and maintain formwork according to ACI 301.

### **3.2 EMBEDDED ITEM INSTALLATION**

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

### **3.3 VAPOR-RETARDER INSTALLATION**

- A. Install, protect, and repair vapor retarders according to ASTM E 1643; place sheets in position with longest dimension parallel with direction of pour.
  - 1. Lap joints 6 inches and seal with manufacturer's recommended adhesive or joint tape.

### 3.4 STEEL REINFORCEMENT INSTALLATION

- A. Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
  - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

### 3.5 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least [**one-fourth**] <Insert depth> of concrete thickness
- C. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
  - 1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.

### 3.6 CONCRETE PLACEMENT

- A. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
- B. Do not add water to concrete during delivery, at Project site, or during placement.
- C. Consolidate concrete with mechanical vibrating equipment according to ACI 301.

### 3.7 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections exceeding 1/2 inch.
  - 1. Apply to concrete surfaces not exposed to public view.
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Remove fins and other projections exceeding 1/8 inch.
  - 1. Apply to concrete surfaces exposed to public view,.
- C. Rubbed Finish: Apply the following rubbed finish, defined in ACI 301, to smooth-formed-finished as-cast concrete where indicated:
  - 1. Smooth-rubbed finish.
- D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

### 3.8 FINISHING UNFORMED SURFACES

- A. General: Comply with ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Screed surfaces with a straightedge and strike off. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane before excess moisture or bleedwater appears on surface.
  - 1. Do not further disturb surfaces before starting finishing operations.
- C. Scratch Finish: Apply scratch finish to surfaces indicated and surfaces to receive concrete floor topping or mortar setting beds for ceramic or quarry tile, portland cement terrazzo, and other bonded cementitious floor finishes unless otherwise indicated.

- D. Float Finish: Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, fluid-applied or direct-to-deck-applied membrane roofing, or sand-bed terrazzo.
- E. Trowel Finish: Apply a hard trowel finish to surfaces indicated and to floor and slab surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin film-finish coating system.
- F. Trowel and Fine-Broom Finish: Apply a partial trowel finish, stopping after second troweling, to surfaces indicated and to surfaces where ceramic or quarry tile is to be installed by either thickset or thinset methods. Immediately after second troweling, and when concrete is still plastic, slightly scarify surface with a fine broom.
- G. Slip-Resistive Broom Finish: Apply a slip-resistive finish to surfaces indicated and to exterior concrete platforms, steps, and ramps. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.

### **3.9 CONCRETE PROTECTING AND CURING**

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- D. Curing Methods: Cure formed and unformed concrete for at least seven days by one or a combination of the following methods:
  - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
    - a. Water.
    - b. Continuous water-fog spray.
    - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
  - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
  - 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
  - 4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

### **3.10 FIELD QUALITY CONTROL**

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Tests: Perform according to ACI 301.
  - 1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
  - 2. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.

### **END OF SECTION 03 3053**

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**DIVISION 04 - MASONRY**

04 2200 CONCRETE UNIT MASONRY

DPW Project No. 20-232  
Idaho State University  
Custodial Office Remodel-Bldg. 24  
Pocatello, Idaho

01/2022

## **SECTION 04 2200 - CONCRETE UNIT MASONRY**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
1. Concrete masonry units (CMU's).

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For reinforcing steel. Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement." Show elevations of reinforced walls.
- C. Samples: For each type and color of exposed masonry unit and colored mortar.

#### **1.3 INFORMATIONAL SUBMITTALS**

- A. Material Certificates: For each type and size of product indicated. For masonry units include data on material properties.
- B. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.
  2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

#### **1.4 QUALITY ASSURANCE**

- A. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.
- B. Sample Panels: Build sample panels to verify selections made under sample submittals and to demonstrate aesthetic effects. Comply with requirements in Section 01 4000 "Quality Requirements" for mockups.
1. Build sample panels for each type of exposed unit masonry construction in sizes approximately 60 inches long by 48 inches high by full thickness.

#### **1.5 PROJECT CONDITIONS**

- A. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
- B. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

### **PART 2 - PRODUCTS**

#### **2.1 MASONRY UNITS, GENERAL**

- A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.



- B. Fire-Resistance Ratings: Where indicated, provide units that comply with requirements for fire-resistance ratings indicated as determined by testing according to ASTM E 119, by equivalent masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

## 2.2 CONCRETE MASONRY UNITS

- A. Shapes: Provide shapes indicated and for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
- B. Integral Water Repellent: Provide units made with liquid polymeric, integral water repellent admixture that does not reduce flexural bond strength for all units.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. ACM Chemistries, Inc.; RainBloc.
    - b. BASF Aktiengesellschaft; Rheopel Plus.
    - c. Grace Construction Products, W. R. Grace & Co. - Conn.; Dry-Block.
- C. CMUs: ASTM C 90.
  - 1. Density Classification: Medium weight.

## 2.3 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- D. Aggregate for Mortar: ASTM C 144.
  - 1. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
  - 2. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- E. Aggregate for Grout: ASTM C 404.
- F. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Euclid Chemical Company (The); Accelguard 80.
    - b. Grace Construction Products, W. R. Grace & Co. - Conn.; Morset.
    - c. Sonneborn Products, BASF Aktiengesellschaft; Trimix-NCA.
- G. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs, containing integral water repellent by same manufacturer.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. ACM Chemistries, Inc.; RainBloc for Mortar.
    - b. BASF Aktiengesellschaft; Rheopel Mortar Admixture.
    - c. Grace Construction Products, W. R. Grace & Co. - Conn.; Dry-Block Mortar Admixture.
- H. Water: Potable.

## 2.4 TIES AND ANCHORS

- A. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated.
1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M; with ASTM A 153/A 153M, Class B-2 coating.
  2. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, with ASTM A 153/A 153M, Class B coating.
  3. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

## 2.5 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
1. Do not use calcium chloride in mortar or grout.
  2. Use portland cement-lime mortar unless otherwise indicated.
  3. For reinforced masonry, use portland cement-lime mortar.
  4. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated.
1. For reinforced masonry, use Type S.
- D. Grout for Unit Masonry: Comply with ASTM C 476.
1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
  2. Proportion grout in accordance with ASTM C 476, Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi.
  3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.

## PART 3 - EXECUTION

### 3.1 TOLERANCES

- A. Dimensions and Locations of Elements:
1. For dimensions in cross section or elevation do not vary by more than plus 1/2 inch or minus 1/4 inch.
  2. For location of elements in plan do not vary from that indicated by more than plus or minus 1/2 inch.
  3. For location of elements in elevation do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.
- B. Lines and Levels:
1. For bed joints and top surfaces of bearing walls do not vary from level by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
  2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
  3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
  4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
  5. For lines and surfaces do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
- C. Joints:
1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.

2. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
3. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch.

### **3.2 MORTAR BEDDING AND JOINTING**

- A. Lay hollow CMUs as follows:
  1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
  2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
  3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
  4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.
- B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

### **3.3 REPAIRING, POINTING, AND CLEANING**

- A. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- B. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
  1. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes.
  2. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

### **3.4 MASONRY WASTE DISPOSAL**

- A. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.
  1. Do not dispose of masonry waste as fill within 18 inches of finished grade.
- B. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Owner's property.

**END OF SECTION 04 2200**

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05 5213	PIPE AND TUBE RAILINGS
05 7500	DECORATIVE FORMED METAL

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## SECTION 05 3100 - STEEL DECKING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
1. Roof deck.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of deck, accessory, and product indicated.
- B. Shop Drawings:
1. Include layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.

#### 1.3 DELIVERY, STORAGE, AND HANDLING

- A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."

#### 2.2 ROOF DECK

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. ASC Profiles, Inc.; a Blue Scope Steel company.
  2. Consolidated Systems, Inc.; Metal Dek Group.
  3. Epic Metals Corporation.
  4. Marlyn Steel Decks, Inc.
  5. Nucor Corp.; Vulcraft Group.
  6. Roof Deck, Inc.
  7. Verco Manufacturing Co.
  8. Wheeling Corrugating Company; Div. of Wheeling-Pittsburgh Steel Corporation.
- B. Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 31, and with the following:
1. Prime-Painted Steel Sheet: ASTM A 1008/A 1008M, Structural Steel (SS), Grade 40 minimum, shop primed with manufacturer's standard baked-on, rust-inhibitive primer.
    - a. Color: Gray top surface with white underside.
  2. Deck Profile: As indicated.
  3. Profile Depth: As indicated.
  4. Design Uncoated-Steel Thickness: As indicated.

#### 2.3 ACCESSORIES

- A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.

- B. Mechanical Fasteners: As required.
- C. Side-Lap Fasteners: As required.
- D. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, not less than 0.0359-inch design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.
- E. Galvanizing Repair Paint: ASTM A 780.
- F. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION, GENERAL**

- A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 31, manufacturer's written instructions, and requirements in this Section.
- B. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.
- C. Place deck panels flat and square and fasten to supporting frame without warp or deflection.
- D. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.
- E. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.
- F. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.
- G. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's written instructions.

#### **3.2 PROTECTION**

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Repair Painting: Wire brush and clean rust spots, welds, and abraded areas on both surfaces of prime-painted deck immediately after installation, and apply repair paint.

#### **END OF SECTION 05 3100**

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

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Miscellaneous steel framing and supports.
  - 2. Miscellaneous steel trim.
  - 3. Loose bearing and leveling plates.
- B. Products furnished, but not installed, under this Section:
  - 1. Loose steel lintels.

#### **1.2 PERFORMANCE REQUIREMENTS**

- A. Delegated Design: Design ladders, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
  - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

#### **1.3 ACTION SUBMITTALS**

- A. Product Data: For the following:
  - 1. Prefabricated building columns.
  - 2. Paint products.
  - 3. Grout.
- B. Shop Drawings: Show fabrication and installation details for metal fabrications.
  - 1. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.

### **PART 2 - PRODUCTS**

#### **2.1 METALS, GENERAL**

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces without blemishes.

#### **2.2 FERROUS METALS**

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Steel Tubing: ASTM A 500, cold-formed steel tubing.
- C. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40) unless otherwise indicated.
- D. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.

#### **2.3 FASTENERS**

- A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, at exterior walls.
  - 1. Provide stainless-steel fasteners for fastening aluminum.



2. Provide stainless-steel fasteners for fastening stainless steel.
  3. Provide stainless-steel fasteners for fastening nickel silver.
  4. Provide bronze fasteners for fastening bronze.
- B. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.
- C. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
  2. Material for Exterior Locations and Where Stainless Steel is Indicated: Alloy Group 1 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.
- D. Slotted-Channel Inserts: Cold-formed, hot-dip galvanized-steel box channels (struts) complying with MFMA-4, 1-5/8 by 7/8 inches by length indicated with anchor straps or studs not less than 3 inches long at not more than 8 inches o.c. Provide with temporary filler and tee-head bolts, complete with washers and nuts, all zinc-plated to comply with ASTM B 633, Class Fe/Zn 5, as needed for fastening to inserts.

## 2.4 MISCELLANEOUS MATERIALS

- A. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
- B. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- C. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.
- D. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- E. Concrete: Comply with requirements in Section 03 3000 "Cast-in-Place Concrete" for normal-weight, air-entrained, concrete with a minimum 28-day compressive strength of 3000 psi.

## 2.5 FABRICATION, GENERAL

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

## **2.6 MISCELLANEOUS FRAMING AND SUPPORTS**

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
- C. Fabricate steel girders for wood frame construction from continuous steel shapes of sizes indicated.
  - 1. Where wood nailers are attached to girders with bolts or lag screws, drill or punch holes at 24 inches o.c.
- D. Fabricate steel pipe columns for supporting wood frame construction from steel pipe with steel baseplates and top plates as indicated. Drill or punch baseplates and top plates for anchor and connection bolts and weld to pipe with fillet welds all around. Make welds the same size as pipe wall thickness unless otherwise indicated.

## **2.7 SERVICE PLATFORM**

- A. Materials:
  - 1. Framing, Railings, And Anchorage: Stainless steel plates, shapes, and bars meeting or exceeding requirements of ASTM A276/A276M, Type 304..
- B. Fabrication:
  - 1. Shop Assembly:
    - a. Preassemble items in shop to greatest extent possible to minimize field splicing and assembly:
      - 1) Disassemble units only as required for shipping and handling.
      - 2) Clearly mark units for reassembly and coordinated installation.
    - b. Grind smooth exposed welds to be smooth and invisible to sight when primed.

## **2.8 MISCELLANEOUS STEEL TRIM**

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

## **2.9 METAL BOLLARDS**

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

## **2.10 LOOSE BEARING AND LEVELING PLATES**

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.

## **2.11 LOOSE STEEL LINTELS**

- A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated.
- B. Galvanize loose steel lintels located in exterior walls.

## **2.12 STEEL WELD PLATES AND ANGLES**

- A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

## **2.13 FINISHES, GENERAL**

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish metal fabrications after assembly.

## **2.14 STEEL AND IRON FINISHES**

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.
- B. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
  - 1. Shop prime with universal shop primer unless primers specified in Section 09 9600 "High-Performance Coatings" are indicated.
- C. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:
  - 1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
  - 2. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
  - 3. Items Indicated to Receive Primers Specified in Section 09 9600 "High-Performance Coatings": SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
  - 4. Other Items: SSPC-SP 3, "Power Tool Cleaning."

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION, GENERAL**

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. At exposed connections, finish exposed welds and surfaces smooth and blended.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

### **3.2 INSTALLING METAL BOLLARDS**

- A. Anchor bollards in concrete in formed or core-drilled holes. Fill annular space around bollard solidly with nonshrink, nonmetallic grout.
- B. Anchor bollards in place with concrete footings. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.
- C. Fill bollards solidly with concrete, mounding top surface to shed water.

### **3.3 INSTALLING BEARING AND LEVELING PLATES**

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.
- B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with grout.
- C. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

### **3.4 ADJUSTING AND CLEANING**

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

**END OF SECTION 05 5000**

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## **SECTION 05 5213 - PIPE AND TUBE RAILINGS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Steel pipe railings.

#### **1.2 PERFORMANCE REQUIREMENTS**

- A. Structural Performance: Railings shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
  - 1. Handrails:
    - a. Uniform load of 50 lbf/ ft. applied in any direction.
    - b. Concentrated load of 200 lbf applied in any direction.
    - c. Uniform and concentrated loads need not be assumed to act concurrently.
- B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

#### **1.3 ACTION SUBMITTALS**

- A. Product Data: For the following:
  - 1. Manufacturer's product lines of mechanically connected railings.
  - 2. Railing brackets.
  - 3. Grout, anchoring cement, and paint products.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
- C. Samples: For each type of exposed finish required.

### **PART 2 - PRODUCTS**

#### **2.1 METALS, GENERAL**

- A. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.

#### **2.2 STEEL AND IRON**

- A. Pipe: ASTM A 53/A 53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.
- B. Plates, Shapes, and Bars: ASTM A 36/A 36M.

#### **2.3 MISCELLANEOUS MATERIALS**

- A. Fasteners: Provide the following:
  - 1. Ungalvanized-Steel Railings: Plated steel fasteners complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5 for zinc coating.
- B. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- C. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.

- D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.
- E. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

## **2.4 FABRICATION**

- A. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- B. Form work true to line and level with accurate angles and surfaces.
- C. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove flux immediately.
  - 4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.
- D. Nonwelded Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
- E. Form changes in direction by bending.
- F. Bend members in jigs to produce uniform curvature without buckling or otherwise deforming exposed surfaces.
- G. Close exposed ends of railing members with prefabricated end fittings.
- H. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated.
- I. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.
  - 1. At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant fillers to transfer loads through wall finishes.

## **2.5 STEEL AND IRON FINISHES**

- A. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
- B. Primer Application: Apply shop primer to prepared surfaces of railings unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
- C. Powder-Coat Finish: Immediately after cleaning and pretreating, apply manufacturer's standard thermosetting polyester or acrylic urethane powder coating with cured-film thickness not less than 1.5 mils. Prepare, treat, and coat metal to comply with resin manufacturer's written instructions.
  - 1. Color and Gloss: Black.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.

1. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
  2. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
  3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.
- B. Anchor posts to metal surfaces with oval flanges.
- C. Anchor railing ends at walls with round flanges anchored to wall construction.
- D. Anchor railing ends to metal surfaces with flanges bolted to metal surfaces.
- E. Attach railings to wall with wall brackets, except where end flanges are used. Use type of bracket with predrilled hole for exposed bolt anchorage.
- F. Secure wall brackets and railing end flanges to building construction as follows:
1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
  2. For hollow masonry anchorage, use toggle bolts.
  3. For steel-framed partitions, use hanger or lag bolts set into fire-retardant-treated wood backing between studs. Coordinate with stud installation to locate backing members.

### **3.2 ADJUSTING AND CLEANING**

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

**END OF SECTION 05 5213**



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## **SECTION 05 7500 - DECORATIVE FORMED METAL**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Metal Canopy.

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product, including finishing materials.
- B. Shop Drawings: Show fabrication and installation details for decorative formed metal.
  - 1. Include plans, elevations, component details, and attachment details.
  - 2. Indicate materials and profiles of each decorative formed metal member, fittings, joinery, finishes, fasteners, anchorages, and accessory items.
- C. Samples: For each type of exposed finish required, prepared on 6-inch-square Samples of metal of same thickness and material indicated for the Work.

#### **1.3 INFORMATIONAL SUBMITTALS**

- A. Coordination Drawings: For decorative formed metal elements that house items specified in other Sections. Show dimensions of housed items, including locations of housing penetrations and attachments, and necessary clearances.
- B. Evaluation Reports: For post-installed anchors, from ICC-ES.

### **PART 2 - PRODUCTS**

#### **2.1 SHEET METAL**

- A. General: Fabricate products from sheet metal without pitting, seam marks, roller marks, stains, discolorations, or other imperfections where exposed to view on finished units.
- B. Galvanized-Steel Sheet: ASTM A653/A653M, G90 coating, either commercial steel or forming steel.
- C. Steel Sheet: electrolytic zinc-coated, ASTM A879/A879M, with steel sheet substrate complying with ASTM A1008/A1008M, commercial steel, exposed.

#### **2.2 MISCELLANEOUS MATERIALS**

- A. Fasteners: Fabricated from same basic metal and alloy as fastened metal unless otherwise indicated.
  - 1. Provide square or hex socket flat-head machine screws for exposed fasteners unless otherwise indicated.
- B. Anchors: Provide fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193.
- C. Anchor Materials:
  - 1. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless-steel bolts, ASTM F593, and nuts, ASTM F594.

#### **2.3 PAINTS AND COATINGS**

- A. Etching Cleaner for Galvanized Metal: Complying with MPI#25.

- B. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- C. Shop Primer for Galvanized Steel: Cementitious galvanized metal primer complying with MPI#26.
- D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.

## **2.4 FABRICATION, GENERAL**

- A. Shop Assembly: Preassemble decorative formed metal items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- B. Fold back exposed edges of unsupported sheet metal to form a 1/2-inch-wide hem on the concealed side, or ease edges to a radius of approximately 1/32 inch and support with concealed stiffeners.
- C. Increase metal thickness or reinforce with concealed stiffeners, backing materials, or both, as needed to provide surface flatness and sufficient strength for indicated use.
  - 1. Support joints with concealed stiffeners as needed to hold exposed faces of adjoining sheets in flush alignment.
- D. Where welding or brazing is indicated, weld or braze joints and seams continuously. Grind, fill, and dress to produce smooth, flush, exposed surfaces in which joints are not visible after finishing is completed.

## **2.5 METAL CANOPY**

- A. Form closures and trim from metal of type and thickness indicated below. Fabricate to fit tightly to adjoining construction.
  - 1. Galvanized-Steel Sheet: 0.0785 inch.
    - a. Finish: Powder coat.

## **2.6 GALVANIZED-STEEL SHEET FINISHES**

- A. Preparing Galvanized Items for Factory Finishing: Clean surfaces with nonpetroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it.
- B. Repairing Galvanized Surfaces: Clean welds and abraded areas and repair galvanizing to comply with ASTM A780/A780M.
- C. Powder-Coat Finish: Immediately after cleaning and pretreating, apply manufacturer's standard thermosetting polyester or acrylic urethane powder coating with cured-film thickness not less than 1.5 mils. Prepare, treat, and coat metal to comply with resin manufacturer's written instructions.
  - 1. Color and Gloss: As selected by Architect from manufacturer's full range.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Locate and place decorative formed metal items level and plumb and in alignment with adjacent construction. Perform cutting, drilling, and fitting required to install decorative formed metal.
- B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where needed to protect metal surfaces and to make a weathertight connection.
- C. Form tight joints with exposed connections accurately fitted together. Provide reveals and openings for sealants and joint fillers as indicated.

- D. Corrosion Protection: Apply bituminous paint or other permanent separation materials on concealed surfaces where metals would otherwise be in direct contact with substrate materials that are incompatible or could result in corrosion or deterioration of either material or finish.
- E. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit or provide new units.

**END OF SECTION 05 7500**

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

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06 6400	PLASTIC PANELING

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## **SECTION 06 1053 - MISCELLANEOUS ROUGH CARPENTRY**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
1. Framing with dimension lumber.
  2. Rooftop equipment bases and support curbs.
  3. Wood blocking and nailers.
  4. Plywood backing panels.

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

#### **1.3 INFORMATIONAL SUBMITTALS**

- A. Evaluation Reports: For the following, from ICC-ES:
1. Preservative-treated wood.
  2. Power-driven fasteners.

### **PART 2 - PRODUCTS**

#### **2.1 WOOD PRODUCTS, GENERAL**

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
1. Factory mark each piece of lumber with grade stamp of grading agency.
  2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece or omit grade stamp and provide certificates of grade compliance issued by grading agency.
  3. Provide dressed lumber, S4S, unless otherwise indicated.
- B. Maximum Moisture Content of Lumber: 19 percent unless otherwise indicated.

#### **2.2 WOOD-PRESERVATIVE-TREATED MATERIALS**

- A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.
1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- D. Application: Treat items indicated on Drawings, and the following:
1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
  2. Wood sills, sleepers, blocking, furring, and similar concealed members in contact with masonry or concrete.
  3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.



4. Wood floor plates that are installed over concrete slabs-on-grade.

### **2.3 DIMENSION LUMBER FRAMING**

- A. Framing: No. 2 grade and the following species:
  1. Douglas fir-larch; WCLIB or WWP.

### **2.4 MISCELLANEOUS LUMBER**

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
  1. Blocking.
  2. Nailers.
  3. Rooftop equipment bases and support curbs.
  4. Furring.
  5. Grounds.
- B. For items of dimension lumber size, provide Construction or No. 2 grade lumber of any species.
- C. For concealed boards, provide lumber with 19 percent maximum moisture content and the following species and grades:
  1. Western woods, Construction or No. 2 Common grade; WCLIB or WWP.

### **2.5 PLYWOOD BACKING PANELS**

- A. Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness.

### **2.6 FASTENERS**

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
  1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
- B. Power-Driven Fasteners: NES NER-272.
- C. Screws for Fastening to Metal Framing: ASTM C 1002, length as recommended by screw manufacturer for material being fastened.

### **2.7 MISCELLANEOUS MATERIALS**

- A. Flexible Flashing: Self-adhesive butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION, GENERAL**

- A. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit.
- B. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

- C. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- D. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant treated plywood backing panels with classification marking of testing agency exposed to view.
- E. Do not splice structural members between supports unless otherwise indicated.
- F. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
- G. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
  - 1. NES NER-272 for power-driven fasteners.
  - 2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.

### **3.2 WOOD BLOCKING**

- A. Provide solid wood blocking at the following locations including, but not limited to:
  - 1. Door stops.
  - 2. Grab bars.
  - 3. Provide 2 rows each at base and upper cabinets and casework.
  - 4. AV Monitor Brackets
  - 5. Other wall mounted fixtures.

### **3.3 PROTECTION**

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

**END OF SECTION 06 1053**

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

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Interior trim.
  - 2. Solid surface window stools.
  - 3. Installation of building specialties.

#### **1.2 ACTION SUBMITTALS**

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

### **PART 2 - PRODUCTS**

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

- A. Lumber: DOC PS 20.
  - 1. Factory mark each piece of lumber with grade stamp of inspection agency indicating grade, species, moisture content at time of surfacing, and mill.
    - a. For exposed lumber, mark grade stamp on end or back of each piece, or omit grade stamp and provide certificates of grade compliance issued by inspection agency.
- B. Softwood Plywood: DOC PS 1.
- C. MDF: ANSI A208.2, Grade 130.
- D. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue.

#### **2.2 INTERIOR TRIM**

- A. Softwood Lumber Trim:
  - 1. Species and Grade: Eastern white, Idaho white, lodgepole, ponderosa, radiata, or sugar pine; D Select (Quality); NeLMA, NLGA, or WWPA.
  - 2. Maximum Moisture Content: 19 percent.
- B. Hardwood Lumber Trim:
  - 1. Species and Grade: Alder; Clear; NHLA.
  - 2. Maximum Moisture Content: 13 percent.

#### **2.3 SOLID SURFACE WINDOW STOOLS:**

- 1. Solid Surfacing Material: Homogeneous solid sheets of filled plastic resin complying with the material and performance requirements of ANSI Z124.3, Type 5 or Type 6, without a precoated finish.
  - a. Provide rounded front edge.
  - b. Stools shall be continuous between window jambs.
  - c. Provide colors as selected by architect from manufacturer's standard selection of colors.
  - d. Products: Subject to compliance with requirements, provide the following product:
    - 1) HI-MACS/LG Hausys M308 Haze.
- 1. Nominal density of not less than 1.5 lb/cu. ft. nor more than 1.7 lb/cu. ft., thermal resistivity of 4 deg F x h x sq. ft./Btu x in. At 75 deg F.
- 2. Combustion Characteristics: Passes ASTM E 136.

## **2.6 MISCELLANEOUS MATERIALS**

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

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

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

### **3.2 INSTALLATION, GENERAL**

- A. Install interior finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.
  - 1. Scribe and cut interior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
  - 2. Countersink fasteners, fill surface flush, and sand unless otherwise indicated.
  - 3. Install to tolerance of 1/8 inch in 96 inches for level and plumb. Install adjoining interior finish carpentry with 1/32-inch maximum offset for flush installation and 1/16-inch maximum offset for reveal installation.
  - 4. Install stairs with no more than 3/16-inch variation between adjacent treads and risers and with no more than 3/8-inch variation between largest and smallest treads and risers within each flight.

### **3.3 STANDING AND RUNNING TRIM INSTALLATION**

- A. Install with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Miter at returns, miter at outside corners, and cope at inside corners to produce tight-fitting joints with full-surface contact throughout length of joint. Use scarf joints for end-to-end joints.

## **END OF SECTION 06 2023**

## **SECTION 06 4116 - PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Plastic-laminate-faced architectural cabinets.
  - 2. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-faced architectural cabinets unless concealed within other construction before cabinet installation.

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product, including panel products, high-pressure decorative laminate, and cabinet hardware and accessories.
- B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
- C. Samples:
  - 1. Plastic laminates, for each color, pattern, and surface finish.
  - 2. Thermoset decorative panels, for each color, pattern, and surface finish.

#### **1.3 QUALITY ASSURANCE**

- A. Fabricator Qualifications: Comply with AWI's Quality Certification Program.
- B. Installer Qualifications: Fabricator of products.
- C. Testing:
  - 1. The Owner reserves the right to take random sampling of casework components to verify that the materials and construction are as specified. In the event that one such sampling proves to be inferior to that which is specified, the entire installation shall become suspect of being inferior. The supplier shall, at his own expense, replace all components suspected of being inferior, or the supplier shall provide the quality of casework to the satisfaction of the Owner.

#### **1.4 FIELD CONDITIONS**

- A. Environmental Limitations: Do not deliver or install cabinets until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

### **PART 2 - PRODUCTS**

#### **2.1 PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS**

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of architectural plastic-laminate cabinets indicated for construction, finishes, installation, and other requirements.
- B. Grade: Custom.
- C. Type of Construction: Frameless.
- D. Cabinet, Door, and Drawer Front Interface Style: Flush overlay.

- E. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by woodwork quality standard.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
    - a. Formica Corporation.
    - b. Lamin-Art, Inc.
    - c. Panolam Industries International, Inc.
    - d. Wilsonart International; Div. of Premark International, Inc.
    - e. Pionite.
- F. Laminate Cladding for Exposed Surfaces:
  - 1. Horizontal Surfaces: Grade HGS.
  - 2. Postformed Surfaces: Grade HGP.
  - 3. Vertical Surfaces: Grade HGS.
- G. Materials for Semiexposed Surfaces:
  - 1. Surfaces Other Than Drawer Bodies: Thermoset decorative panels.
  - 2. Drawer Sides and Backs: Thermoset decorative panels with PVC or polyester edge banding.
  - 3. Drawer Bottoms: Thermoset decorative panels or hardboard.
- H. Edge-banding:
  - 1. Edge-banding for cabinet body parts shall be purified 3 mm PVC applied with hot melt glue by automatic edge-banding equipment. Color shall be as selected by Architect from manufacturers full color range.
  - 2. Edge-banding for door and drawer fronts shall be purified 3 mm PVC applied with hot melt glue by automatic edge-banding equipment. Edges and corners shall be rounded with a 3mm radius and scraped free from machining or chatter marks. Color shall be as selected by Architect from manufacturers full color range.
- I. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
  - 1. Wilsonart, Hard Rock Maple 86992-58 Matte Finish.
    - a. Run wood grain horizontally.

## 2.2 WOOD MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.
- B. Composite Wood and Agrifiber Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.
  - 1. Medium-Density Fiberboard: ANSI A208.2, Grade 130.
  - 2. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue.
  - 3. Softwood Plywood: DOC PS 1, medium-density overlay.
  - 4. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1.
  - 5. Thermoset Decorative Panels: 45-pound density particleboard finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for test methods 3.3, 3.4, 3.6, 3.8, and 3.10.
    - a. Color: White for all cabinet interiors exposed or semi-exposed.

## 2.3 CABINET HARDWARE AND ACCESSORIES

- A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets except for items specified in Section 08 7100 "Door Hardware."
- B. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 170 degrees of opening, self-closing.
  - 1. Doors up to 48" in height shall have 2 hinges per door. Doors over 48" in height shall have 3 hinges per door. Hinges which require cutting the edge-banding off the door will not be allowed.
- C. Drawer Slides: Drawer slides for standard drawers shall be Blum Series 230E or equal with 100-pound rating and baked enamel corrosion resistant finish.

1. File drawers and paper drawer slides shall be KV 8500 or equal full extension with 150-pound rating.
- D. Wire Pulls: Back mounted, solid metal, 4 inches long, 5/16 inch in diameter.
- E. Adjustable Shelf Supports:
  1. Adjustable shelves shall be supported on adjustable shelf supports inserted in shelf holes drilled into the case ends or partitions and adjustable on 32mm (1 1/2") centers. Supports to be KV 346 clips.
- F. Screws: Reed and Prince square drive screws. Standard wood screws and sheet metal screws are not acceptable.
- G. Shelf Rests: BHMA A156.9, B04013; metal.
- H. Door and Drawer Silencers: BHMA A156.16, L03011.
- I. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
  1. Brushed Nickel.

#### **2.4 MISCELLANEOUS MATERIALS**

- A. Furring, Blocking, Shims, and Hanging Strips: Fire-retardant-treated softwood lumber, kiln dried to less than 15 percent moisture content.
- B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.
- C. Adhesives: Do not use adhesives that contain urea formaldehyde.

#### **2.5 FABRICATION**

- A. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
- B. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

#### **2.6 COMPONENT CONSTRUCTION**

- A. Toe Kicks: Fixed cabinet bases shall be constructed of 3/4" exterior grade oriented strand board with 2x4 fir stringers. Bases shall be leveled and anchored to the floor in continuing lengths to ensure straight and true lines of casework. Rubber or other finished base shall be furnished and installed by others.
- B. Core Material:
  1. Core Material: 45-pound particle board and Premium Multi-Core Panel Products. provide the Premium Multi-Core Panel at locations listed below.
  2. Particleboard: Premium grade board of balanced construction with a density of 45 lbs. per cubic foot and moisture content of 8% or less. Face screw holding shall be a minimum of 320 lbs. withdrawal.
  3. Provide premium multi-core panel products at the following locations:
    - a. Cabinet doors.
    - b. Cabinet drawer fronts.
    - c. Cabinet sides and ends.
    - d. Cabinet bottoms.
    - e. Cabinet partitions.
- C. Case Body:



1. Ends: Case ends shall be 3/4" fused melamine laminated to thermo-fused melamine to core material with phenolic backer on concealed side. Exposed exterior cabinet ends shall be laminated with vertical grade high pressure plastic laminate. Exposed edges shall be edges with 0.020" PVC edge-banding. Holes shall be drilled for adjustable shelf supports at 32mm (1 1/4") centers.
  2. Cabinet Top and Bottom:
    - a. Base and tall cabinet top and bottom shall be 3/4" thick with melamine thermo-fused to core material and phenolic backer sheets on concealed sides.
    - b. Wall cabinet top and bottom shall be 1" thick for cabinets 36 1/2" and wider. Melamine thermo-fused to core material on both sides.
    - c. All exposed edges shall be banded with 0.020" PVC edge-banding.
    - d. Adjustable Shelves:
      - 1) Adjustable shelves shall be 3/4" thick with melamine thermo-fused to core material on both sides for shelves up to 30" in width, and 1" thick for shelves over 30" in width.
      - 2) Library bookshelves shall be 1" thick.
      - 3) All exposed edges shall be banded with 0.020" thick PVC.
      - 4) All shelves to be adjustable on 1 1/4" centers.
  3. Cabinet Backs:
    - a. Cabinet backs shall be 1/4" thick pre-finished hardboard for use in cabinets with or without doors and shall be recessed into ends and sides. The 1/4" is backed up with 4" x 3/4" hanging cleats on the back side.
    - b. Exposed back shall be 3/4" thick with melamine thermo-fused to core material on interior and high pressure plastic laminate on exterior surface.
- D. Doors and Drawer Fronts:
1. Plastic Laminate Doors and Drawer Fronts: Plastic laminate doors and drawer fronts shall be 3/4" thick for all hinged and sliding doors with vertical grade high pressure plastic laminate exterior face and color cabinet liner on interior face white.
    - a. Core material to be 11/16" thick.
  2. Stile and Rail Doors:
    - a. Stile and rail doors shall be a 3/4" door blank with a cutout to provide 3" wide stile and 3" rail top and bottom. 1/4" thick plate glass is fitted to cut-out and stopped with a white color removable vinyl extrusion.
    - b. Doors and drawer fronts shall have edges with 3 mm edge-banding in color to match plastic laminate.
- E. Drawers:
1. Drawer box sides, backs, and sub-fronts shall be 5/8" thick with melamine thermo-fused to 45 lb density particle board. Exposed top edges shall be banded with 0.020" thick PVC.
  2. Drawer bottoms shall be 1/4" thick pre-finished hardboard recessed into the sides, backs and sub-front.
  3. Paper storage drawers shall be fitted with a hood at back for paper retainage, and shall have a 1/2" thick reinforced bottom.
  4. Drawer fronts shall be mounted with an adjusting mechanism to allow full adjustability and alignment in field.
- F. Joinery:
1. All parts shall be accurately machined and fit for square and true.
  2. Cabinet components shall be doweled into ends using 10mm hardwood dowels 4" on center, securely glued.
  3. All backs shall be rabbeted into case, glued and stapled at four inches on center. 4" wide rails will be mounted on backs for installation purposes, one top and one bottom in wall and base cabinets. Three rails will be used for all tall cabinets.
  4. Drawer bodies shall be box type construction with detachable drawer fronts. Joints shall be securely fastened with hardwood dowels and glue.

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

- A. Before installation, condition cabinets to average prevailing humidity conditions in installation areas.

### **3.2        INSTALLATION**

- A.    Grade: Install cabinets to comply with same grade as item to be installed.
- B.    Install cabinets level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches.
- C.    Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- D.    Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork.
- E.    Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
  - 1.    Install cabinets with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
- F.    Provide sink and fitting cut outs. Installation of sinks, fittings, plumbing rough-in and final connection, and electrical rough and final connection shall be by Divisions 22 and 26.

**END OF SECTION 06 4116**

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

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

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

#### **1.2 ACTION SUBMITTALS**

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

#### **1.3 QUALITY ASSURANCE**

- A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Flame-Spread Index: 25 or less.
  - 2. Smoke-Developed Index: 450 or less.

### **PART 2 - PRODUCTS**

#### **2.1 MANUFACTURERS**

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

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

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

#### **2.3 ACCESSORIES**

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

### **PART 3 - EXECUTION**

#### **3.1 PREPARATION**

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

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

### **3.2 INSTALLATION**

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

**END OF SECTION 06 6400**

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## **SECTION 07 0150.19 - PREPARATION FOR REROOFING**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Full tear-off of entire roof system.
  - 2. Removal of flashings and counterflashings.

#### **1.2 PREINSTALLATION MEETINGS**

- A. Preliminary Roofing Conference: Before starting removal Work, conduct conference at Project site.

#### **1.3 QUALITY ASSURANCE**

- A. Installer Qualifications: Approved by warrantor of existing roofing system to work on existing roofing.

#### **1.4 FIELD CONDITIONS**

- A. Existing Roofing System: PVC roofing.
- B. Owner will occupy portions of building immediately below reroofing area.
  - 1. Conduct reroofing so Owner's operations are not disrupted.
  - 2. Provide Owner with not less than 72 hours' written notice of activities that may affect Owner's operations.
  - 3. Coordinate work activities daily with Owner so Owner has adequate advance notice to place protective dust and water-leakage covers over sensitive equipment and furnishings, shut down HVAC and fire-alarm or -detection equipment if needed, and evacuate occupants from below work area.
- C. Protect building to be reroofed, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from reroofing operations.
- D. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.
- E. Conditions existing at time of inspection for bidding will be maintained by Owner as far as practical.
- F. Weather Limitations: Proceed with reroofing preparation only when existing and forecasted weather conditions permit Work to proceed without water entering existing roofing system or building.
  - 1. Remove only as much roofing in one day as can be made watertight in the same day.

### **PART 2 - PRODUCTS**

#### **2.1 AUXILIARY REROOFING MATERIALS**

- A. General: Use auxiliary reroofing preparation materials recommended by roofing system manufacturer for intended use and compatible with components of new roofing system.

### **PART 3 - EXECUTION**

#### **3.1 PREPARATION**

- A. Seal or isolate windows that may be exposed to airborne substances created in removal of existing materials.
- B. Shut off rooftop utilities and service piping before beginning the Work.
- C. Coordinate with Owner to shut down air-intake equipment in the vicinity of the Work.



1. Cover air-intake louvers before proceeding with reroofing work that could affect indoor air quality or activate smoke detectors in the ductwork.
- D. During removal operations, have sufficient and suitable materials on-site to facilitate rapid installation of temporary protection in the event of unexpected rain.

### **3.2 ROOF TEAR-OFF**

- A. Notify Owner each day of extent of roof tear-off proposed for that day.
- B. Lower removed roofing materials to ground and onto lower roof levels, using dust-tight chutes or other acceptable means of removing materials from roof areas.
- C. Full Roof Tear-off: Remove existing roofing and other roofing system components down to the existing roof deck.
  1. Remove base flashings and counter flashings.
  2. Remove perimeter edge flashing and gravel stops.
  3. Remove flashings at pipes, curbs, mechanical equipment, and other penetrations.
  4. Remove wood blocking, curbs, and nailers.

### **3.3 DECK PREPARATION**

- A. Inspect deck after tear-off of roofing system.
- B. If deck surface is unsuitable for receiving new roofing or if structural integrity of deck is suspect, immediately notify Architect.
  1. Do not proceed with installation until directed by Architect.

### **3.4 BASE FLASHING REMOVAL**

- A. Remove existing base flashings.
  1. Clean substrates of contaminants, such as asphalt, sheet materials, dirt, and debris.

**END OF SECTION 07 0150.19**

## **SECTION 07 2100 - THERMAL INSULATION**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Glass-fiber blanket insulation.

#### **1.2 ACTION SUBMITTALS**

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

#### **1.3 INFORMATIONAL SUBMITTALS**

- A. Product test reports.
- B. Research/evaluation reports.

### **PART 2 - PRODUCTS**

#### **2.1 GLASS-FIBER BLANKET INSULATION**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. CertainTeed Corporation.
  - 2. Guardian Building Products, Inc.
  - 3. Johns Manville.
  - 4. Knauf Insulation.
  - 5. Owens Corning.
- B. Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION, GENERAL**

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

#### **3.2 INSTALLATION OF INSULATION FOR FRAMED CONSTRUCTION**

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

- B. Glass-Fiber Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
  2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
  3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
  4. At stud walls provide R-5 at 2x4 flat installations, R-13 at 2x4 installations, and R-20 at 2x6 and 2x8 installations.
- C. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
1. Loose-Fill Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft..

**END OF SECTION 07 2100**

## **SECTION 07 5419 - POLYVINYL-CHLORIDE (PVC) ROOFING**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Adhered polyvinyl chloride (PVC) roofing system.
  - 2. Vapor retarder.
  - 3. Roof insulation.

#### **1.2 PREINSTALLATION MEETINGS**

- A. Preinstallation Conference: Conduct conference at Project site.

#### **1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. For insulation and roof system component fasteners, include copy of SPRI's Directory of Roof Assemblies listing.
- B. Shop Drawings: Include roof plans, sections, details, and attachments to other work, including the following:
  - 1. Layout and thickness of insulation.
  - 2. Base flashings and membrane terminations.
  - 3. Flashing details at penetrations.
  - 4. Tapered insulation thickness and slopes.
  - 5. Roof plan showing orientation of steel roof deck and orientation of roof membrane, fastening spacings, and patterns for mechanically fastened roofing system.
  - 6. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
- C. Samples: For the following products:
  - 1. Roof membrane and flashing, of color required.
- D. Wind Uplift Resistance Submittal: For roofing system, indicating compliance with wind uplift performance requirements.

#### **1.4 INFORMATIONAL SUBMITTALS**

- A. Manufacturer Certificates:
  - 1. Performance Requirement Certificate: Signed by roof membrane manufacturer, certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
    - a. Submit evidence of compliance with performance requirements.
  - 2. Special Warranty Certificate: Signed by roof membrane manufacturer, certifying that all materials supplied under this Section are acceptable for special warranty.
- B. Product Test Reports: For roof membrane and insulation, tests performed by independent qualified testing agency indicating compliance with specified requirements.
- C. Research reports.
- D. Field Test Reports:
  - 1. Concrete internal relative humidity test reports.
- E. Field quality-control reports.
- F. Sample warranties.

## 1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

## 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

## 1.7 WARRANTY

- A. Installer's Warranty: Installer agrees to warrant the roofing system against leaks and faulty or defective materials and workmanship for designated Warranty Period.
  - 1. Warranty Period: 5 years from the date of Substantial Completion.
  - 2. See attached Warranty Form to be submitted to Owner.
- B. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: 30 years from date of Substantial Completion.
  - 2. See attached Warranty Form to be submitted to Owner.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Accelerated Weathering: Roof membrane shall withstand 2000 hours of exposure when tested according to ASTM G152, ASTM G154, or ASTM G155.
- B. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D3746, ASTM D4272/D4272M, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.
- C. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roof membrane manufacturer based on testing and field experience.
- D. Wind Uplift Resistance: Design roofing system to resist the following wind uplift pressures when tested according to FM Approvals 4474, UL 580, or UL 1897:
  - 1. Zone 1 (Roof Area Field): 30 psf.
  - 2. Zone 2 (Roof Area Perimeter): 50.3 psf.
  - 3. Zone 3 (Roof Area Corners): 75.7 psf.
- E. SPRI's Directory of Roof Assemblies Listing: Roof membrane, base flashings, and component materials shall comply with requirements in FM Approvals 4450 or FM Approvals 4470 as part of a roofing system, and shall be listed in SPRI's Directory of Roof Assemblies for roof assembly identical for that specified for this Project.
  - 1. Wind Uplift Load Capacity: 90 psf.
- F. Exterior Fire-Test Exposure: ASTM E108 or UL 790, Class C; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

### 2.2 POLYVINYL CHLORIDE (PVC) ROOFING

- A. PVC Sheet: ASTM D4434/D4434M, Type II, glass-fiber reinforced, felt backed.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
    - a. Sika Sarnafil.
  - 2. Thickness: 80 mils.
  - 3. Exposed Face Color: White.
- B. PVC Sheet: ASTM D4434/D4434M, Type II, reinforced, fabric backed.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
  - a. Carlisle SynTec Incorporated; Carlisle Construction Materials.
  - b. Bond Cote Roofing Systems.
  - c. Fibertite.
  - d. GAF.
  - e. Johns Manville.
  - f. Tremco TPA.
2. Thickness: 80 mils.
3. Exposed Face Color: White.

### 2.3 AUXILIARY ROOFING MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with other roofing components.
  1. Adhesives and Sealants: Comply with VOC limits of authorities having jurisdiction.
- B. Sheet Flashing: Manufacturer's standard sheet flashing of same material, type, reinforcement, thickness, and color as PVC sheet.
- C. Prefabricated Pipe Flashings: As recommended by roof membrane manufacturer.
- D. Bonding Adhesive: Manufacturer's standard.
- E. Water-Based, Fabric-Backed Membrane Adhesive: Roofing system manufacturer's standard water-based, cold-applied adhesive formulated for compatibility and use with fabric-backed membrane roofing.
- F. Low-Rise, Urethane, Fabric-Backed Membrane Adhesive: Roof system manufacturer's standard spray-applied, low-rise, two-component urethane adhesive formulated for compatibility and use with fabric-backed membrane roofing.
- G. Metal Termination Bars: Manufacturer's standard, predrilled stainless steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.
- H. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roofing components to substrate, and acceptable to roofing system manufacturer.
- I. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

### 2.4 ROOF INSULATION

- A. Polyisocyanurate Board Insulation: ASTM C1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Atlas Roofing Corporation - Polyiso.
    - b. Carlisle SynTec Incorporated; Carlisle Construction Materials.
    - c. Firestone Building Products.
    - d. GAF.
    - e. Hunter Panels; Carlisle Construction Materials.
    - f. Insulfoam; Carlisle Construction Materials Company.
    - g. Johns Manville; a Berkshire Hathaway company.
    - h. Rmax, Inc.
  2. Size: 48 by 48 inches.
  3. Thickness:
    - a. Base Layer: 2.6 inches.
    - b. Upper Layer: 2.6 inches.
- B. Tapered Insulation: Provide factory-tapered insulation boards.
  1. Material: Match roof insulation.

2. Minimum Thickness: 1/4 inch.
3. Slope:
  - a. Roof Field: 1/4 inch per foot unless otherwise indicated on Drawings.
  - b. Saddles and Crickets: 1/2 inch per foot unless otherwise indicated on Drawings.

## 2.5 INSULATION ACCESSORIES

- A. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer as follows:
  1. Modified asphaltic, asbestos-free, cold-applied adhesive.
  2. Bead-applied, low-rise, one-component or multicomponent urethane adhesive.
  3. Full-spread, spray-applied, low-rise, two-component urethane adhesive.
- B. Cover Board: ASTM C1177/C1177M, glass-mat, water-resistant gypsum board or ASTM C1278/C1278M fiber-reinforced gypsum board.
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Georgia-Pacific Gypsum LLC.
    - b. National Gypsum Company.
    - c. USG Corporation.
  2. Thickness: 1/2 inch.
  3. Surface Finish: Unprimed.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
  1. Verify that minimum concrete drying period recommended by roofing system manufacturer has passed.
  2. Verify that concrete substrate is visibly dry and free of moisture, and that minimum concrete internal relative humidity is not more than 75 percent, or as recommended by roofing system manufacturer, when tested according to ASTM F2170.
    - a. Test Frequency: One test probe per each 1000 sq. ft., or portion thereof, of roof deck, with no fewer than three test probes.
    - b. Submit test reports within 24 hours of performing tests.
  3. Verify that concrete-curing compounds that will impair adhesion of roofing components to roof deck have been removed.
  4. Verify that joints in precast concrete roof decks have been grouted flush with top of concrete.

### 3.2 INSTALLATION OF ROOFING, GENERAL

- A. Install roofing system according to roofing system manufacturer's written instructions, SPRI's Directory of Roof Assemblies listed roof assembly requirements, and FM Global Property Loss Prevention Data Sheet 1-29.
- B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at end of workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

### 3.3 INSTALLATION OF INSULATION

- A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at end of workday.
- B. Comply with roofing system and insulation manufacturer's written instructions for installing roof insulation.
- C. Installation Over Metal Decking:
  1. Install base layer of insulation with joints staggered not less than 24 inches in adjacent rows.
    - a. Make joints between adjacent insulation boards not more than 1/4 inch in width.
    - b. Fill gaps exceeding 1/4 inch with insulation.

- c. Mechanically attach base layer of insulation using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to metal decks.
    - 1) Fasten insulation according to requirements in SPRI's Directory of Roof Assemblies for specified Wind Uplift Load Capacity.
    - 2) Fasten insulation to resist specified uplift pressure at corners, perimeter, and field of roof.
  2. Install upper layers of insulation and tapered insulation with joints of each layer offset not less than 12 inches from previous layer of insulation.
    - a. Staggered end joints within each layer not less than 24 inches in adjacent rows.
    - b. Install with long joints continuous and with end joints staggered not less than 12 inches in adjacent rows.
    - c. Make joints between adjacent insulation boards not more than 1/4 inch in width.
    - d. Fill gaps exceeding 1/4 inch with insulation.
    - e. Adhere each layer of insulation to substrate using adhesive according to SPRI's Directory of Roof Assemblies listed roof assembly requirements for specified Wind Uplift Load Capacity and FM Global Property Loss Prevention Data Sheet 1-29, as follows:
      - 1) Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.
- D. Installation Over Concrete Decks:
1. Install base layer of insulation with joints staggered not less than 24 inches in adjacent rows.
    - a. Where installing composite and noncomposite insulation in two or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
    - b. Make joints between adjacent insulation boards not more than 1/4 inch in width.
    - c. Fill gaps exceeding 1/4 inch with insulation.
    - d. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
    - e. Adhere base layer of insulation to vapor retarder according to SPRI's Directory of Roof Assemblies listed roof assembly requirements for specified Wind Uplift Load Capacity and FM Global Property Loss Prevention Data Sheet 1-29, as follows:
      - 1) Set insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.
  2. Install upper layers of insulation and tapered insulation with joints of each layer offset not less than 12 inches from previous layer of insulation.
    - a. Staggered end joints within each layer not less than 24 inches in adjacent rows.
    - b. Install with long joints continuous and with end joints staggered not less than 12 inches in adjacent rows.
    - c. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
    - d. Make joints between adjacent insulation boards not more than 1/4 inch in width.
    - e. Fill gaps exceeding 1/4 inch with insulation.
    - f. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
    - g. Adhere each layer of insulation to substrate using adhesive according to SPRI's Directory of Roof Assemblies listed roof assembly requirements for specified Wind Uplift Load Capacity and FM Global Property Loss Prevention Data Sheet 1-29, as follows:
      - 1) Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

### 3.4 INSTALLATION OF COVER BOARDS

- A. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches in each direction.
  1. Trim cover board neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
  2. Cut and fit cover board tight to nailers, projections, and penetrations.
  3. Adhere cover board to substrate using adhesive according to SPRI's Directory of Roof Assemblies listed roof assembly requirements for specified Wind Uplift Load Capacity and FM Global Property Loss Prevention Data Sheet 1-29, as follows:
    - a. Set cover board in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.



### **3.5 INSTALLATION OF ADHERED ROOF MEMBRANE**

- A. Adhere roof membrane over area to receive roofing according to roofing system manufacturer's written instructions.
- B. Unroll roof membrane and allow to relax before installing.
- C. Start installation of roofing in presence of roofing system manufacturer's technical personnel.
- D. Accurately align roof membrane, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- E. Bonding Adhesive: Apply to substrate and underside of roof membrane at rate required by manufacturer, and allow to partially dry before installing roof membrane. Do not apply to splice area of roof membrane.
- F. Fabric-Backed Roof Membrane Adhesive: Apply to substrate at rate required by manufacturer, and install fabric-backed roof membrane.
- G. In addition to adhering, mechanically fasten roof membrane securely at terminations, penetrations, and perimeter of roofing.
- H. Apply roof membrane with side laps shingled with slope of roof deck where possible.
- I. Seams: Clean seam areas, overlap roofing, and hot-air weld side and end laps of roof membrane and sheet flashings to ensure a watertight seam installation.
  - 1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roof membrane and sheet flashings.
  - 2. Verify field strength of seams a minimum of twice daily, and repair seam sample areas.
  - 3. Repair tears, voids, and lapped seams in roof membrane that do not comply with requirements.
- J. Spread sealant bed over deck-drain flange at roof drains, and securely seal roof membrane in place with clamping ring.

### **3.6 INSTALLATION OF MECHANICALLY FASTENED ROOF MEMBRANE**

- A. Mechanically fasten roof membrane over area to receive roofing according to roofing system manufacturer's written instructions.
- B. Unroll roof membrane and allow to relax before installing.
- C. For in-splice attachment, install roof membrane with long dimension perpendicular to steel roof deck flutes.
- D. Start installation of roofing in presence of roofing system manufacturer's technical personnel.
- E. Accurately align roof membrane, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- F. Mechanically fasten or adhere roof membrane securely at terminations, penetrations, and perimeter of roofing.
- G. Apply roof membrane with side laps shingled with slope of roof deck where possible.
- H. In-Seam Attachment: Secure one edge of PVC sheet using fastening plates or metal battens centered within seam, and mechanically fasten PVC sheet to roof deck.
- I. Seams: Clean seam areas, overlap roof membrane, and hot-air weld side and end laps of roof membrane and sheet flashings to ensure a watertight seam installation.
  - 1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roof membrane and sheet flashings.

2. Verify field strength of seams a minimum of twice daily, and repair seam sample areas.
  3. Repair tears, voids, and lapped seams in roof membrane that do not comply with requirements.
- J. Spread sealant bed over deck-drain flange at roof drains, and securely seal roof membrane in place with clamping ring.

### **3.7 INSTALLATION OF BASE FLASHING**

- A. Install sheet flashings and preformed flashing accessories, and adhere to substrates according to roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate, and allow to partially dry. Do not apply to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.
- E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

### **3.8 PROTECTING AND CLEANING**

- A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing, inspect roofing system for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

**END OF SECTION 07 5419**

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**5 YR  
ROOFING WARRANTY**

WHEREAS \_\_\_\_\_

of (Address) \_\_\_\_\_

herein called the "Roofing Contractor", has performed roofing and associated ("work") on following project:

Owner: \_\_\_\_\_

DPW PROJECT NO: \_\_\_\_\_

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

Name and Type of Building: \_\_\_\_\_

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

Area of Work: \_\_\_\_\_ Date of Acceptance: \_\_\_\_\_

Warranty Period: Five (5) years Date of Expiration: \_\_\_\_\_

AND WHEREAS Roofing Contractor has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period.

NOW THEREFORE Roofing Contractor hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work, and as are necessary to maintain said work in watertight condition. In addition to making the work watertight, the Roofing Contractor shall remove and/or repair blisters, ridges, flashings, splits and other irregularities which in the opinion of the Roofing Manufacturer's technical representative do not conform to acceptable roofing practices and conditions. These repairs shall be made prior to expiration of the five (5) year Warranty Period and to the satisfaction of the Roofing Manufacturer's technical representative.

This Warranty is made subject to the following terms and conditions:

1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by: a) lightning, windstorm; b) fire; c) failure of roofing system substrate including cracking, settlement, excessive deflection, deterioration, and decomposition; d) faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work; and e) activity on roofing by others including construction contractors, maintenance personnel, other persons, and animals whether authorized or unauthorized by Owner.

When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Contractor, and until cost and expense thereof has been paid by Owner or by another responsible party so designated.

2. The Roofing Contractor is responsible for damage to work covered by this Warranty, but is not liable for consequential damages to building or building contents, resulting from leaks or faults or defects of work.

3. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Contractor, including cutting, patching and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void upon date of said alterations, but only to extent said alterations affect work covered by this Warranty. If Owner engages Roofing Contractor to perform said alterations, Warranty shall not become null and void, unless Roofing Contractor, prior to proceeding with said work, shall claim that said alterations would like damage or deteriorate work, thereby reasonably justifying a limitation or termination of this warranty.

4. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void upon date of said change, but only to extent said change affects work covered by this Warranty.

5. The Owner shall promptly notify Roofing Contractor of observed, known or suspected leaks, defect or deterioration, and shall afford reasonable opportunity for Roofing Contractor to inspect work, and to examine evidence of such leaks, defects or deterioration.

6. This Warranty is recognized to be the only Warranty of Roofing Contractor on said work, and is in addition to the Roofing Guarantee furnished by the Roofing Manufacturer, and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to him in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Contractor of responsibility for performance of original work in accordance with requirements of the Contract Documents, regardless of whether

Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

IN WITNESS THEREOF, this instrument has been duly executed this

\_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_

Cosigned by General Contractor by:

\_\_\_\_\_  
(General Contractor)

\_\_\_\_\_  
(Roofing Contractor)

\_\_\_\_\_  
(Business Address)

\_\_\_\_\_  
(Business Address)

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Signature)

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

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(Title)

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**30 YEAR  
GUARANTY FOR SINGLE-PLY ROOFING**

WHEREAS, \_\_\_\_\_, corporation whose address is \_\_\_\_\_, hereinafter called the Manufacturer, has manufactured and sold and caused to have applied, pursuant to the specifications and inspection, the necessary roofing materials to construct a \_\_\_\_\_ roof of approximately \_\_\_\_\_ square feet, and associated roof flashing of approximately \_\_\_\_\_ linear feet on the building described below:

OWNER: State of Idaho, Division of Public Works

DPW PROJECT NO: \_\_\_\_\_

BUILDING: \_\_\_\_\_

LOCATION: \_\_\_\_\_

DATE OF COMPLETION OF ROOFING: \_\_\_\_\_, 20\_\_\_\_.

ROOFING CONTRACTOR: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

ROOFING SPECIFICATION: \_\_\_\_\_

MANUFACTURER'S GUARANTEE NO: \_\_\_\_\_

AND WHEREAS, by careful examination of said roof by the Manufacturer's representative, it has been determined that required quantities of roofing materials have been used and that roofing materials have been applied in conformance with contract documents;

AND WHEREAS, Manufacturer represents and wishes to guarantee, subject to the limits stated herein, that its roofing when so applied is effectively watertight for a period of **thirty (30) years** despite normal wear and tear by the elements, as well as guaranteeing it against defects in workmanship or materials; which result in leaks.

NOW THEREFORE, said Manufacturer guarantees to the said Owner that, as set forth below, during a period of **thirty (30) years** from the date of substantial completion of said single-ply roofing described above, Manufacturer will at its own expense, make or cause to be made, any repairs that may be necessary, as a result of defects in workmanship or materials supplied by the Manufacturer which results in leaks or of normal wear and tear by the elements which results



in leaks, and will maintain said roof in water tight condition free from all leaks arising from such causes. For purposes of this Guaranty, damage to the roof caused by hurricanes, lightning, tornadoes, gales, hailstorms or other unusual natural phenomena shall not be deemed to be "normal wear and tear by the elements".

**INCLUSIONS:** This Guaranty does cover, and Manufacturer shall be liable for the following:

1. Roofing membrane, membrane flashings, metal flashings, mechanical fastening system, anchors, adhesives, seaming materials, slip sheets, fabrics, insulations, underlayments, and accessories furnished by the Manufacturer as incorporated into the roof membrane system.
2. Replacement of roof insulation and vapor barrier damages by any leakage and/or failure of the roof membrane assembly;
3. Repair of blisters, buckles, splits, breaks, cracks, and seam failures in membrane system.

**EXCLUSIONS:** This Guaranty does not cover, and Manufacturer shall not be liable for the following:

1. Metal work, including metal counter flashings, not a part of the roof membrane system and such damage as may result from application of these materials;
2. Any damage to the roof caused by structural defect in, or failure of, the building or defects in, or failure of, any structural roof deck, or other sheathing materials, used as the base over which the roof and roof insulation is applied;
3. Roof damage from special chemical conditions not disclosed to Manufacturer;
4. Any damage to the building or contents thereof, except replacement of damaged roof insulation and vapor barrier as noted under "INCLUSION" above;
5. Roof damage through use of materials after original installation not furnished by Manufacturer;
6. Damage to the roof due to mechanical abrasion or abuse not caused by the Manufacturer.
7. Reasonable care and maintenance will be the responsibility of the Owner.

**INSPECTION AND REPAIR:** During the term of this Guarantee, Manufacturer, its agents or employees, shall have free access to the roof during regular business hours. Upon written notice by Owner to Manufacturer within four days of the discovery of any leaks in the roofing system, or need of repair of roof, the Manufacturer shall have ten (10) days to inspect the roof. Following such inspection:

1. Manufacturer, at its own expense shall make such repairs to thereof as are required by the Guaranty.

2. In case owner or his agent has notified Manufacturer in writing that repairs are required and such repairs are not covered by the Guaranty (including repairs required by owner's alteration, extension or addition to the roof) Owner, after having obtained Manufacturer's consent thereto, in writing, shall make or cause to be made, such repairs at Owner's expense in accordance with specifications and procedures as established by Manufacturer and this Guaranty shall thereupon remain in effect for the un-expired portion of its original term. If Owner fails to obtain authorization from Manufacturer or if repairs are made by one other than the Manufacturer's authorized designee, this Guaranty with respect to such area shall be automatically terminated.
  
3. In the event the (1) Owner notifies Manufacturer and has confirmed in writing the need of repair of roof and (2) Manufacturer is unable to promptly inspect and repair same, and (3) an emergency condition exists which requires prompt repair in order to avoid substantial damage to owner, then owner may make such temporary repairs as may be essential and any such action shall not be a breach of the provision of this Guaranty. Owner will bear emergency repair expenses.

INSPECTION SERVICE: Manufacturer agrees to re-inspect the completed roof not earlier than 12 nor later than 24 months after completion of the roofing, and if it is determined that there are leaks in the roofing, then Manufacturer shall make, or cause to be made at its own expense, such repairs as are necessary in the opinion of the Manufacturer, to assure watertight integrity of the roof within the scope of its' responsibility under the terms of this Guaranty.

IN WITNESS WHEREOF, Manufacturer has caused this instrument to be signed and sealed by its duly authorized officer this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

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

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

CORPORATION: \_\_\_\_\_

SEAL:

\_\_\_\_\_  
Pat Donaldson, Administrator  
Division of Public Works

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

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Formed roof-drainage sheet metal fabrications.

#### **1.2 QUALITY ASSURANCE**

- A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
  - 1. For copings and roof edge flashings that are ANSI/SPRI/FM 4435/ES-1 tested, shop shall be listed as able to fabricate required details as tested and approved.

#### **1.3 WARRANTY**

- A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
    - a. Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.
    - b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
    - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
  - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

### **PART 2 - PRODUCTS**

#### **2.1 PERFORMANCE REQUIREMENTS**

- A. Sheet metal flashing and trim assemblies, including cleats, anchors, and fasteners, shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual: Architectural Metal Flashing, Condensation and Air Leakage Control, and Reroofing" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- C. FM Approvals Listing: Manufacture and install roof edge flashings that are listed in FM Approvals' "RoofNav" and approved for windstorm classification, Class 1-90. Identify materials with name of fabricator and design approved by FM Approvals.
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

#### **2.2 SHEET METALS**

- A. Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.
- B. Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet in accordance with ASTM A653/A653M, G90 coating designation; prepainted by coil-coating process to comply with ASTM A755/A755M.
  - 1. Surface: Smooth, flat.

2. Exposed Coil-Coated Finish:
  - a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
3. Color: White.
4. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil.

### 2.3 MISCELLANEOUS MATERIALS

- A. Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal.
  1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
    - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
    - b. Blind Fasteners: High-strength aluminum or stainless steel rivets suitable for metal being fastened.
    - c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.
  2. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel in accordance with ASTM A153/A153M or ASTM F2329.
- C. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
- D. Elastomeric Sealant: ASTM C920, elastomeric silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- E. Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- F. Bituminous Coating: Cold-applied asphalt emulsion in accordance with ASTM D1187/D1187M.
- G. Asphalt Roofing Cement: ASTM D4586, asbestos free, of consistency required for application.

### 2.4 FABRICATION, GENERAL

- A. Custom fabricate sheet metal flashing and trim to comply with details indicated and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required.
  1. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
  2. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
  3. Verify shapes and dimensions of surfaces to be covered and obtain field measurements for accurate fit before shop fabrication.
  4. Form sheet metal flashing and trim to fit substrates without excessive oil-canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
  5. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.
- B. Fabrication Tolerances:
  1. Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.
  2. Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified.
- C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.

1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
  2. Use lapped expansion joints only where indicated on Drawings.
- D. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal in accordance with cited sheet metal standard to provide for proper installation of elastomeric sealant.
- E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
- F. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard for application, but not less than thickness of metal being secured.
- G. Seams:
1. Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.
  2. Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.

## 2.5 ROOF-DRAINAGE SHEET METAL FABRICATIONS

- A. Hanging Gutters:
1. Fabricate to cross section required, complete with end pieces, outlet tubes, and other accessories as required.
  2. Fabricate in minimum 96-inch-long sections.
  3. Furnish flat-stock gutter brackets and flat-stock gutter spacers and straps fabricated from same metal as gutters, of size recommended by cited sheet metal standard, but with thickness not less than twice the gutter thickness.
  4. Fabricate expansion joints, expansion-joint covers, and gutter accessories from same metal as gutters. Shop fabricate interior and exterior corners.
  5. Gutters with Girth up to 15 Inches: Fabricate from the following materials:
    - a. Galvanized Steel: 0.028 inch thick.
- B. Downspouts: Fabricate rectangular open-face downspouts to dimensions indicated on Drawings, complete with mitered elbows. Furnish with metal hangers from same material as downspouts and anchors. Shop fabricate elbows.
1. Fabricate from the following materials:
    - a. Galvanized Steel: 0.028 inch thick.

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Install sheet metal flashing and trim to comply with details indicated and recommendations of cited sheet metal standard that apply to installation characteristics required unless otherwise indicated on Drawings.
1. Install fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
  2. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of sealant.
  3. Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement.
  4. Install sheet metal flashing and trim to fit substrates and to result in watertight performance.
  5. Install continuous cleats with fasteners spaced not more than 12 inches o.c.
  6. Space individual cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
  7. Install exposed sheet metal flashing and trim with limited oil-canning, and free of buckling and tool marks.
  8. Do not field cut sheet metal flashing and trim by torch.
- B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.

1. Coat concealed side of sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
  2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim.
1. Space movement joints at maximum of 10 feet with no joints within 24 inches of corner or intersection.
  2. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
  3. Use lapped expansion joints only where indicated on Drawings.
- D. Fasteners: Use fastener sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.
- E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.
- F. Seal joints as required for watertight construction.
1. Use sealant-filled joints unless otherwise indicated.
    - a. Embed hooked flanges of joint members not less than 1 inch into sealant.
    - b. Form joints to completely conceal sealant.
    - c. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way.
    - d. Adjust setting proportionately for installation at higher ambient temperatures.
      - 1) Do not install sealant-type joints at temperatures below 40 deg F.
  2. Prepare joints and apply sealants to comply with requirements in Section 07 9200 "Joint Sealants."
- G. Rivets: Rivet joints in where necessary for strength.

### **3.2 INSTALLATION OF ROOF-DRAINAGE SYSTEM**

- A. Install sheet metal roof-drainage items to produce complete roof-drainage system in accordance with cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system.
- B. Hanging Gutters:
1. Join sections with joints sealed with sealant.
  2. Provide for thermal expansion.
  3. Attach gutters at eave or fascia to firmly anchor them in position.
  4. Provide end closures and seal watertight with sealant.
  5. Slope to downspouts.
  6. Install gutter with expansion joints at locations indicated on Drawings, but not exceeding, 50 feet apart. Install expansion-joint caps.
- C. Downspouts:
1. Join sections with 1-1/2-inch telescoping joints.
  2. Provide hangers with fasteners designed to hold downspouts securely to walls.
  3. Locate hangers at top and bottom and at approximately 60 inches o.c.
  4. Provide elbows at base of downspout to direct water away from building.

### **3.3 INSTALLATION OF ROOF FLASHINGS**

- A. Install sheet metal flashing and trim to comply with performance requirements and cited sheet metal standard.
1. Provide concealed fasteners where possible, and set units true to line, levels, and slopes.
  2. Install work with laps, joints, and seams that are permanently watertight and weather resistant.
- B. Roof Edge Flashing:
1. Install roof edge flashings in accordance with ANSI/SPRI/FM 4435/ES-1.

2. Anchor to resist uplift and outward forces in accordance with recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3-inch centers.
  3. Anchor to resist uplift and outward forces in accordance with recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for FM Approvals' listing for required windstorm classification.
- C. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches over base flashing. Install stainless steel draw band and tighten.
- D. Counterflashing: Coordinate installation of counterflashing with installation of base flashing.
1. Insert counterflashing in reglets or receivers and fit tightly to base flashing.
  2. Extend counterflashing 4 inches over base flashing.
  3. Lap counterflashing joints minimum of 4 inches.
- E. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric sealant and clamp flashing to pipes that penetrate roof.

### **3.4 INSTALLATION TOLERANCES**

- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

### **3.5 CLEANING**

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder.
- C. Clean off excess sealants.

### **3.6 PROTECTION**

- A. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions.
- B. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures, as determined by Architect.

**END OF SECTION 07 6200**



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

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

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

#### **1.2 PRECONSTRUCTION TESTING**

- A. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers eight samples of materials that will contact or affect joint sealants. Use manufacturer's standard test method to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
  - 1. Testing will not be required if joint sealant manufacturers submit joint preparation data that are based on previous testing of current sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.
- B. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates. Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

#### **1.3 ACTION SUBMITTALS**

- A. Product Data: For each joint-sealant product indicated.
- B. Samples: For each kind and color of joint sealant required.
- C. Joint-Sealant Schedule: Include the following information:
  - 1. Joint-sealant application, joint location, and designation.
  - 2. Joint-sealant manufacturer and product name.
  - 3. Joint-sealant formulation.
  - 4. Joint-sealant color.

#### **1.4 INFORMATIONAL SUBMITTALS**

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

#### **1.5 QUALITY ASSURANCE**

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

## 1.6 WARRANTY

- A. Special Installer's Warranty: Manufacturer's standard form in which Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
1. Warranty Period: Three years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MATERIALS, GENERAL

- A. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
1. Suitability for Immersion in Liquids. Where sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247. Liquid used for testing sealants is deionized water, unless otherwise indicated.
- B. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- C. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.

### 2.2 SILICONE JOINT SEALANTS

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

### 2.3 URETHANE JOINT SEALANTS

- A. Single-Component Nonsag Urethane Joint Sealant: ASTM C 920.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. BASF Building Systems, Sonneborn, NP1.
    - b. Mameco International, Vulkem 245.
    - c. Pecora Corporation, Dynatrol I.
    - d. Tremco Incorporated, DyMonic.
  2. Type: Single-component (S).

3. Grade: Nonsag (NS).
4. Class: 25.
5. Uses Related to Exposure: Nontraffic (NT).

B. Multi-Component Pourable Urethane Joint Sealant: ASTM C 920.

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

## 2.4 LATEX JOINT SEALANTS

A. Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. BASF Building Systems, Sonneborn, ChemRex, Inc., Sonolac.
  - b. Pecora Corporation, AC-20.
  - c. Tremco Incorporated, Tremflex 834.

## 2.5 JOINT SEALANT BACKING

- A. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), Type O (open-cell material), Type B (bicellular material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- B. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer.

## 2.6 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions.
  1. Remove laitance and form-release agents from concrete.
  2. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

### 3.2 INSTALLATION

- A. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- B. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
  - 1. Do not leave gaps between ends of sealant backings.
  - 2. Do not stretch, twist, puncture, or tear sealant backings.
  - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- C. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- D. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
  - 1. Place sealants so they directly contact and fully wet joint substrates.
  - 2. Completely fill recesses in each joint configuration.
  - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
  - 1. Remove excess sealant from surfaces adjacent to joints.
  - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
  - 3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.
- F. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

### 3.3 FIELD QUALITY CONTROL

- A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:
  - 1. Extent of Testing: Test completed and cured sealant joints as follows:
    - a. Perform 10 tests for the first 1000 feet of joint length for each kind of sealant and joint substrate.
    - b. Perform 1 test for each 1000 feet of joint length thereafter or 1 test per each floor per elevation.
  - 2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.
- B. Evaluation of Field-Adhesion Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

### 3.4 JOINT-SEALANT SCHEDULE

- A. Joint-Sealant Application: Interior joints in field-painted vertical surfaces and horizontal nontraffic surfaces.
  - 1. Joint Locations:
    - a. Control and expansion joints on exposed interior surfaces of exterior walls.
    - b. Perimeter joints of exterior openings where indicated.
    - c. Vertical joints on exposed surfaces of interior unit masonry, concrete, walls and partitions.
    - d. Perimeter joints between interior wall surfaces and frames of interior doors, windows and elevator entrances.

- e. Other joints as indicated.
  2. Joint Sealant: Latex.
  3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- B. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Sealant Location:
    - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
    - b. Tile control and expansion joints where indicated.
    - c. Other joints as indicated.
  2. Joint Sealant: Mildew Resistant Silicone.
  3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

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08 7100	DOOR HARDWARE
08 8000	GLAZING





## SECTION 08 1113 - HOLLOW METAL DOORS AND FRAMES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes hollow-metal work.

#### 1.2 DEFINITIONS

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

#### 1.3 ACTION SUBMITTALS

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

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Product test reports.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

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

#### 2.2 REGULATORY REQUIREMENTS

- A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings and temperature-rise limits indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
  1. Smoke- and Draft-Control Assemblies: Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.

- B. Fire-Rated, Borrowed-Light Assemblies: Complying with NFPA 80 and listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.

### 2.3 INTERIOR DOORS AND FRAMES

- A. Heavy-Duty Doors and Frames: SDI A250.8, Level 2..
  - 1. Physical Performance: Level A according to SDI A250.4.
  - 2. Doors:
    - a. Type: As indicated in the Door and Frame Schedule.
    - b. Thickness: 1-3/4 inches.
    - c. Face: Uncoated, cold-rolled steel sheet, minimum thickness of 0.042 inch.
    - d. Edge Construction: Model 2, Seamless.
    - e. Core: Manufacturer's standard.
  - 3. Frames:
    - a. Materials: Uncoated, steel sheet, minimum thickness of 0.053 inch.
    - b. Construction: Face welded.
  - 4. Exposed Finish: Prime.

### 2.4 EXTERIOR HOLLOW-METAL DOORS AND FRAMES

- A. Maximum Duty Doors and Frames: SDI A250.8, Level 4..
  - 1. Physical Performance: Level A according to SDI A250.4.
  - 2. Doors:
    - a. Type: As indicated in the Door and Frame Schedule.
    - b. Thickness: 1-3/4 inches.
    - c. Face: Metallic-coated steel sheet, minimum thickness of 0.067 inch, with minimum A40 coating.
    - d. Edge Construction: Model 2, Seamless.
    - e. Core: Manufacturer's standard insulation material.
  - 3. Thermal-Rated Doors: Provide doors fabricated with thermal-resistance value (R-value) of not less than 2.1 deg F x h x sq. ft./Btu when tested according to ASTM C 1363.
  - 4. Frames:
    - a. Materials: Metallic-coated steel sheet, minimum thickness of 0.067 inch, with minimum A40 coating.
    - b. Construction: Face welded.
  - 5. Exposed Finish: Prime.

### 2.5 FRAME ANCHORS

- A. Jamb Anchors:
  - 1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
  - 2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
  - 3. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch-diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.
- B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch, and as follows:
  - 1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
  - 2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at finish floor surface.

### 2.6 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

- B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.
  - 1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.
- D. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- E. Power-Actuated Fasteners in Concrete: From corrosion-resistant materials.
- F. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to ASTM C 143/C 143M.
- G. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing).
- H. Glazing: Section 08 8000 "Glazing."
- I. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil dry film thickness per coat.

## 2.7 FABRICATION

- A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Hollow-Metal Doors:
  - 1. Exterior Doors: Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
  - 2. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated.
- C. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
  - 1. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
  - 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
  - 3. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
  - 4. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.
  - 5. Jamb Anchors: Provide number and spacing of anchors as follows:
    - a. Masonry Type: Locate anchors not more than 16 inches from top and bottom of frame. Space anchors not more than 32 inches o.c., to match coursing, and as follows:
      - 1) Two anchors per jamb up to 60 inches high.
      - 2) Three anchors per jamb from 60 to 90 inches high.
      - 3) Four anchors per jamb from 90 to 120 inches high.
      - 4) Four anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
    - b. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
      - 1) Three anchors per jamb up to 60 inches high.
      - 2) Four anchors per jamb from 60 to 90 inches high.
      - 3) Five anchors per jamb from 90 to 96 inches high.
      - 4) Five anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
    - c. Postinstalled Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.
  - 6. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers.

- a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
  - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- D. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
  2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.
- E. Stops and Moldings: Provide stops and moldings around glazed lites and louvers where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow-metal work.
  2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
  3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
  4. Provide loose stops and moldings on inside of hollow-metal work.
  5. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.

## 2.8 STEEL FINISHES

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

## 2.9 ACCESSORIES

- A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.
- B. Grout Guards: Formed from same material as frames, not less than 0.016 inch thick.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Hollow-Metal Frames: Install hollow-metal frames of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.
1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
    - a. At fire-rated openings, install frames according to NFPA 80.
    - b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
    - c. Install frames with removable stops located on secure side of opening.
    - d. Install door silencers in frames before grouting.
    - e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
    - f. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
    - g. Field apply bituminous coating to backs of frames that will be filled with grout containing antifreezing agents.
  2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
    - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
  3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation inside frames.
  4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
  5. Concrete Walls: Solidly fill space between frames and concrete with mineral-fiber insulation.

6. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
  7. In-Place Metal or Wood-Stud Partitions: Secure slip-on drywall frames in place according to manufacturer's written instructions.
  8. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
    - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
    - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
    - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
    - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.
- B. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.
1. Non-Fire-Rated Steel Doors:
    - a. Between Door and Frame Jambs and Head: 1/8 inch plus or minus 1/32 inch.
    - b. Between Edges of Pairs of Doors: 1/8 inch to 1/4 inch plus or minus 1/32 inch.
    - c. At Bottom of Door: 5/8 inch plus or minus 1/32 inch.
    - d. Between Door Face and Stop: 1/16 inch to 1/8 inch plus or minus 1/32 inch.
  2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
  3. Smoke-Control Doors: Install doors and gaskets according to NFPA 105.
- C. Glazing: Comply with installation requirements in Section 08 8000 "Glazing" and with hollow-metal manufacturer's written instructions.
1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

### 3.2 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.
- B. Remove grout and other bonding material from hollow-metal work immediately after installation.
- C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- D. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

**END OF SECTION 08 1113**

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## **SECTION 08 1416 - FLUSH WOOD DOORS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Solid-core doors with wood-veneer faces.
  - 2. Factory finishing flush wood doors.
- B. Related Requirements:
  - 1. Section 08 8000 "Glazing" for glass view panels in flush wood doors.

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of door. Include factory-finishing specifications.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:
  - 1. Dimensions and locations of blocking.
  - 2. Dimensions and locations of mortises and holes for hardware.
  - 3. Dimensions and locations of cutouts.
  - 4. Undercuts.
  - 5. Requirements for veneer matching.
  - 6. Doors to be factory finished and finish requirements.
- C. Samples: For factory-finished doors.

#### **1.3 INFORMATIONAL SUBMITTALS**

- A. Sample Warranty: For special warranty.
- B. Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

#### **1.4 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: A qualified manufacturer that is a certified participant in AWI's Quality Certification Program.

#### **1.5 WARRANTY**

- A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
    - b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
  - 2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
  - 3. Warranty Period for Solid-Core Interior Doors: Life of installation.

### **PART 2 - PRODUCTS**

#### **2.1 MANUFACTURERS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Algoma Hardwoods, Inc.
  - 2. Eggers Industries.



3. Graham Wood Doors; an Assa Abloy Group company.
4. Marshfield Door Systems, Inc.
5. Oshkosh Door Company.
6. Vancouver Door Company.
7. VT Industries, Inc.

## **2.2 FLUSH WOOD DOORS, GENERAL**

- A. Quality Standard: In addition to requirements specified, comply with AWI's, AWMAC's, and WI's "Architectural Woodwork Standards."
- B. Mineral-Core Doors:
  1. Core: Noncombustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire-protection rating indicated.
  2. Blocking: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated as needed to eliminate through-bolting hardware.
  3. Edge Construction: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.

## **2.3 VENEER-FACED DOORS FOR TRANSPARENT FINISH**

- A. Interior Solid-Core Doors:
  1. Grade: Premium, with Grade A faces.
  2. Species: Natural Maple.
  3. Cut: Rotary cut.
  4. Match between Veneer Leaves: Book match.
  5. Assembly of Veneer Leaves on Door Faces: Running match.
  6. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
  7. Core: Particleboard.
  8. Construction: Five plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before veneering.

## **2.4 LIGHT FRAMES AND LOUVERS**

- A. Metal Frames for Light Openings in Fire-Rated Doors: Manufacturer's standard frame formed of 0.048-inch-thick, cold-rolled steel sheet; factory primed for paint finish; and approved for use in doors of fire-protection rating indicated.

## **2.5 FABRICATION**

- A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
  1. Comply with NFPA 80 requirements for fire-rated doors.
- B. Openings: Factory cut and trim openings through doors.
  1. Light Openings: Trim openings with moldings of material and profile indicated.

## **2.6 FACTORY FINISHING**

- A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
  1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on bottom edges, edges of cutouts, and mortises.
- B. Factory finish doors that are indicated to receive transparent finish.
- C. Transparent Finish:
  1. Grade: Premium.

2. Finish: AWT's, AWMAC's, and WT's "Architectural Woodwork Standards" System 11, catalyzed polyurethane.
3. Staining: Match Architect's sample.
4. Effect: Open-grain finish.
5. Sheen: Semigloss.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Hardware: For installation, see Section 08 7100 "Door Hardware."
- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
  1. Install fire-rated doors according to NFPA 80.
  2. Install smoke- and draft-control doors according to NFPA 105.
- C. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
  1. Clearances: Provide 1/8 inch at heads, jambs, and between pairs of doors. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 1/4 inch from bottom of door to top of threshold unless otherwise indicated.
    - a. Comply with NFPA 80 for fire-rated doors.
- D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

#### **3.2 ADJUSTING**

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

**END OF SECTION 08 1416**

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## **SECTION 08 4113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
1. Storefront framing.
  2. Storefront framing for punched openings.
  3. Manual-swing entrance doors.

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Shop Drawings: For aluminum-framed entrances and storefronts. Include plans, elevations, sections, full-size details, and attachments to other work.
- C. Samples: For each type of exposed finish required.
- D. Entrance Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams.

#### **1.3 CLOSEOUT SUBMITTALS**

- A. Maintenance data.

#### **1.4 QUALITY ASSURANCE**

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.
1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

#### **1.5 WARRANTY**

- A. Special Warranty: Manufacturer agrees to repair or replace components of aluminum-framed entrances and storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
1. Warranty Period: Five years from date of Substantial Completion.
- B. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.
1. Warranty Period: 20 years from date of Substantial Completion.

### **PART 2 - PRODUCTS**

#### **2.1 PERFORMANCE REQUIREMENTS**

- A. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.

1. Aluminum-framed entrances and storefronts shall withstand movements of supporting structure, including, but not limited to, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
  2. Failure also includes the following:
    - a. Thermal stresses transferring to building structure.
    - b. Glass breakage.
    - c. Noise or vibration created by wind and thermal and structural movements.
    - d. Loosening or weakening of fasteners, attachments, and other components.
    - e. Failure of operating units.
- B. Structural Loads:
1. Wind Loads: As indicated on Drawings.
- C. Air Infiltration: Test according to ASTM E 283 for infiltration as follows:
1. Fixed Framing and Glass Area:
    - a. Maximum air leakage of 0.06 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft..
  2. Entrance Doors:
    - a. Single Doors: Maximum air leakage of 0.5 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft..
- D. Water Penetration under Static Pressure: Test according to ASTM E 331 as follows:
1. No evidence of water penetration through fixed glazing and framing areas, including entrance doors, when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft..
- E. Energy Performance: Certify and label energy performance according to NFRC as follows:
1. Thermal Transmittance (U-factor): Fixed glazing and framing areas as a system shall have U-factor of not more than 0.41 Btu/sq. ft. x h x deg F as determined according to NFRC 100.
  2. Solar Heat Gain Coefficient (SHGC): Fixed glazing and framing areas as a system shall have SHGC of no greater than 0.40 as determined according to NFRC 200.
  3. Condensation Resistance: Fixed glazing and framing areas as a system shall have an NFRC-certified condensation resistance rating of no less than 45 as determined according to NFRC 500.
- F. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes.
1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

## 2.2 STOREFRONT SYSTEMS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Kawneer North America; an Alcoa company; Trifab VG 451 center glazed or a comparable product by one of the following:
1. Arcadia, Inc.
  2. EFCO Corporation.
  3. Oldcastle BuildingEnvelope™.
  4. Pittco Architectural Metals, Inc.
  5. Tubelite Inc.
- B. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
1. Exterior Framing Construction: Thermally broken.
  2. Interior Vestibule Framing Construction: Nonthermal.
  3. Glazing System: Retained mechanically with gaskets on four sides.
  4. Finish: Color anodic finish.
  5. Fabrication Method: Field-fabricated stick system.
  6. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
  7. Steel Reinforcement: As required by manufacturer.
- C. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.

- D. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

### 2.3 ENTRANCE DOOR SYSTEMS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Kawneer North America; an Alcoa company; **500 Tuffline** or a comparable product by one of the following:
  - 1. Arcadia, Inc.
  - 2. EFCO Corporation.
  - 3. Oldcastle BuildingEnvelope™.
  - 4. Pittco Architectural Metals, Inc.
  - 5. Tubelite Inc.
- B. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing or automatic operation.
  - 1. Door Construction: 2-inch overall thickness, with minimum 0.188-inch- thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
    - a. Thermal Construction: High-performance plastic connectors separate aluminum members exposed to the exterior from members exposed to the interior.
  - 2. Door Design: Wide stile; 5-inch nominal width.
  - 3. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.
    - a. Provide nonremovable glazing stops on outside of door.

### 2.4 ENTRANCE DOOR HARDWARE

- A. Entrance Door Hardware: Hardware not specified in this Section is specified in Section 08 7100 "Door Hardware."
- B. General: Provide entrance door hardware and entrance door hardware sets indicated in "Entrance Door Hardware Sets" Article for each entrance door, to comply with requirements in this Section.
  - 1. Entrance Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturers' products.
  - 2. Opening-Force Requirements:
    - a. Egress Doors: Not more than 15 lbf to release the latch and not more than 30 lbf to set the door in motion.
    - b. Accessible Interior Doors: Not more than 5 lbf to fully open door.
- C. Designations: Requirements for design, grade, function, finish, quantity, size, and other distinctive qualities of each type of entrance door hardware are indicated in "Entrance Door Hardware Sets" Article. Products are identified by using entrance door hardware designations as follows:
  - 1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in "Entrance Door Hardware Sets" Article.
  - 2. References to BHMA Standards: Provide products complying with these standards and requirements for description, quality, and function.
- D. Cylinders: As specified in Section 08 7100 "Door Hardware."
- E. Continuous-Gear Hinges: BHMA A156.26.
- F. Mortise Auxiliary Locks: BHMA A156.5, Grade 1.
- G. Cylinders: BHMA A156.5, Grade 1.
  - 1. Keying: Master key system. Permanently inscribe each key with a visual key control number and include notation "DO NOT DUPLICATE".
- H. Strikes: Provide strike with black-plastic dust box for each latch or lock bolt; fabricated for aluminum framing.

- I. Operating Trim: BHMA A156.6.
- J. Removable Mullions: BHMA A156.3 extruded aluminum.
  - 1. When used with panic exit devices, provide removable mullions listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305. Use only mullions that have been tested with exit devices to be used.
- K. Closers: BHMA A156.4, Grade 1, with accessories required for a complete installation, sized as required by door size, exposure to weather, and anticipated frequency of use; adjustable to comply with field conditions and requirements for opening force.
- L. Door Stops: BHMA A156.16, Grade 1, floor or wall mounted, as appropriate for door location indicated, with integral rubber bumper.
- M. Weather Stripping: Manufacturer's standard replaceable components.
  - 1. Compression Type: Made of ASTM D 2000 molded neoprene or ASTM D 2287 molded PVC.
  - 2. Sliding Type: AAMA 701/702, made of wool, polypropylene, or nylon woven pile with nylon-fabric or aluminum-strip backing.
- N. Weather Sweeps: Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip.
- O. Thresholds: BHMA A156.21 raised thresholds beveled with a slope of not more than 1:2, with maximum height of 1/2 inch.

## **2.5 GLAZING**

- A. Glazing: Comply with Section 08 8000 "Glazing."
- B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.
- C. Glazing Sealants: As recommended by manufacturer.

## **2.6 MATERIALS**

- A. Sheet and Plate: ASTM B 209.
- B. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
- C. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.
- D. Structural Profiles: ASTM B 308/B 308M.
- E. Steel Reinforcement:
  - 1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
  - 2. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
  - 3. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.
  - 4. Primer: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM, and prepare surfaces according to applicable SSPC standard.

## **2.7 FABRICATION**

- A. Form or extrude aluminum shapes before finishing.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

- C. Fabricate components that, when assembled, have the following characteristics:
  - 1. Profiles that are sharp, straight, and free of defects or deformations.
  - 2. Accurately fitted joints with ends coped or mitered.
  - 3. Physical and thermal isolation of glazing from framing members.
  - 4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
  - 5. Provisions for field replacement of glazing from interior.
  - 6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.
- E. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.
- F. Entrance Doors: Reinforce doors as required for installing entrance door hardware.
- G. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.
- H. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

## **2.8 ALUMINUM FINISHES**

- A. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.
  - 1. Color: Black.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. General:
  - 1. Comply with manufacturer's written instructions.
  - 2. Do not install damaged components.
  - 3. Fit joints to produce hairline joints free of burrs and distortion.
  - 4. Rigidly secure nonmovement joints.
  - 5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
  - 6. Seal perimeter and other joints watertight unless otherwise indicated.
- B. Metal Protection:
  - 1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
  - 2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- C. Set continuous sill members and flashing in full sealant bed, as specified in Section 07 9200 "Joint Sealants," to produce weathertight installation.
- D. Install components plumb and true in alignment with established lines and grades.
- E. Install operable units level and plumb, securely anchored, and without distortion. Adjust weather-stripping contact and hardware movement to produce proper operation.
- F. Install glazing as specified in Section 08 8000 "Glazing."
- G. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.
  - 1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.



2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.








### 3.2 ENTRANCE DOOR HARDWARE SETS

#### Hardware Group No. AL01

For use on Door #(s):

100

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	112XY		US28	IVE
1	EA	REMOVABLE MULLION	KR4954 STAB		689	VON
1	EA	PANIC HARDWARE	98-EO		626	VON
1	EA	PANIC HARDWARE	98-NL		626	VON
1	EA	FSIC MORTISE CYL HOUSING	20-059		626	SCH
1	EA	FSIC RIM CYL HOUSING	20-079		626	SCH
2	EA	PRIMUS CORE	20-740 EV29 T		626	SCH
2	EA	SURFACE CLOSER	4040XP SCUSH		689	LCN
1	EA	Threshold, w/S, Sweep	By Door Supplier			KAW

**END OF SECTION 08 4113**

## **SECTION 08 7100 – DOOR HARDWARE**

### **PART 1 - GENERAL**

#### **1.01 SUMMARY**

- A. Section includes:
  - 1. Mechanical and electrified door hardware for:
    - a. Swinging doors.
  - 2. Field verification, preparation and modification of existing doors and frames to receive new door hardware.
- B. Section excludes:
  - 1. Windows
  - 2. Cabinets (casework), including locks in cabinets
  - 3. Signage
  - 4. Toilet accessories
  - 5. Overhead doors
- C. Related Sections:
  - 1. Division 01 Section “Alternates” for alternates affecting this section.
  - 2. Division 08 Sections:
    - a. “Metal Doors and Frames”
    - b. “Flush Wood Doors”
    - c. "Aluminum-Framed Entrances and Storefronts"
    - d.

#### **1.02 SUBMITTALS**

- A. General:
  - 1. Submit in accordance with Conditions of Contract and Division 01 Submittal Procedures.
  - 2. Prior to forwarding submittal:
    - a. Comply with procedures for verifying existing door and frame compatibility for new hardware, as specified in PART 3, “EXAMINATION” article, herein.
    - b. Review drawings and Sections from related trades to verify compatibility with specified hardware.
    - c. Highlight, encircle, or otherwise specifically identify on submittals: deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.
- B. Action Submittals:
  - 1. Product Data: Submit technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
  - 2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:
    - a. Wiring Diagrams: For power, signal, and control wiring and including:
      - 1) Details of interface of electrified door hardware and building safety and security systems.
      - 2) Schematic diagram of systems that interface with electrified door hardware.
      - 3) Point-to-point wiring.
      - 4) Risers.
  - 3. Samples for Verification: If requested by Architect, submit production sample of requested door hardware unit in finish indicated and tagged with full description for coordination with schedule.
    - a. Samples will be returned to supplier. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.
  - 4. Door Hardware Schedule:
    - a. Submit concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work critical in Project construction schedule.

- b. Submit under direct supervision of a Door Hardware Institute (DHI) certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule published by DHI.
  - c. Indicate complete designations of each item required for each opening, include:
    - 1) Door Index: door number, heading number, and Architect's hardware set number.
    - 2) Quantity, type, style, function, size, and finish of each hardware item.
    - 3) Name and manufacturer of each item.
    - 4) Fastenings and other pertinent information.
    - 5) Location of each hardware set cross-referenced to indications on Drawings.
    - 6) Explanation of all abbreviations, symbols, and codes contained in schedule.
    - 7) Mounting locations for hardware.
    - 8) Door and frame sizes and materials.
    - 9) Degree of door swing and handing.
    - 10) Operational Description of openings with electrified hardware covering egress, ingress (access), and fire/smoke alarm connections.
  5. Templates: After final approval of hardware schedule, provide templates for doors, frames and other work specified to be factory or shop prepared for door hardware installation.
- C. Informational Submittals:
1. Provide Qualification Data for Supplier, Installer and Architectural Hardware Consultant.
  2. Provide Product Data:
    - a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
    - b. Include warranties for specified door hardware.
- D. Closeout Submittals:
1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:
    - a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
    - b. Catalog pages for each product.
    - c. Factory order acknowledgement numbers (for warranty and service)
    - d. Name, address, and phone number of local representative for each manufacturer.
    - e. Parts list for each product.
    - f. Final approved hardware schedule edited to reflect conditions as installed.
    - g. Final keying schedule
    - h. Copies of floor plans with keying nomenclature
    - i. Copy of warranties including appropriate reference numbers for manufacturers to identify project.
    - j. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.

### **1.03 DELIVERY, STORAGE, AND HANDLING**

- A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site. Promptly replace products damaged during shipping.
- B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package. Deliver each article of hardware in manufacturer's original packaging.
- C. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.
- D. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.
- E. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.
- F. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

#### 1.04 COORDINATION

- A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.
- B. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.
- D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.
- E. Existing Openings: Where existing doors, frames and/or hardware are to remain, field verify existing functions, conditions and preparations and coordinate to suit opening conditions and to provide proper door operation.

#### 1.05 MAINTENANCE

- A. Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.
- B. Turn over unused materials to Owner for maintenance purposes.

### PART 2 - PRODUCTS

#### 2.01 HINGES

- A. Manufacturers and Products:
  - 1. Scheduled Manufacturer and Product:
    - a. Ives 5BB series
  - 2. Acceptable Manufacturers and Products:
    - a. Hager BB1191/1279 series
    - b. McKinney TA/T4A series
    - c. Bommer BB5000 series
- B. Requirements:
  - 1. Provide hinges conforming to ANSI/BHMA A156.1.
  - 2. Provide five knuckle, ball bearing hinges.
  - 3. 1-3/4 inch thick doors, up to and including 36 inches (914 mm) wide:
    - a. Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches (114 mm) high
    - b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high
  - 4. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:
    - a. Exterior: Heavy weight, bronze/stainless steel, 5 inches (127 mm) high
    - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
  - 5. 2 inches or thicker doors:
    - a. Exterior: Heavy weight, bronze or stainless steel, 5 inches (127 mm) high
    - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
  - 6. Adjust hinge width for door, frame, and wall conditions to allow proper degree of opening.
  - 7. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
  - 8. Where new hinges are specified for existing doors or existing frames, provide new hinges of identical size to hinge preparation present in existing door or existing frame.
  - 9. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
    - a. Steel Hinges: Steel pins
    - b. Non-Ferrous Hinges: Stainless steel pins
    - c. Out-Swinging Exterior Doors: Non-removable pins
    - d. Out-Swinging Interior Lockable Doors: Non-removable pins
    - e. Interior Non-lockable Doors: Non-rising pins

10. Provide hinges with electrified options as scheduled in the hardware sets. Provide with enough and wire gage to accommodate electric function of specified hardware. Locate electric hinge at second hinge from bottom or nearest to electrified locking component. Provide mortar guard for each electrified hinge specified.

## **2.02 CONTINUOUS HINGES**

- A. Manufacturers:
  1. Scheduled Manufacturer:
    - a. Ives
  2. Acceptable Manufacturers:
    - a. Select
    - b. Roton
    - c. Hager
- B. Requirements:
  1. Provide aluminum geared continuous hinges conforming to ANSI/BHMA A156.26, Grade 1.
  2. Provide aluminum geared continuous hinges, where specified in the hardware sets, fabricated from 6063-T6 aluminum.
  3. Provide split nylon bearings at each hinge knuckle for quiet, smooth, self-lubricating operation.
  4. Provide hinges capable of supporting door weights up to 450 pounds, and successfully tested for 1,500,000 cycles.
  5. On fire-rated doors, provide aluminum geared continuous hinges classified for use on rated doors by testing agency acceptable to authority having jurisdiction.
  6. Provide aluminum geared continuous hinges with electrified option scheduled in the hardware sets. Provide with enough and wire gage to accommodate electric function of specified hardware.
  7. Provide hinges 1 inch (25 mm) shorter in length than nominal height of door, unless otherwise noted or door details require shorter length and with symmetrical hole pattern.

## **2.03 CYLINDRICAL LOCKS – GRADE 1**

- A. Manufacturers and Products:
  1. Scheduled Manufacturer and Product:
    - a. Schlage ND series
  2. Acceptable Manufacturers and Products:
    - a. Owner Standard
- B. Requirements:
  1. Provide cylindrical locks conforming to ANSI/BHMA A156.2 Series 4000, Grade 1, and UL Listed for 3-hour fire doors.
  2. Cylinders: Refer to “KEYING” article, herein.
  3. Provide locks with standard 2-3/4 inches backset, unless noted otherwise, with 1/2-inch latch throw. Provide proper latch throw for UL listing at pairs.
  4. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.
  5. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
  6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
  7. Provide electrified options as scheduled in the hardware sets.

## **2.04 EXIT DEVICES**

- A. Manufacturers and Products:
  1. Scheduled Manufacturer and Product:
    - a. Von Duprin 98 series
  2. Acceptable Manufacturers and Products:
    - a. Owners Standard
- B. Requirements:
  1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1 and UL listed for Panic Exit or Fire Exit Hardware.

2. Cylinders: Refer to "KEYING" article, herein.
3. Provide smooth touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.
4. Touchpad must extend a minimum of one half of door width. No plastic inserts are allowed in touchpads.
5. Provide exit devices with deadlatching feature for security and for future addition of alarm kits and/or other electrified requirements.
6. Provide exit devices with weather resistant components that can withstand harsh conditions of various climates and corrosive cleaners used in outdoor pool environments.
7. Provide flush end caps for exit devices.
8. Provide exit devices with manufacturer's approved strikes.
9. Provide exit devices cut to door width and height. Install exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.
10. Mount mechanism case flush on face of doors or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
11. Provide cylinder or hex-key dogging as specified at non fire-rated openings.
12. Removable Mullions: 2 inches (51 mm) x 3 inches (76 mm) steel tube. Where scheduled as keyed removable mullion, provide type that can be removed by use of a keyed cylinder, which is self-locking when re-installed.
13. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive areas, and where noted in hardware sets.
14. Provide electrified options as scheduled.
15. Provide exit devices with optional trim designs to match other lever and pull designs used on the project.

## 2.05 KEYING

- A. Provide cylinders/cores keyed into Owner's existing keying – Schlage Everest D-145
- B. Requirements:
  1. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.
    - a. Master Keying system as directed by the Owner.
  2. Provide keys with the following features:
    - a. Material: Nickel silver; minimum thickness of .107-inch (2.3mm)
    - b. Patent Protection: Keys and blanks protected by one or more utility patent(s).
  3. Identification:
    - a. Mark permanent cylinders/cores and keys with applicable blind code for identification. Do not provide blind code marks with actual key cuts.
    - b. Identification stamping provisions must be approved by the Architect and Owner.
    - c. Stamp cylinders/cores and keys with Owner's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with "DO NOT DUPLICATE" along with the "PATENTED" or patent number to enforce the patent protection.
    - d. Failure to comply with stamping requirements will be cause for replacement of keys involved at no additional cost to Owner.
    - e. Forward permanent cylinders/cores to Owner, separately from keys, by means as directed by Owner.
  4. Quantity: Furnish in the following quantities.
    - a. Change (Day) Keys: 3 per cylinder/core.
    - b. Permanent Control Keys: 3.
    - c. Master Keys: 6.

## 2.06 DOOR CLOSERS

- A. Manufacturers and Products:
  1. Scheduled Manufacturer and Product:
    - a. LCN 4040XP series
  2. Acceptable Manufacturers and Products:
    - a. Owners Standard
- B. Requirements:
  1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture code.

2. Provide door closers with fully hydraulic, full rack and pinion action with high strength cast iron cylinder, and full complement bearings at shaft.
3. Cylinder Body: 1-1/2-inch (38 mm) diameter with 5/8-inch (16 mm) diameter double heat-treated pinion journal.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck.
7. Provide closers with solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers.
8. Pressure Relief Valve (PRV) Technology: Not permitted.
9. Finish for Closer Cylinders, Arms, Adapter Plates, and Metal Covers: Powder coating finish which has been certified to exceed 100 hours salt spray testing as described in ANSI Standard A156.4 and ASTM B117, or has special rust inhibitor (SRI).
10. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

## **2.07 DOOR TRIM**

- A. Manufacturers:
  1. Scheduled Manufacturer:
    - a. Ives.
  2. Acceptable Manufacturers:
    - a. Elmes
    - b. Burns
    - c. Rockwood
- B. Requirements:
  1. Provide push plates, push bars, pull plates, pulls, and hands-free reversible door pulls with diameter and length as scheduled.

## **2.08 PROTECTION PLATES**

- A. Manufacturers:
  1. Scheduled Manufacturer:
    - a. Ives
  2. Acceptable Manufacturers:
    - a. Burns
    - b. Rockwood
- B. Requirements:
  1. Provide protection plates with a minimum of 0.050 inch (1 mm) thick, beveled four edges as scheduled. Furnish with sheet metal or wood screws, finished to match plates.
  2. Sizes plates 2 inches (51 mm) less width of door on single doors, pairs of doors with a mullion, and doors with edge guards. Size plates 1 inch (25 mm) less width of door on pairs without a mullion or edge guards.
  3. At fire rated doors, provide protection plates over 16 inches high with UL label.

## **2.09 OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS**

- A. Manufacturers:
  1. Scheduled Manufacturers:
    - a. Glynn-Johnson
  2. Acceptable Manufacturers:
    - a. Rixson
    - b. Sargent
- B. Requirements:

1. Provide overhead stop at any door where conditions do not allow for a wall stop or floor stop presents tripping hazard.
2. Provide friction type at doors without closer and positive type at doors with closer.

## **2.10 DOOR STOPS AND HOLDERS**

- A. Manufacturers:
1. Scheduled Manufacturer:
    - a. Ives
  2. Acceptable Manufacturers:
    - a. Burns
    - b. Rockwood
- B. Provide door stops at each door leaf:
1. Provide wall stops wherever possible. Provide concave type where lockset has a push button or thumbturn.
  2. Where a wall stop cannot be used, provide universal floor stops.
  3. Where wall or floor stop cannot be used, provide overhead stop.
  4. Provide roller bumper where doors open into each other and overhead stop cannot be used.

## **2.11 SILENCERS**

- A. Manufacturers:
1. Scheduled Manufacturer:
    - a. Ives
  2. Acceptable Manufacturers:
    - a. Burns
    - b. Rockwood
- B. Requirements:
1. Provide "push-in" type silencers for hollow metal or wood frames.
  2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair frame.
  3. Omit where gasketing is specified.

## **PART 3 - EXECUTION**

### **3.01 EXAMINATION**

- A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance. Verify doors, frames, and walls have been properly reinforced for hardware installation.
- B. Field verify existing doors and frames receiving new hardware and existing conditions receiving new openings. Verify that new hardware is compatible with existing door and frame preparation and existing conditions.
- C. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- D. Submit a list of deficiencies in writing and proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 PREPARATION**

- A. Where on-site modification of doors and frames is required:
1. Carefully remove existing door hardware and components being reused. Clean, protect, tag, and store in accordance with storage and handling requirements specified herein.
  2. Field modify and prepare existing doors and frames for new hardware being installed.
  3. When modifications are exposed to view, use concealed fasteners, when possible.



4. Prepare hardware locations and reinstall in accordance with installation requirements for new door hardware and with:
  - a. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.
  - b. Wood Doors: DHI WDHS.5 "Recommended Hardware Reinforcement Locations for Mineral Core Wood Flush Doors."
  - c. Doors in rated assemblies: NFPA 80 for restrictions on on-site door hardware preparation.

### 3.03 INSTALLATION

- A. Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.
  1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
  2. Custom Steel Doors and Frames: HMMA 831.
  3. Interior Architectural Wood Flush Doors: ANSI/WDMA I.S. 1A
  4. Installation Guide for Doors and Hardware: DHI TDH-007-20
- B. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.
- C. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.
- D. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.
- E. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- F. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.
- G. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated.
- H. Wiring: Coordinate with Division 26, ELECTRICAL and Division 28 ELECTRONIC SAFETY AND SECURITY sections for:
  1. Conduit, junction boxes and wire pulls.
  2. Connections to and from power supplies to electrified hardware.
  3. Connections to fire/smoke alarm system and smoke evacuation system.
  4. Connection of wire to door position switches and wire runs to central room or area, as directed by Architect.
  5. Connections to panel interface modules, controllers, and gateways.
  6. Testing and labeling wires with Architect's opening number.
- I. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
- J. Door Closers: Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Mount closers so they are not visible in corridors, lobbies and other public spaces unless approved by Architect.
- K. Closer/holders: Mount closer/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.
- L. Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings or in equipment room, or alternate location as directed by Architect.
- M. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."

- N. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.
- O. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
- P. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- Q. Door Bottoms and Sweeps: Apply to bottom of door, forming seal with threshold when door is closed.

### **3.04 ADJUSTING**

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
  - 1. Spring Hinges: Adjust to achieve positive latching when door can close freely from an open position of 30 degrees.
  - 2. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
  - 3. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
- B. Occupancy Adjustment: Approximately three to six months after date of Substantial Completion, examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors and door hardware.

### **3.05 CLEANING AND PROTECTION**

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items per manufacturer's instructions to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

### **3.06 DOOR HARDWARE SCHEDULE**

- A. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.
- B. Discrepancies, conflicting hardware, and missing items are to be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application.
- C. Hardware items are referenced in the following hardware schedule. Refer to the above specifications for special features, options, cylinders/keying, and other requirements.
- D. Hardware Sets:






Abbreviation	Name
IVE	H.B. Ives
KAW	Kawneer Company Inc
LCN	Lcn Commercial Division
SCH	Schlage Lock Company
VON	Von Duprin
ZER	ZERO

**Hardware Group No. H01**

For use on Door #(s):

120

Provide each SGL door(s) with the following:





QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		630	IVE
1	EA	STOREROOM LOCK	ND80JD RHO		626	SCH
1	EA	FSIC CORE	23-030 EV D		626	SCH
1	EA	WALL STOP	WS406/407CVX		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

**Hardware Group No. H02**

For use on Door #(s):

119

Provide each SGL door(s) with the following:





QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		630	IVE
1	EA	PASSAGE SET	ND10S RHO		626	SCH
1	EA	WALL STOP	WS406/407CVX		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

**Hardware Group No. H03**

For use on Door #(s):

114A                      115

Provide each SGL door(s) with the following:










QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	PASSAGE SET	ND10S RHO		626	SCH
1	EA	WALL STOP	WS406/407CVX		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

**Hardware Group No. H04**

For use on Door #(s):

111

Provide each SGL door(s) with the following:






QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	112HD		628	IVE
1	EA	CLASSROOM SEC W/DB	L9457J 06B		626	SCH
2	EA	FSIC CORE	23-030 EV D		626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH		689	LCN
1	EA	WALL STOP	WS406/407CVX		630	IVE
1	EA	FRAME RAIN DRIP	142A		AL	ZER
1	SET	GASKETING	429AA-S		AA	ZER
1	EA	DOOR SWEEP	39A		A	ZER
1	EA	THRESHOLD	545A		A	ZER

**Hardware Group No. H05**

For use on Door #(s):

104                      105                      106                      112                      116                      118

Provide each SGL door(s) with the following:







QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	ENTRANCE LOCK	ND53JD RHO		626	SCH
1	EA	FSIC CORE	23-030 EV D		626	SCH
1	EA	WALL STOP	WS406/407CVX		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

**Hardware Group No. H06**

For use on Door #(s):

114B

Provide each SGL door(s) with the following:











QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	PASSAGE SET	ND10S RHO		626	SCH
1	EA	SURFACE CLOSER	4040XP EDA		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CVX		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

**Hardware Group No. H07**

For use on Door #(s):

122

Provide each SGL door(s) with the following:







QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		630	IVE
1	EA	PANIC HARDWARE	98-NL		626	VON
1	EA	FSIC RIM CYL HOUSING	20-079		626	SCH
1	EA	FSIC CORE	23-030 EV D		626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH		689	LCN
1	EA	WALL STOP	WS406/407CVX		630	IVE
1	EA	FRAME RAIN DRIP	142A		AL	ZER
1	SET	GASKETING	429AA-S		AA	ZER
1	EA	DOOR SWEEP	39A		A	ZER
1	EA	THRESHOLD	545A		A	ZER

**Hardware Group No. H08**

For use on Door #(s):

124

Provide each SGL door(s) with the following:








QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	ENTRANCE LOCK	ND53JD RHO		626	SCH
3	EA	FSIC CORE	23-030 EV D		626	SCH
1	EA	SURFACE CLOSER	4040XP EDA		689	LCN
1	EA	WALL STOP	WS406/407CVX		630	IVE
1	EA	SMOKE SEAL	188SBR PSA ZAG		BR	ZER

**Hardware Group No. H09**

For use on Door #(s):

109 117

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	ENTRANCE LOCK	ND53JD RHO		626	SCH
1	EA	FSIC CORE	23-030 EV D		626	SCH
1	EA	SURFACE CLOSER	4040XP EDA		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CVX		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

**END OF SECTION 08 7100**

## SECTION 08 8000 - GLAZING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes:
1. Glass for windows, doors, interior borrowed lites, storefront framing.
  2. Glazing sealants and accessories.
  3. Glazing infill panels.

#### 1.2 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

#### 1.4 WARRANTY

- A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
1. Warranty Period: 10 years from date of Substantial Completion.
- B. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.
1. Warranty Period: 10 years from date of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. AGC Glass Company North America, Inc.
  2. Cardinal Glass Industries.
  3. Guardian Glass; SunGuard.
  4. Northwestern Industries, Inc.
  5. Oldcastle BuildingEnvelope™.
  6. Pilkington North America.
  7. PPG Industries, Inc.
  8. Viracon, Inc.

#### 2.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the International Building Code and ASTM E 1300.

1. Design Wind Pressures: As indicated on Drawings.
  2. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.
- B. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.
- C. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
1. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F.
  2. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
  3. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

### **2.3 GLASS PRODUCTS, GENERAL**

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
1. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
- B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or manufacturer. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.
- D. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than the thickness indicated.
- E. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.

### **2.4 GLASS PRODUCTS**

- A. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear), Quality-Q3.
- B. Heat-Strengthened Float Glass: ASTM C 1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear), Quality-Q3.
- C. Coated Clear Float-Glass Units: Class 1 (clear), Kind HS (heat-strengthened) or Kind FT (fully tempered), float glass.

### **2.5 INSULATING GLASS**

- A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190.
1. Sealing System: Dual seals.
  2. Perimeter Spacer: Manufacturer's standard spacer material and construction.

## **2.6 GLAZING INFILL PANELS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Mapes Industries.
  - 2. Equal as approved by Architect before to bidding.
- B. Panels:
  - 1. 28 ga (0.40 mm) porcelain enameled steel face and back.
  - 2. Core: Polystyrene.
  - 3. Thickness: One Inch (25 mm).
  - 4. Color as selected by Architect.

## **2.7 GLAZING SEALANTS**

- A. General:
  - 1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
  - 2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
  - 3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

## **2.8 MISCELLANEOUS GLAZING MATERIALS**

- A. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- B. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- C. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- D. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- E. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

## **PART 3 - EXECUTION**

### **3.1 GLAZING, GENERAL**

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- F. Provide spacers for glass lites where length plus width is larger than 50 inches.
- G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.



### **3.2 GASKET GLAZING (DRY)**

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

### **3.3 CLEANING AND PROTECTION**

- A. Immediately after installation remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
  - 1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.
- C. Remove and replace glass that is damaged during construction period.

### **3.4 MONOLITHIC GLASS SCHEDULE**

- A. Glass Type: Clear fully tempered float glass.
  - 1. Minimum Thickness: 6 mm.
  - 2. Safety glazing required.
- B. Glass Type: Clear heat-strengthened float glass.
  - 1. Minimum Thickness: 6 mm.

### **3.5 INSULATING GLASS SCHEDULE**

- A. Glass Type: Low-E-coated, clear fully tempered insulating glass.
  - 1. Basis-of-Design Product: Solarban 60.
  - 2. Overall Unit Thickness: 1 inch.
  - 3. Minimum Thickness of Each Glass Lite: 6 mm.
  - 4. Outdoor Lite: Class 1 Solexia Fully tempered float glass.
  - 5. Interspace Content: Air.
  - 6. Indoor Lite: Class 1 Solarban 60 Fully tempered float glass.
  - 7. Low-E Coating: Pyrolytic on second or third surface.
  - 8. Winter Nighttime U-Factor: 0.29 maximum.
  - 9. Visible Light Transmittance: 51 percent minimum.
  - 10. Solar Heat Gain Coefficient: 0.37 maximum.
  - 11. Safety glazing required.

- B. Glass Type: Low-E-coated, clear heat-strengthened insulating glass.
  - 1. Basis-of-Design Product: Solarban 60.
  - 2. Overall Unit Thickness: 1 inch.
  - 3. Minimum Thickness of Each Glass Lite: 6 mm.
  - 4. Outdoor Lite: Class1 Solexia Heat-strengthened float glass.
  - 5. Interspace Content: Air.
  - 6. Indoor Lite: Class 1 Solarban 60 Heat-strengthened float glass.
  - 7. Low-E Coating: Pyrolytic on second or third surface.
  - 8. Winter Nighttime U-Factor: 0.29 maximum.
  - 9. Visible Light Transmittance: 51 percent minimum.
  - 10. Solar Heat Gain Coefficient: 0.23 maximum.

**END OF SECTION 08 8000**

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## **SECTION 09 2216 - NON-STRUCTURAL METAL FRAMING**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Non-load-bearing steel framing systems for interior assemblies.
  - 2. Suspension systems for interior gypsum ceilings.

#### **1.2 ACTION SUBMITTALS**

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

### **PART 2 - PRODUCTS**

#### **2.1 PERFORMANCE REQUIREMENTS**

- A. Fire-Test-Response Characteristics: Provide materials and construction identical to those tested according to ASTM E 119.
- B. STC-Rated Assemblies: Provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413.

#### **2.2 FRAMING SYSTEMS**

- A. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
  - 1. Minimum Base-Metal Thickness: 0.033 inch.
  - 2. Depth: 7/8 inch.
- B. Resilient Furring Channels: 1/2-inch-deep, steel sheet members designed to reduce sound transmission.
  - 1. Configuration: Asymmetrical or hat shaped.
- C. Cold-Rolled Furring Channels: 0.053-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges.
  - 1. Depth: 3/4 inch.
  - 2. Furring Brackets: Adjustable, corrugated-edge type of steel sheet with minimum uncoated-steel thickness of 0.033 inch.
  - 3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double strand of 0.048-inch-diameter wire.

#### **2.3 SUSPENSION SYSTEMS**

- A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double strand of 0.048-inch-diameter wire.
- B. Hanger Attachments to Concrete:
  - 1. Powder-Actuated Fasteners: Capable of sustaining, a load equal to 10 times that imposed as determined by ASTM E 1190.
- C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch in diameter.
- D. Flat Hangers: Steel sheet, 1 by 3/16 inch by length indicated.
- E. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.053 inch and minimum 1/2-inch-wide flanges.
  - 1. Depth: 1-1/2 inches.

- F. Furring Channels (Furring Members):
  - 1. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch deep.
    - a. Minimum Base-Metal Thickness: 0.033 inch.
  - 2. Resilient Furring Channels: 1/2-inch-deep members designed to reduce sound transmission.
    - a. Configuration: Asymmetrical or hat shaped.

## **2.4 AUXILIARY MATERIALS**

- A. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- B. Isolation Strip at Exterior Walls: Provide foam gasket.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION, GENERAL**

- A. Installation Standard: ASTM C 754.
  - 1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- C. Install bracing at terminations in assemblies.
- D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

### **3.2 INSTALLING FRAMED ASSEMBLIES**

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
- B. Direct Furring:
  - 1. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
- C. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

### **3.3 INSTALLING SUSPENSION SYSTEMS**

- A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Suspend hangers from building structure as follows:
  - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
    - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
  - 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
  - 3. Do not attach hangers to steel roof deck.

4. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
  5. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
  6. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- D. Seismic Bracing: Sway-brace suspension systems with hangers used for support.
- E. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

**END OF SECTION 09 2216**



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## SECTION 09 2900 - GYPSUM BOARD

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
1. Interior gypsum board.
  2. Tile backing panels.
  3. Texture finishes.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples:
1. Textured Finishes: Manufacturer's standard size for each textured finish indicated and on same backing indicated for Work.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

#### 2.2 INTERIOR GYPSUM BOARD

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. American Gypsum.
  2. CertainTeed Corp.
  3. Georgia-Pacific Gypsum LLC.
  4. National Gypsum Company.
  5. PABCO Gypsum.
  6. USG Corporation.
- B. Gypsum Board, Type X: ASTM C 1396/C 1396M.
1. Thickness: 5/8 inch.
  2. Long Edges: Tapered.

#### 2.3 TILE BACKING PANELS

- A. Cementitious Backer Units: ANSI A118.9 and ASTM C 1288 or 1325, with manufacturer's standard edges.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. CertainTeed Corp.; FiberCement BackerBoard.
    - b. Custom Building Products; Wonderboard.
    - c. James Hardie Building Products, Inc.; Hardiebacker.
    - d. National Gypsum Company, Permapace Cement Board.
    - e. USG Corporation; DUROCK Cement Board.
  2. Thickness: 5/8 inch.
  3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

#### 2.4 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.

- B. Aluminum Trim: ASTM B 221, Alloy 6063-T5.

## 2.5 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:
  - 1. Interior Gypsum Board: Paper.
  - 2. Tile Backing Panels: As recommended by panel manufacturer.
- C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

## 2.6 AUXILIARY MATERIALS

- A. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
- B. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
- C. Sound Attenuation Blankets: As specified in Section 07 2100 "Thermal Insulation."
- D. Vapor Retarder: As specified in Section 07 2100 "Thermal Insulation."
  - 1. Apply at exterior walls only.

## 2.7 TEXTURE FINISHES

- A. Products: Subject to compliance with requirements, provide one of the following:
  - 1. Aggregate Finish:
    - a. United States Gypsum Co.; SHEETROCK Wall and Ceiling Texture (Aggregated).
- B. Primer: As recommended by textured finish manufacturer.
- C. Aggregate Finish: Water-based, job-mixed, aggregated, drying-type texture finish for roll application.
  - 1. Texture: Light-stipple Roll Texture as approved by Architect.

## PART 3 - EXECUTION

### 3.1 APPLYING AND FINISHING PANELS

- A. Comply with ASTM C 840.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch-wide spaces at these locations and trim edges with edge trim where edges of panels are exposed.
- D. Install trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
  - 1. Interior Trim: Install in the following locations:
    - a. Cornerbead: Use at outside corners, unless otherwise indicated.
    - b. Bullnose Bead: Use where indicated.
    - c. LC-Bead: Use at exposed panel edges.
    - d. L-Bead: Use where indicated.
    - e. U-Bead: Use at exposed panel edges.
    - f. Curved-Edge Cornerbead: Use at curved openings.

2. Aluminum Trim: Install in locations indicated on Drawings.
  3. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.
- E. Prefill open joints and damaged surface areas.
- F. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- G. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
1. Level 1: Ceiling plenum areas, Mezzanine area, behind tackable wall panels, concealed areas, and where indicated.
  2. Level 2: Panels that are substrate for tile.
  3. Level 3: Panels that are substrates for wall coverings and wall panels.
  4. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
    - a. Primer and its application to surfaces are specified in Section 09 9123 "Painting."
  5. Level 5: In areas with oblique lighting such as corridors with a window at the end, lobby walls that end at windows and on wall surfaces to receive deep tone paints or satin or glossier paint coatings.
    - a. Primer and its application to surfaces are specified in Section 09 9123 "Painting."
- H. Texture Finish Application: Produce a uniform texture matching approved mockup and free of starved spots or other evidence of thin application or of application patterns.
- I. Protect adjacent surfaces from drywall compound and texture finishes and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- J. Remove and replace panels that are wet, moisture damaged, and mold damaged.

### **3.2 FIELD QUALITY CONTROL**

- A. Above-Ceiling Observation: Architect will conduct an above-ceiling observation before installing gypsum board ceilings and report deficiencies in the Work observed. Do not proceed with installation of gypsum board to ceiling support framing until deficiencies have been corrected.
1. Notify Architect seven days in advance of date and time when Project, or part of Project, will be ready for above-ceiling observation.
  2. Before notifying Architect, complete the following in areas to receive gypsum board ceilings:
    - a. Installation of 80 percent of lighting fixtures, powered for operation.
    - b. Installation, insulation, and leak and pressure testing of water piping systems.
    - c. Installation of air-duct systems.
    - d. Installation of air devices.
    - e. Installation of mechanical system control-air tubing.
    - f. Installation of ceiling support framing.

**END OF SECTION 09 2900**

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## SECTION 09 3000 - TILING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
1. Ceramic tile.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples:
1. Each type and composition of tile and for each color and finish required.
  2. Assembled samples, with grouted joints, for each type and composition of tile and for each color and finish required.

### PART 2 - PRODUCTS

#### 2.1 TILE PRODUCTS

- A. ANSI Ceramic Tile Standard: Provide Standard grade tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
- A. Tile Type: wall tile.
1. Basis of Design Product: Subject to compliance with requirements, provide Dal tile, Rittenhouse Square, 3" x 6" or equal as approved by Architect.
  2. Colors:
    - a. Wainscot: White 0100.
  3. Grout Color: As selected by Architect from manufacturer's full range.
  4. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable. Provide shapes as follows, selected from manufacturer's standard shapes:
    - a. Internal Corners: Field-buttet square corners.
    - b. Bullnose Trim: Schluter -RONDEC, stainless steel.

#### 2.2 SETTING MATERIALS

- A. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Bonsal American; an Oldcastle company.
    - b. Bostik, Inc.
    - c. Laticrete International, Inc.
    - d. MAPEI Corporation.
    - e. Mer-Kote Products, Inc.
    - f. Summitville Tiles, Inc.
    - g. TEC; a subsidiary of H. B. Fuller Company.
  2. Prepackaged, dry-mortar mix combined with liquid-latex additive.
  3. For wall applications, provide nonsagging mortar.

#### 2.3 GROUT MATERIALS

- A. Polymer-Modified Tile Grout: ANSI A118.7.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Mapei Keracolor U for unsanded joints less than 1/8 inch or Mapei Keracolor S for joints greater than 1/8 inch or comparable product by one of the following:
    - a. Bonsal American; an Oldcastle company.

- b. Bostik, Inc.
  - c. Laticrete International, Inc.
  - d. MAPEI Corporation.
  - e. Summitville Tiles, Inc.
  - f. TEC: a subsidiary of H. B. Fuller Company.
2. Polymer Type: Liquid-latex form for addition to prepackaged dry-grout mix.

## 2.4 ELASTOMERIC SEALANTS

- A. One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and extreme temperatures.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Dow Corning Corporation; Dow Corning 786.
    - b. GE Silicones, a division of GE Specialty Materials; Sanitary 1700.
    - c. Laticrete International, Inc.; Latasil Tile & Stone Sealant.
    - d. Pecora Corporation; Pecora 898 Sanitary Silicone Sealant.
    - e. Tremco Incorporated; Tremsil 600 White.

## 2.5 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Grout Sealer: Manufacturer's standard product for sealing grout joints and that does not change color or appearance of grout.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Bonsal American, an Oldcastle company; Grout Sealer.
    - b. Bostik, Inc.; CeramaSeal Grout & Tile Sealer.
    - c. C-Cure; Penetrating Sealer 978.
    - d. Custom Building Products; Surfaceguard Sealer.
    - e. Jamo Inc.; Penetrating Sealer.
    - f. MAPEI Corporation; KER 003, Silicone Spray Sealer for Cementitious Tile Grout.
    - g. Southern Grouts & Mortars, Inc.; Silicone Grout Sealer.
    - h. Summitville Tiles, Inc.; SL-15, Invisible Seal Penetrating Grout and Tile Sealer.
    - i. TEC, a subsidiary of H. B. Fuller Company; TA-256 Penetrating Silicone Grout Sealer.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
1. Verify that substrates for setting tile are firm, dry, clean, free of coatings that are incompatible with tile-setting materials including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.

### 3.2 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thin-set mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot toward drains.
- C. Blending: For tile exhibiting color variations, use factory blended tile or blend tiles at Project site before installing.

- D. Field-Applied Temporary Protective Coating: If indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

### **3.3 INSTALLATION**

- A. Comply with TCA's "Handbook for Ceramic Tile Installation" for TCA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 Series "Specifications for Installation of Ceramic Tile" that are referenced in TCA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.
- E. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
- F. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
  - 1. Glazed Wall Tile: 1/16 inch.
- G. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
  - 1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
  - 2. Prepare joints and apply sealants to comply with requirements in Section 07 9200 "Joint Sealants."
- H. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness and bonded securely to substrate.

### **3.4 INTERIOR TILE INSTALLATION SCHEDULE**

- A. Interior Wall Installations, Wood Studs or Furring:
  - 1. Tile Installation W245: Thin-set mortar on coated glass-mat, water-resistant gypsum backer board; TCA W245.
    - a. Tile Type: Wall tile.
    - b. Thin-Set Mortar: Latex- portland cement mortar.
    - c. Grout: Polymer-modified unsanded grout.

**END OF SECTION 09 3000**



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## SECTION 09 5113 - ACOUSTICAL PANEL CEILINGS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes acoustical panels and exposed suspension systems for ceilings.

#### 1.2 ACTION SUBMITTALS

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

#### 1.3 CLOSEOUT SUBMITTALS

- A. Maintenance data.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Acoustical ceiling shall withstand the effects of earthquake motions determined according to ASCE/SEI 7 Section 13.5.6, IBC-2009 Chapter 16, ASTM 635 and ASTM 636.
- B. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Flame-Spread Index: Comply with ASTM E 1264 for Class A materials.
  - 2. Smoke-Developed Index: 50 or less.

#### 2.2 ACOUSTICAL PANEL CEILINGS, GENERAL

- A. Acoustical Panel Standard: Comply with ASTM E 1264.
- B. Metal Suspension System Standard: Comply with ASTM C 635.
- C. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

#### 2.3 ACOUSTICAL PANELS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Armstrong World Industries, Inc.
  - 2. Equal products by USG Interiors, Inc.; Subsidiary of USG Corporation may be considered prior to bidding upon approval by Architect.
- B. Ceiling Panels:
  - 1. Type 3b:
    - a. Size: 24" x 24" x 3/4"
    - b. Pattern: Type III, Form 2, Pattern C E.
    - c. Edge: Square lay-in
    - d. CAC: 35
    - e. LR: 0.85.
    - f. NRC: 0.70.
    - g. Surface finish: Factory-applied latex paint.
      - 1) Color: White.

- h. Basis-of-Design Product:
  - 1) Armstrong World Industries, Inc.; School Zone Fine Fissured.

## 2.4 METAL SUSPENSION SYSTEM

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Armstrong World Industries, Inc
  - 2. Donn.
  - 3. Chicago Metallic Corporation.
  - 4. USG Interiors, Inc.; Subsidiary of USG Corporation.
- B. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, not less than G30 coating designation; with prefinished 15/16-inch-wide metal caps on flanges.
  - 1. Structural Classification: Heavy-duty system.
  - 2. End Condition of Cross Runners: butt-edge type.
  - 3. Face Design: Flat, flush.
  - 4. Cap Material: Steel or aluminum cold-rolled sheet.
  - 5. Cap Finish: Painted in color as selected from manufacturer's full range.
  - 6. Basis-of-Design: Armstrong Prelude XL 15/16 inch Exposed Tee.
- C. Hold-Down Clips: Minimum 24 gauge spring steel, 1-7/16 inches deep x 7/8 inches wide, designed to fit over cross tees. Provide clips spaced symmetrically 2 ft. o.c.
- D. Seismic Struts: Manufacturer's standard compression struts designed to accommodate seismic forces. Struts will be required at 12 feet on center both ways for all suspended ceilings according to UBC Standard 25-2. (Seismic wall calculations have been done which require rigid struts at 12 feet on center in order to allow for 7/8" perimeter wall molding in lieu of a 2" perimeter wall mold.) In lieu of compression struts provide a seismic clip with an ES Report number from ICC demonstrating that the compression struts and the 2" perimeter wall mold are not required. Equal to:
  - 1. BERC seismic clips as manufactured by Armstrong.
  - 2. 1496 Perimeter Clip as manufactured by Chicago Metallic Corp.
  - 3. ACM-7 clip as manufactured by USG.
- E. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install acoustical panel ceilings to comply with ASTM C 636/C 636M and seismic design requirements indicated, according to manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
  - 1. Install hold-down clips in vestibules, in areas indicated, and in areas where required by governing regulations or for fire-resistance ratings; space as recommended by panel manufacturer, unless otherwise indicated or required.
- B. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.
  - 1. Arrange directionally patterned acoustical panels as indicated on reflected ceiling plans.

**END OF SECTION 09 5113**

## SECTION 09 6513 - RESILIENT BASE AND ACCESSORIES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Resilient base.
  - 2. Rubber molding accessories.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For each type of product indicated, in manufacturer's standard-size Samples but not less than 12 inches long, of each resilient product color, texture, and pattern required.

#### 1.3 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
  - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

#### 1.4 PROJECT CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer in spaces to receive resilient products.
- B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer.
- C. Install resilient products after other finishing operations, including painting, have been completed.

### PART 2 - PRODUCTS

#### 2.1 RESILIENT BASE (THERMOPLASTIC-RUBBER BASE)

- A. Resilient Base:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Armstrong Flooring, Inc.
- B. Resilient Base Standard: ASTM F 1861.
  - 1. Material Requirement: Type TP (rubber, thermoplastic).
  - 2. Manufacturing Method: Group I (solid, homogeneous).
  - 3. Style:
    - a. Cove (base with toe) at all areas noted.
- C. Minimum Thickness: 0.125 inch.
- D. Height:
  - 1. 4 inches unless noted otherwise.
- E. Lengths: Coils in manufacturer's standard length.
- F. Outside Corners: Preformed.
- G. Inside Corners: Field formed.

- H. Finish: As selected by Architect from manufacturer's full range.
- I. Colors and Patterns: As selected by Architect from full range of industry colors.

## **2.2 RUBBER MOLDING ACCESSORY**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Armstrong Flooring, Inc.
  - 2. Burke Mercer Flooring Products; a division of Burke Industries Inc.
  - 3. Flexco.
  - 4. Roppe Corporation, USA.
- B. Description: Rubber transition strips.
- C. Colors and Patterns: Match flooring.

## **2.3 INSTALLATION MATERIALS**

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.
- C. Floor Polish: Provide protective, liquid floor-polish products recommended by resilient stair-tread manufacturer.

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- C. Do not install resilient products until they are same temperature as the space where they are to be installed.
  - 1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
- D. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

### **3.2 RESILIENT BASE INSTALLATION**

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

- G. Preformed Corners: Install preformed corners before installing straight pieces.
- H. Job-Formed Corners:
  - 1. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.
    - a. Miter or cope corners to minimize open joints.

### **3.3 RESILIENT ACCESSORY INSTALLATION**

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

### **3.4 CLEANING AND PROTECTION**

- A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.
- B. Cover resilient products until Substantial Completion.

**END OF SECTION 09 6513**

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## **SECTION 09 6519 - RESILIENT TILE FLOORING**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Vinyl composition floor tile.

#### **1.2 ACTION SUBMITTALS**

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

#### **1.3 CLOSEOUT SUBMITTALS**

- A. Maintenance data.

#### **1.4 QUALITY ASSURANCE**

- A. Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by manufacturer for floor tile installation.

### **PART 2 - PRODUCTS**

#### **2.1 PERFORMANCE REQUIREMENTS**

- A. Fire-Test-Response Characteristics: For resilient floor tile, as determined by testing identical products according to ASTM E648 or NFPA 253 by a qualified testing agency.
  - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

#### **2.2 VINYL COMPOSITION FLOOR TILE**

- A. Products: Subject to compliance with requirements, provide products by the following:
  - 1. Patcraft, Vining 1405V, Light Taupe 00700.
- B. Dimensions: 48 inches by 6 inches.
- C. Thickness: 30 mil.
- D. Wear Layer: 20 mil.

#### **2.3 INSTALLATION MATERIALS**

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.
- B. Metal Edge Trim: Schluter Vinpro-S Edge Trim.
  - 1. Finish: Brushed Chrome Anodized Aluminum.
  - 2. Location: At all LVP/Carpet transitions.
- C. Adhesive: As recommended by manufacturer of vinyl tiles.



### **PART 3 - EXECUTION**

#### **3.1 PREPARATION**

- A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F710.
  - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
  - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
  - 3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
  - 4. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft. and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
    - a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
    - b. Relative Humidity Test: Using in-situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install floor tiles until materials are the same temperature as space where they are to be installed.
  - 1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.
- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

#### **3.2 FLOOR TILE INSTALLATION**

- A. Position planks so the end seams are no closer than the width of the plank being installed. Maintain this approach to staggering the planks throughout the entire installation while keeping a random appearance.
- B. Center tiles or planks in rooms and hallways so borders are not less than half a tile or plank when possible.
- C. Cut edges shall always be installed against a wall.
- D. Install using tile and plank installation techniques recommended by manufacturer.
- E. Install tiles, planks, borders and feature strips in locations and configurations indicated on the Drawings.

#### **3.3 PRODUCT APPLICATION**

- A. Comply with manufacturer's instruction sheets included in material packaging.
- B. Clean, stable, and dry subfloors are required. Concrete subfloors must be moisture tested and any above 75% RH must have a DPM, damp proof membrane, or moisture mitigation installed.
- C. Confirm floors are flat to within 1/8 inch in 10 feet.
- D. Install with a 1/4-inch expansion at all walls and other vertical abutments.

#### **3.4 CLEANING**

- A. Wipe off any adhesive on floor as installation proceeds. Wait 48 hours before applying the cleaning and maintenance products.

- B. Prior to installation of permanent fixtures or furniture, remove all dirt, debris, or residual adhesive and clean the floor. If desired, a protective covering may be applied at this time. Specific products and instructions are available from the manufacturer.

### **3.5 PROTECTION**

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

### **3.6 MAINTENANCE**

- A. Comply with manufacturer's instructions for proper cleaning and maintenance of the products.

**END OF SECTION 09 6519**

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## **SECTION 09 6813 - TILE CARPETING**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes:
  - 1. Carpet tile.
  - 2. Walk-off carpet tile.

#### **1.2 ACTION SUBMITTALS**

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

#### **1.3 CLOSEOUT SUBMITTALS**

- A. Maintenance data.

#### **1.4 WARRANTY**

- A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: 10 years from date of Substantial Completion.

### **PART 2 - PRODUCTS**

#### **2.1 CARPET TILE**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Milliken Remix Remastered, Base Line.
- B. Size: 50 cm. by 50 cm.
- C. Color:
  - 1. Office spaces: BSL27 Vinyl.
  - 2. Common areas: BSL252-27 Vinyl with Papaya.

#### **2.2 WALK-OFF CARPET TILE**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Bentley, Rough Idea Shear 8RN24.
- B. Size: 24 in. by 24 in.
- C. Color: 800116 Design.

#### **2.3 INSTALLATION ACCESSORIES**

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and are recommended by carpet tile manufacturer for releasable installation.

### **PART 3 - EXECUTION**

#### **3.1 EXAMINATION**

- A. Concrete Slabs:
  - 1. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
    - a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
    - b. Relative Humidity Test: Using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
    - c. Perform additional moisture tests recommended in writing by adhesive and carpet tile manufacturers. Proceed with installation only after substrates pass testing.

#### **3.2 PREPARATION**

- A. General: Comply with CRI's "CRI Carpet Installation Standards" and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider, and protrusions more than 1/32 inch unless more stringent requirements are required by manufacturer's written instructions.
- C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.
- D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

#### **3.3 INSTALLATION**

- A. General: Comply with CRI's "CRI Carpet Installation Standard," Section 18, "Modular Carpet" and with carpet tile manufacturer's written installation instructions.
- B. Installation Method: Glue down; install every tile with full-spread, releasable, pressure-sensitive adhesive.
- C. Maintain dye-lot integrity. Do not mix dye lots in same area.
- D. Maintain pile-direction patterns recommended in writing by carpet tile manufacturer.
- E. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.
- F. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.
- H. Install pattern parallel to walls and borders.
- I. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

#### **END OF SECTION 09 6813**

## SECTION 09 9123 - PAINTING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes painting work, interior and exterior. Work Includes, but is not limited to painting or finishing the following:
1. Exterior steel.
  2. Metal doors, metal door frames, grilles and frames.
  3. Exterior metal mechanical units, grilles and louvers.
  4. Interior walls and ceilings.
  5. Interior steel misc. metal.
  6. Exterior exposed metal flashing.
  7. Interior masonry.
  8. Work includes field painting of exposed bare and covered pipes and ducts (including color coding), and of hangers, exposed steel and iron work, plug mold, electric panels, and primed metal surfaces of equipment installed under mechanical and electrical work, except as otherwise indicated.
- B. "Paint" as used herein means all coating systems materials, including primers, emulsions, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats.
- C. Surfaces to be Painted: Except where natural finish of material is specifically noted as a surface not to be painted, paint all exposed surfaces whether or not colors are designated in "schedules". Where items or surfaces are not specifically mentioned, paint the same as similar adjacent materials or areas. If color or finish is not designated, Architect will select these from manufacturer's full range of colors and finishes. Multiple colors will be selected by the Architect for any type of paint system. If colors are not indicated on the drawings, provide for a minimum of 20 percent of the walls to be an accent color.
1. Surface preparation, priming and coats of paint specified are in addition to shop-priming and surface treatment specified under other sections of work.
  2. Walls behind scheduled coverings shall receive prime coat.
  3. If it can be seen, paint it.
- D. Following categories of work are not included as part of field-applied finish work:
1. Pre-Finished Items: Unless otherwise indicated, do not include painting when factory-finishing or installer-finishing is specified for such items as (but not limited to) metal toilet enclosures, pre-finished partition systems, architectural woodwork and casework, elevator entrance doors and frames, elevator equipment, and finished mechanical and electrical equipment, including light fixtures, switchgear and distribution cabinets.
  2. Concealed Surfaces: Unless otherwise indicated, painting is not required on surfaces such as walls or ceilings in concealed areas and generally inaccessible areas, foundation spaces, furred areas, utility tunnels, pipe spaces and duct shafts.
  3. Finished Metal Surfaces: Unless otherwise indicated, metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze and similar finished materials will not require finish painting.
  4. Operating Parts: Unless otherwise indicated, moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sinkages, sensing devices, motor and fan shafts will not require finish painting.
  5. Labels: Do not paint over any code-required labels, such as Underwriters' Laboratories and Factory Mutual, or any equipment identification, performance rating, name, or nomenclature plates.
- E. Related Sections:
1. Shop Primers: Unless otherwise specified, shop priming of ferrous metal items is included under various sections for structural steel, metal fabrications, hollow metal work and similar items.
    - a. Unless otherwise specified, shop priming of fabricated components such as architectural woodwork, wood casework and shop-fabricated or factory-built mechanical and electrical equipment or accessories is included under other sections of these specifications.
- F. Related Documents: Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

## 1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's technical information including Paint label analysis and application instructions for each material proposed for use.
- B. Samples: Prior to beginning work, review Finish Schedule for colors to be painted. Use representative colors when preparing samples for review. Submit samples for Architect's review of color and texture only. Provide a listing of material and application for each coat of each finish sample.
  - 1. On 12" x 12" hardboard, provide two samples of each color and material, with texture to simulate actual conditions. Resubmit samples as requested by Architect until acceptable sheen, color, and texture is achieved.
  - 2. On actual wood surfaces, provide two 4" x 8" samples of natural and stained wood finish. Label and identify each as to location and application.
  - 3. On actual wall surfaces and other exterior and interior building components, duplicate painted finishes of prepared samples. Provide full-coat finish samples on at least 100 sq. ft. of surface, or as directed, until required sheen, color and texture is obtained; simulate finished lighting conditions for review of in-place work.
    - a. Final acceptance of colors will be from samples applied on the job.

## 1.3 QUALITY ASSURANCE

- A. Single Source Responsibility: Provide primers and other undercoat paint produced by same manufacturer as finish coats. Use only thinners approved by paint manufacturer, and use only within recommended limits.
- B. Coordination of Work: Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of total coatings system for various substrates. Upon request from other trades, furnish information or characteristics of finish materials provided for use, to ensure compatible prime coats are used.

## 1.4 DELIVERY AND STORAGE

- A. Deliver materials to job site in original, new and unopened packages and containers bearing manufacturer's name and label, and following information:
  - 1. Name or title of material.
  - 2. Fed. Spec. number, if applicable.
  - 3. Manufacturer's stock number and date of manufacture.
  - 4. Manufacturer's name.
  - 5. Contents by volume, for major pigment and vehicle constituents.
  - 6. Thinning instructions.
  - 7. Application instructions.
  - 8. Color name and number.
- B. Store materials not in actual use in tightly covered containers. Maintain containers used in storage of paint in a clean condition, free of foreign materials and residue.
  - 1. Protect from freezing where necessary. Keep storage area neat and orderly. Remove oily rags and waste daily. Take all precautions to ensure that workmen and work areas are adequately protected from fire hazards and health hazards resulting from handling, mixing and application of paints.

## 1.5 PROJECT CONDITIONS

- A. Apply water-base paints only when temperature of surfaces to be painted and surrounding air temperatures are between 50 deg. F and 90 deg. F, unless otherwise permitted by paint manufacturer's printed instructions.
- B. Apply solvent-thinned paints only when temperature of surfaces to be painted and surrounding air temperatures are between 45 deg. F and 95 deg. F, unless otherwise permitted by paint manufacturer's printed instructions.
- C. Do not paint in snow, rain, fog or mist, or when relative humidity exceeds 85%, or to damp or wet surfaces, unless otherwise permitted by paint manufacturer's printed instructions.
  - 1. Painting may be continued during inclement weather if areas and surfaces to be painted are enclosed and heated within temperature limits specified by paint manufacturer during application and drying periods.

- D. Determine moisture content of surfaces to be painted by performing appropriate tests using a commercially available moisture meter. Apply paint only when surfaces are within limits specified by the paint manufacturer's printed instructions.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURER**

- A. Approved Manufacturers:
  - 1. PPG Industries, Pittsburgh Paints (Pittsburgh).
  - 2. Pratt and Lambert (P & L).
  - 3. The Sherwin-Williams Company (S-W).
  - 4. Benjamin Moore & Co.

### **2.2 MATERIALS**

- A. Material Quality: Provide best quality grade of various types of coatings as regularly manufactured by acceptable paint materials manufacturers. Materials not displaying manufacturer's identification as a standard, best-grade product will not be acceptable.
- B. Proprietary names used to designate color or materials are not intended to imply that products of named manufacturers are required to exclusion of equivalent products of other manufacturers.
- C. Federal Specifications establish minimum acceptable quality for paint materials. Provide written certification from paint manufacturer that materials provided meet or exceed these minimums.
- D. Manufacturer's products which comply with coating qualitative requirements of applicable Federal Specifications, yet differ in quantitative requirements, may be considered for use when acceptable to Architect. Furnish material data and manufacturer's certificate of performance to Architect for any proposed substitutions.
- E. Color Pigments: Pure, non-fading, applicable types to suit substrates and service indicated.
- F. Lead content in pigment, if any, is limited to contain not more than 0.06% lead, as lead metal based on the total non-volatile (dry-film) of paint by weight.
  - 1. This limitation is extended to interior surfaces and those exterior surfaces, such as stairs, decks, porches, railings, windows, and doors which are readily accessible to children under seven years of age.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Applicator must examine areas and conditions under which painting work is to be applied and notify Contractor in writing of conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to Applicator.
- B. Starting of painting work will be construed as Applicator's acceptance of surfaces and conditions within any particular area.
- C. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to formation of a durable paint film.

### **3.2 PREPARATION**

- A. General: Perform preparation and cleaning procedures in accordance with paint manufacturer's instructions and as herein specified, for each particular substrate condition.
- B. Barrier Coats: Provide barrier coats over incompatible primers or remove and re-prime as required. Notify Architect in writing of any anticipated problems in using the specified coating systems with substrates primed by others.



- C. Accessories Removal: Remove hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be finish-painted, or provide surface-applied protection prior to surface preparation and painting operations. Remove, if necessary, for complete painting of items and adjacent surfaces. Following completion of painting of each space or area, reinstall removed items.
- D. Surface Preparation: Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease prior to mechanical cleaning. Program cleaning and painting so that contaminants from cleaning process will not fall onto wet, newly-painted surfaces.
- E. Cementitious Materials: Prepare cementitious surfaces to be painted by removing efflorescence, chalk, dust, dirt, grease, oils, and by roughening as required to remove glaze.
  - 1. Determine alkalinity and moisture content of surfaces to be painted by performing appropriate tests. If surfaces are found to be sufficiently alkaline to cause blistering and burning of finish paint, correct this condition before application of paint. Do not paint over surfaces where moisture content exceeds that permitted in manufacturer's printed directions.
  - 2. Clean concrete floor surfaces scheduled to be painted with a commercial solution or muriatic acid, or other etching cleaner. Flush floor with clean water to neutralize acid, and allow to dry before painting.
- F. Ferrous Metals: Clean ferrous surfaces, which are not galvanized or shop-coated, of oil, grease, dirt, loose mill scale and other foreign substances by solvent or mechanical cleaning.
  - 1. Caulk fabrication joints in hollow metal door frames which paint application cannot bridge.
- G. Touch-up: Touch-up shop-applied prime coats wherever damaged or bare, where required by other sections of these specifications. Clean and touch-up with same type shop primer.
- H. Galvanized Surfaces: Clean free of oil and surface contaminants with non-petroleum based solvent.
- I. Wood: Clean wood surfaces to be painted of dirt, oil, or other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sandpaper smooth those finished surfaces exposed to view, and dust off. Scrape and clean small, fry, seasoned knots and apply a thin coat of white shellac or other recommended knot sealer, before application of priming coat. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood-filler. Sandpaper smooth when dried.
  - 1. Prime, stain, or seal wood required to be job-painted immediately upon delivery to job. Prime edges, ends, faces, undersides, and backsides of such wood, including cabinets, counters, cases, paneling.
  - 2. When transparent finish is required, use spar varnish for backpriming.
  - 3. Apply penetrating oil finish in accordance with manufacturer's written instructions, including wood preparation, drying times, and application method.
- J. Materials Preparation:
  - 1. Mix and prepare painting materials in accordance with manufacturer's directions.
  - 2. Maintain containers used in mixing and application of paint in a clean condition, free of foreign materials and residue.
  - 3. Stir materials before application to produce a mixture of uniform density, and stir as required during application. Do not stir surface film into material. Remove film and, if necessary, strain material before using.

### 3.3 APPLICATION

- A. General: Apply paint in accordance with manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied.
  - 1. Paint colors, surface treatments, and finishes, are indicated in "schedules" of the contract documents.
  - 2. Provide finish coats which are compatible with prime paints used.
  - 3. Apply additional coats when undercoats, stains or other conditions show through final coat of paint, until paint film is of uniform finish, color and appearance. Give special attention to insure that surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
  - 4. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Paint surfaces behind permanently-fixed equipment or furniture with prime coat only before final installation of equipment.

5. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint.
  6. Paint back sides of access panels, and removable or hinged covers to match exposed surfaces.
  7. Finish doors on tops, bottoms and side edges same as faces, unless otherwise indicated.
  8. Sand lightly between each succeeding enamel or varnish coat.
  9. Omit first coat (exterior faces) of surfaces which have been **shop-primed** and touch-up painted, unless otherwise indicated.
- B. Scheduling Painting: Apply first-coat material to surfaces that have been cleaned, pretreated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
1. Re-coat Time: Allow sufficient time between successive coatings to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.
  2. Minimum Coating Thickness: Apply materials at not less than manufacturer's recommended spreading rate, to establish a total dry film thickness as indicated or, if not indicated, as recommended by coating manufacturer.
- C. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to those items exposed to mechanical equipment rooms and in occupied spaces.
1. Mechanical items to be painted include, but are not limited to, the following:
    - a. Piping, pipe hangers, and supports.
    - b. Roof mounted mechanical units.
    - c. Ductwork, where exposed in occupied spaces.
    - d. Motor, mechanical equipment, and supports.
    - e. Accessory items.
  2. Electrical items to be painted include, but are not limited to, the following:
    - a. Conduit and fittings.
- D. Prime Coats: Apply prime coat of material which is required to be painted or finished, and which has not been prime coated by others.
1. Recoat primed and sealed surfaces where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn-through or other defects due to insufficient sealing.
- E. Pigmented (Opaque) Finishes: Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness or other surface imperfections will not be acceptable.
- F. Completed Work: Match approved samples for color, texture and coverage. Remove, refinish or repaint work not in compliance with specified requirements.

### 3.4 FIELD QUALITY CONTROL

- A. The right is reserved by Owner to invoke the following material testing procedure at any time, and any number of times during period of field painting:
1. Owner will engage services of an independent testing laboratory to sample paint being used. Samples of materials delivered to project site will be taken, identified and sealed, and certified in presence of Contractor.
    - a. Testing laboratory will perform appropriate tests for any or all of following characteristics: Abrasion resistance, apparent reflectivity, flexibility, washability, absorption, accelerated weathering, dry opacity, accelerated yellowness, recoating, skinning, color retention, alkali resistance and quantitative materials analysis.
    - b. If test results show that material being used does not comply with specified requirements, Contractor may be directed to stop painting work, and remove non-complying paint; pay for testing; repaint surfaces coated with rejected paint; remove rejected paint from previously painted surfaces if, upon repainting with specified paint, the two coatings are non-compatible.

### 3.5 CLEAN-UP AND PROTECTION

- A. Clean-Up: During progress of work, remove from site discarded paint materials, rubbish, cans and rags at end of each work day.

1. Upon completion of painting work, clean window glass and other paint spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using car not to scratch or otherwise damage finished surfaces.
- B. Protection: Protect work of other trades, whether to be painted or not, against damage by painting and finishing work. Correct any damage by cleaning, repairing or replacing, and repainting, as acceptable to Architect.
  1. Provide "Wet Paint" signs as required to protect newly-painted finishes. Remove temporary protective wrappings provided by others for protection of their work, after completion of painting operations.
  2. At completion of work of other trades, touch-up and restore all damaged or defaced painted surfaces.
- C. Extra Stock: Deliver stock or maintenance materials to Owner. Furnish maintenance material matching products installed, packaged with protective covering for storage and identified with appropriate labels.
  1. Paint: Furnish not less than one (1) full gallon for each color and type of paint installed.

### 3.6 EXTERIOR PAINT SCHEDULE

- A. General: Provide the following paint systems for the various substrates as indicated below or equivalent system from approved manufacturers listed above.
- B. METAL (Misc. Iron, Ornamental Iron, Handrails, Ladders, Doors and Frames, etc.)

#### Sherwin-Williams - Alkyd Systems

- 1st Coat: S-W Kem Kromik Universal Metal Primer, B50Z  
Finish: Flat  
Sheen: (Percent at 60 deg) less than 10%  
Thickness: (Mils per coat) 6 - 8 wet - 3 - 4 dry.
- 2nd Coat: S-W Industrial Enamel, B54Z Series  
3rd Coat: S-W Industrial Enamel, B54Z Series  
Finish: Gloss  
Sheen: (Percent at 60 deg) 75-85%  
Thickness: (Mils per coat) 6.5 - 10 wet - 2.5 - 4 dry.

#### Benjamin Moore- Alkyd Systems

- 1st Coat: B-M Super Spec HP Alkyd Metal Primer P14  
Finish: Flat  
Sheen: (Percent at 60 deg) 10% max  
Thickness: (Mils per coat) 4.0 – 5.4 mils wet 1.9-2.6 mils dry.
- 2nd Coat: B-M Super Spec HP Alkyd DTM Semi-Gloss P24  
3rd Coat: B-M Super Spec HP Alkyd DTM Semi-Gloss P24  
Finish: Semi-Gloss  
Sheen: (Percent at 60 deg) 45-55%  
Thickness: (Mils per coat) 3.6 – 4.6 mils wet- 1.7 – 2.3 mils dry.

#### PPG - Alkyd Systems

- 1st Coat: PPG Multiprime Low VOC Universal Primer 97-680.  
Finish: Satin  
Sheen: (Percent at 60 deg) less than 25.  
Thickness: (Mils per coat) 5.6 - 7.4 wet; 3.0 - 4.0 dry.
- 2nd Coat: PPG Speedhide Gloss Oil Enamels 6-282 Series.  
3rd Coat: PPG Speedhide Gloss Oil Enamels 6-282 Series  
Finish: Gloss  
Sheen: (Percent at 60 deg) 85-100  
Thickness: 3.2 - 4.0 wet; 1.8 - 2.3 dry.

### 3.7 INTERIOR PAINT SCHEDULE

- A. General: Provide the following paint systems for the various substrates as indicated below or equivalent system from approved manufacturers listed above.

B. MASONRY PAINTED (Interior Concrete Masonry Units)

Sherwin-Williams - Vinyl Acrylic Systems

1st Coat: S-W ProMar Interior/Exterior Block Filler B25W25

Finish: Flat

Sheen: (Percent at 85 deg) 0-5%

Thickness: (Mils per coat) 16 wet - 8 dry.

2nd Coat: S-W ProMar 200 Latex Semi-Gloss B31W200 Series

3rd Coat: S-W ProMar 200 Latex Semi-Gloss B31W200 Series

Finish: Semi-Gloss

Thickness: (Mils per coat) 4 wet - 1.5 dry.

PPG - Vinyl Acrylic Systems

1st Coat: PPG Speedhide Masonry Block Filler Latex 6-7

Finish: Flat

Sheen: (Percent at 60 & 85 deg) 0 - 5.

Thickness: (Mils per coat) 11.0 - 32.0 wet; 5.1 - 14.7 dry.

2nd Coat: PPG Speedhide Interior Semi-Gloss Latex 6-500 Series.

3rd Coat: PPG Speedhide Interior Semi-Gloss Latex 6-500 Series.

Finish: Semi-gloss

Sheen: (Percent at 60 deg) 50 - 60.

Thickness: (Mils per coat) 4.0 wet; 1.4 dry.

C. METAL - (Interior Structural Steel - Columns, Joists, Trusses, Beams - Misc. & Ornamental Iron, Doors, Door Frames, Non-Galvanized Metal)

Sherwin-Williams - Vinyl Acrylic with 100% Acrylic primer:

1st Coat S-W DTM Acrylic Primer, B66W1 Series

Finish: Flat

Sheen: (Percent at 85 deg) less than 10%

Thickness: (Mils per coat) 10 wet - 5 dry.

2nd Coat: S-W ProMar 200 Latex Semi-Gloss B31W200 Series

3rd Coat: S-W ProMar 200 Latex Semi-Gloss B31W200 Series

Finish: Semi-Gloss

Sheen: (Percent at 60 deg) 25-35%

Thickness: (Mils per coat) 3.5 wet - 1.3 dry.

Benjamin Moore- Acrylic Copolymer with 100% Acrylic primer:

1st Coat B-M Ultra Spec HP Acrylic Metal Primer HP04

Finish: Matte

Sheen: (Percent at 60 deg) less than

10% Thickness: (Mils per coat) 4.4-5.5

wet-1.7 - 2.3 dry.

2nd Coat: B-M Ultra Spec 500 Latex Semi-Gloss 539

3rd Coat: B-M Ultra Spec 500 Latex Semi-Gloss 539

Finish: Semi-Gloss

Sheen: (Percent at 60 deg) 20-35%

Thickness: (Mils per coat) 4.3 wet- 1.8

dry.

PPG - Vinyl Acrylic with 100% Acrylic Primer:

1st Coat: PPG Pitt-Tech Primer/Finish DTM 90-712 Series.

Finish: Flat

Sheen: (Percent at 60 deg) 0-10

Thickness: (Mils per coat) 5.1 - 7.7 wet; 2.0 -3.0 dry.

2nd Coat: PPG Speedhide Interior Semi-Gloss Latex 6-500 Series.

3rd Coat: PPG Speedhide Interior Semi-Gloss Latex 6-500 Series.

Finish: Semi-gloss

Sheen: (Percent at 60 deg) 50 - 60.

Thickness: (Mils per coat) 4.0 wet; 1.4 dry.

Alkyd Systems (Interior Contractor Option for Doors and Door Frames)

Sherwin-Williams - Vinyl Acrylic with 100% Acrylic primer:

1st Coat: S-W Kem Kromik Universal Primer, B50Z Series

Finish: Flat

Sheen: (Percent at 60 deg) less than 10%

Thickness: (Mils per coat) 6-8 wet - 3-4 dry.

2nd Coat: S-W ProMar 200 Alkyd Semi-Gloss, B34W200 Series

3rd Coat: S-W ProMar 200 Alkyd Semi-Gloss, B34W200 Series

Finish: Semi-Gloss

Sheen: (Percent at 60 deg) 30-40%

Thickness: (Mils per coat) 4 wet - 1.7 dry.

Benjamin Moore- Acrylic Copolymer with 100% Acrylic primer:

1st Coat: B-M Ultra Spec HP Acrylic Metal Primer HP04

Finish: Matte

Sheen: (Percent at 60 deg) less than

10% Thickness: (Mils per coat) 4.4-5.5

wet-1.7 - 2.3 dry.

2nd Coat: B-M Ultra Spec 500 Latex Semi-Gloss 539

3rd Coat: B-M Ultra Spec 500 Latex Semi-Gloss 539

Finish: Semi-Gloss

Sheen: (Percent at 60 deg) 20-35%

Thickness: (Mils per coat) 4.3 wet- 1.8

dry.

PPG - Vinyl Acrylic with 100% Acrylic Primer:

1st Coat: PPG Pitt-Tech Primer/Finish DTM 90-712 Series.

Finish: Flat

Sheen: (Percent at 60 deg) 0-10

Thickness: (Mils per coat) 5.1 - 7.7 wet; 2.0 -3.0 dry.

2nd Coat: PPG Speedhide Interior Semi-Gloss Latex 6-500 Series.

3rd Coat: PPG Speedhide Interior Semi-Gloss Latex 6-500 Series.

Finish: Semi-gloss

Sheen: (Percent at 60 deg) 50 - 60.

Thickness: (Mils per coat) 4.0 wet; 1.4 dry.

D. DRYWALL (Walls, Ceilings, Gypsum Board, Etc.)

Drywall Primer: Apply one coat on drywall surfaces prior to application of any 3-coat system indicated below.

Sheetrock First Coat by USG.

Prep Coat by Westpac Materials.

Level Coat by Magnum Products.

Equal as approved by Architect before bidding.

Sherwin-Williams - Vinyl Acrylic Systems

1st Coat: S-W Preprite 200 Latex Wall Primer, B28W200

Finish: Flat

Sheen: (Percent at 85 deg) 0-5%

Thickness: (Mils per coat) 4.3 wet - 1.2 dry.

2nd Coat: S-W ProMar 200 Latex Semi-Gloss, B31W200 Series

3rd Coat: S-W ProMar 200 Latex Semi-Gloss, B31W200 Series

Finish: Semi-Gloss

Sheen: (Percent at 60 deg) 25-35%

Thickness: (Mils per coat) 3.5 wet - 1.3 dry.

Benjamin Moore- Acrylic Copolymer Systems

1st Coat: Ultra Spec 500 Interior Primer/Sealer 534

Finish: Flat

Sheen: (Percent at 85 deg) 3-8%

Thickness: (Mils per coat) 4.3 wet- 1.8 dry.  
2nd Coat: B-M Ultra Spec 500 Latex Semi-Gloss 539  
3rd Coat: B-M Ultra Spec 500 Latex Semi-Gloss 539  
Finish: Semi-Gloss  
Sheen: (Percent at 60 deg) 20-35%  
Thickness: (Mils per coat) 4.3 wet- 1.8  
dry.

PPG - Vinyl Acrylic Systems

1st Coat: PPG Speedhide Interior Quick Drying Latex Sealer 6-2.  
Finish: Primer  
Sheen: (Percent at 60 deg) 2 - 6  
Thickness: (Mils per coat) 3.6 - 4.5 wet; 1.0 - 1.3 dry  
2nd Coat: PPG Speedhide Interior Semi-Gloss Latex 6-500 Series.  
3rd Coat: PPG Speedhide Interior Semi-Gloss Latex 6-500 Series.  
Finish: Semi-gloss  
Sheen: (Percent at 60 deg) 50 - 60.  
Thickness: (Mils per coat) 4.0 wet; 1.4 dry.

E. WOODWORK (Painted)

Latex Systems

Semi-Gloss Finish

1st Coat: B-M Sure Seal Interior/Exterior Primer 027 (3.8 mils wet 1.3 mils dry)

All Colors:

2nd Coat: B-M Ultra Spec 500 Latex Semi-Gloss 539  
3rd Coat: B-M Ultra Spec 500 Latex Semi-Gloss 539  
Finish: Semi-Gloss  
Sheen: (Percent at 60 deg) 20-35%  
Thickness: (Mils per coat) 4.3 wet- 1.8  
dry.

**END OF SECTION 09 9123**

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## SECTION 09 9300 - STAINING AND TRANSPARENT FINISHING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes surface preparation and application of wood stains and transparent finishes.

#### 1.2 DEFINITIONS

- A. MPI Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- C. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- D. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- E. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
  - 1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
- B. Samples: For each type of finish system and in each color and gloss of finish required.

#### 1.4 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each finish system indicated and each color selected to verify preliminary selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
  - 1. Architect will select one surface to represent surfaces and conditions for application of each type of finish system and substrate.
    - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft..
    - b. Other Items: Architect will designate items or areas required.
  - 2. Final approval of stain color selections will be based on mockups.
    - a. If preliminary stain color selections are not approved, apply additional mockups of additional stain colors selected by Architect at no added cost to Owner.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
  - 1. Benjamin Moore & Co.
  - 2. PPG Industries, Pittsburgh Paints (Pittsburgh).
  - 3. Pratt and Lambert (P & L).
  - 4. The Sherwin-Williams Company (S-W).
  - 5. UltraClear Epoxy <http://www.bestbartopepoxy.com>.
- B. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to products listed in wood finish systems schedules for the product category indicated.



## **2.2 MATERIALS, GENERAL**

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products List."
- B. Material Compatibility:
  - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
  - 2. For each coat in a paint system, products shall be recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- C. Stain Colors: Match Architect's samples.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Exterior Wood Substrates: 15 percent, when measured with an electronic moisture meter.
- C. Maximum Moisture Content of Interior Wood Substrates: 15 percent, when measured with an electronic moisture meter.
- D. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- E. Proceed with finish application only after unsatisfactory conditions have been corrected.
  - 1. Beginning finish application constitutes Contractor's acceptance of substrates and conditions.

### **3.2 PREPARATION**

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and finishing.
  - 1. After completing finishing operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean and prepare surfaces to be finished according to manufacturer's written instructions for each substrate condition and as specified.
  - 1. Remove dust, dirt, oil, and grease by washing with a detergent solution; rinse thoroughly with clean water and allow to dry. Remove grade stamps and pencil marks by sanding lightly. Remove loose wood fibers by brushing.
  - 2. Remove mildew by scrubbing with a commercial wash formulated for mildew removal and as recommended by stain manufacturer.

### **3.3 APPLICATION**

- A. Apply finishes according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
- B. Apply finishes to produce surface films without cloudiness, holidays, lap marks, brush marks, runs, ropiness, or other surface imperfections.

**3.4 CLEANING AND PROTECTION**

- A. Protect work of other trades against damage from finish application. Correct damage by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- B. At completion of construction activities of other trades, touch up and restore damaged or defaced finished wood surfaces.

**3.5 INTERIOR WOOD -FINISH-SYSTEM SCHEDULE**

- A. Wood Substrates: Wood trim, architectural woodwork.
  - 1. Polyurethane Varnish over Stain System MPI INT 6.4E:
    - a. Stain Coat: Stain, semitransparent, for interior wood, MPI #90.
    - b. First Intermediate Coat: Polyurethane varnish matching topcoat.
    - c. Second Intermediate Coat: Polyurethane varnish matching topcoat.
    - d. Topcoat: Varnish, interior, polyurethane, oil modified, satin (MPI Gloss Level 4), MPI #57.

**END OF SECTION 09 9300**

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**DIVISION 10 - SPECIALTIES**

10 4413	FIRE EXTINGUISHER CABINETS
10 4416	FIRE EXTINGUISHERS

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## SECTION 10 4413 - FIRE EXTINGUISHER CABINETS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes fire protection cabinets for fire extinguishers.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For fire protection cabinets. Include plans, elevations, sections, details, and attachments to other work.
- C. Samples: For each exposed product and for each color and texture specified.

#### 1.3 CLOSEOUT SUBMITTALS

- A. Maintenance data.

#### 1.4 QUALITY ASSURANCE

- A. Coordinate size of fire protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.
- B. Coordinate sizes and locations of fire protection cabinets with wall depths.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.
- B. Transparent Acrylic Sheet: ASTM D 4802, Category A-1 (cell-cast sheet), 6 mm thick, with Finish 1 (smooth or polished).

#### 2.2 FIRE PROTECTION CABINET

- A. Cabinet Type: Suitable for fire extinguisher.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. J. L. Industries, Inc., a division of Activar Construction Products Group; Design Standard: Cosmopolitan 1017W12.
    - b. Kidde Residential and Commercial Division, Subsidiary of Kidde plc.
    - c. Larsen's Manufacturing Company.
    - d. Potter Roemer LLC.
    - e. Watrous Division, American Specialties, Inc..
- B. Cabinet Construction: Nonrated.
- C. Cabinet Material: Steel sheet.
- D. Semirecessed Cabinet: Cabinet box partially recessed in walls of sufficient depth to suit style of trim indicated; with one-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend). Provide where walls are of insufficient depth for recessed cabinets but are of sufficient depth to accommodate semirecessed cabinet installation.

1. Rolled-Edge Trim: 2-1/2-inch backbend depth.
- E. Cabinet Trim Material: Steel sheet.
- F. Door Material: Steel sheet.
- G. Door Style: Center glass panel with frame.
- H. Door Glazing: Break glass.
- I. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
- J. Accessories:
  1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
  2. Door Lock: Cam lock that allows door to be opened during emergency by pulling sharply on door handle.
  3. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as directed by Architect.
    - a. Identify fire extinguisher in fire protection cabinet with the words "FIRE EXTINGUISHER."
      - 1) Location: Applied to cabinet door.
      - 2) Application Process: Silk-screened.
      - 3) Lettering Color: Red.
      - 4) Orientation: Vertical.
- K. Finishes:
  1. Manufacturer's standard baked-enamel paint for the following:
    - a. Exterior of cabinet, door, and trim, except for those surfaces indicated to receive another finish.
    - b. Interior of cabinet.

## 2.3 FABRICATION

- A. Fire Protection Cabinets: Provide manufacturer's standard box (tub), with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated. Miter and weld joints and grind smooth.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Examine walls and partitions for suitable framing depth and blocking where semirecessed cabinets will be installed and prepare recesses as required by type and size of cabinet and trim style.
- B. Install fire protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.
- C. Fire Protection Cabinets: Fasten cabinets to structure, square and plumb.
- D. Adjust fire protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.
- E. Replace fire protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

## END OF SECTION 10 4413

## SECTION 10 4416 - FIRE EXTINGUISHERS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.

#### 1.2 ACTION SUBMITTALS

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

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Warranty: Sample of special warranty.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

#### 1.5 QUALITY ASSURANCE

- A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
- B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.
- C. Coordinate type and capacity of fire extinguishers with fire protection cabinets to ensure fit and function.

#### 1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Failure of hydrostatic test according to NFPA 10.
    - b. Faulty operation of valves or release levers.
  - 2. Warranty Period: Six years from date of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

- A. Fire Extinguishers: Type, size, and capacity for each fire protection cabinet and mounting bracket indicated.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Amerex Corporation.
    - b. Ansul Incorporated; Tyco International Ltd.
    - c. Badger Fire Protection; a Kidde company.
    - d. J. L. Industries, Inc.; a division of Activar Construction Products Group.
    - e. Kidde Residential and Commercial Division; Subsidiary of Kidde plc.
    - f. Larsen's Manufacturing Company.
    - g. Potter Roemer LLC.
  - 2. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B.
- B. Multipurpose Dry-Chemical Type: UL-rated 4-A:60-B-C nominal capacity, with monoammonium phosphate-based dry chemical in manufacturer's standard enameled container.



## 2.2 MOUNTING BRACKETS

- A. Mounting Brackets: Manufacturer's standard steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or red baked-enamel finish.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Amerex Corporation.
    - b. Ansul Incorporated; Tyco International Ltd.
    - c. Badger Fire Protection; a Kidde company.
    - d. Buckeye Fire Equipment Company.
    - e. J. L. Industries, Inc.; a division of Activar Construction Products Group.
    - f. Larsen's Manufacturing Company.
    - g. Potter Roemer LLC.
- B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.
  - 1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.
    - a. Orientation: Vertical.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Examine fire extinguishers for proper charging and tagging.
  - 1. Remove and replace damaged, defective, or undercharged fire extinguishers.
- B. Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.
  - 1. Mounting Brackets: 54 inches above finished floor to top of fire extinguisher.
- C. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

**END OF SECTION 10 4416**

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**DIVISION 12 – FURNISHINGS**

12 2113	HORIZONTAL LOUVER BLINDS
12 3661	SOLID SURFACE COUNTERTOPS

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## SECTION 12 2113 - HORIZONTAL LOUVER BLINDS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Horizontal louver blinds with aluminum slats.
    - a. At all exterior windows in Rooms 100, 101, 116, 117, 118, 120,405 and 514.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show fabrication and installation details for horizontal louver blinds.
- C. Samples: For each exposed product and for each color and texture specified.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Product certificates.
- B. Product test reports.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.

### PART 2 - PRODUCTS

#### 2.1 HORIZONTAL LOUVER BLINDS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Comfortex Window Fashions.
  - 2. Hunter Douglas Contract.
  - 3. Levolor Contract; a Newell Rubbermaid company.
  - 4. Springs Window Fashions.
- B. Aluminum Slats:
  - 1. Width: 1 inch.
  - 2. Thickness: Manufacturer's standard.
  - 3. Spacing: Manufacturer's standard.
- C. Slat Features:
  - 1. Lift-Cord Rout Holes: Minimum size required for lift cord and located near back (outside) edge of slat to maximize slat overlap and minimize light gaps between slats.
- D. Headrail:
  - 1. Manual Lift Mechanism:
    - a. Lift-Cord Lock: Variable; stops lift cord at user-selected position within blind full operating range.
    - b. Operator: Extension of lift cord(s) through lift-cord lock mechanism to form cord pull.
  - 2. Manual Tilt Mechanism: Enclosed worm-gear mechanism and linkage rod that adjusts ladders.
    - a. Tilt: Full.
    - b. Operator: Clear-plastic wand.
  - 3. Manual Lift-Operator and Tilt-Operator Lengths: Manufacturer's standard.
  - 4. Manual Lift-Operator and Tilt-Operator Locations: Manufacturer's standard unless otherwise indicated.

- E. Bottom Rail: Matching slats.
  - 1. Type: Manufacturer's standard.
- F. Ladders: Braided cord.
- G. Valance: Manufacturer's standard.
- H. Mounting Brackets: With spacers and shims required for blind placement and alignment indicated.
  - 1. Type: Wall.
  - 2. Intermediate Support: Provide intermediate support brackets to produce support spacing recommended by blind manufacturer for weight and size of blind.
- I. Hold-Down Brackets and Hooks or Pins: Manufacturer's standard.
- J. Side Channels and Perimeter Light Gap Seals: Manufacturer's standard.
- K. Colors, Textures, Patterns, and Gloss:
  - 1. Slats: As selected by Architect from manufacturer's full range.
  - 2. Components: Provide rails, cords, ladders, and materials exposed to view matching or coordinating with slat color unless otherwise indicated.

## **2.2 HORIZONTAL LOUVER BLIND FABRICATION**

- A. Product Safety Standard: Fabricate horizontal louver blinds to comply with WCMA A 100.1 including requirements for corded, flexible, looped devices; lead content of components; and warning labels.
- B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F:
  - 1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which blind is installed less 1/4 inch per side or 1/2 inch total, plus or minus 1/8 inch. Length equal to head-to-sill dimension of opening in which blind is installed less 1/4 inch, plus or minus 1/8 inch.
  - 2. Outside of Jamb Installation: Width and length as indicated, with terminations between blinds of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance.
  - 1. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Install horizontal louver blinds level and plumb, aligned and centered on openings, and aligned with adjacent units according to manufacturer's written instructions.
  - 1. Locate so exterior slat edges are not closer than 2 inches from interior faces of glass and not closer than 1/2 inch from interior faces of glazing frames through full operating ranges of blinds.
  - 2. Install mounting and intermediate brackets to prevent deflection of headrails.
  - 3. Install with clearances that prevent interference with adjacent blinds, adjacent construction, and operating hardware of glazed openings, other window treatments, and similar building components and furnishings.
- C. Adjust horizontal louver blinds to operate free of binding or malfunction through full operating ranges.
- D. Clean horizontal louver blind surfaces after installation according to manufacturer's written instructions.

### **END OF SECTION 12 2113**

## SECTION 12 3661 - SOLID SURFACING COUNTERTOPS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Solid surface material countertops.
  - 2. Solid surface material backsplash.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For countertop materials.
- B. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles and methods of joining.
- C. Samples: For each type of material exposed to view.

### PART 2 - PRODUCTS

#### 2.1 SOLID SURFACE COUNTERTOP MATERIALS

- A. Solid Surface Material: Homogeneous-filled plastic resin complying with ICPA SS-1.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Wilsonart LLC.
  - 2. Type: Provide Standard type unless Special Purpose type is indicated.
  - 3. Colors and Patterns: Yukon Riverstone 9196RS.
- B. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue.
- C. Plywood: Exterior softwood plywood complying with DOC PS 1, Grade C-C Plugged, touch sanded.

#### 2.2 COUNTERTOP FABRICATION

- A. Fabricate countertops according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI's "Architectural Woodwork Standards."
  - 1. Grade: Custom.
- B. Configuration:
  - 1. Front: Straight, slightly eased at top.
- C. Countertops: 3/4-inch-thick, solid surface material.
- D. Backsplashes: 3/4-inch-thick, solid surface material.
- E. Joints: Fabricate countertops in sections for joining in field.
- F. Cutouts and Holes:
  - 1. Make cutouts for in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.

#### 2.3 INSTALLATION MATERIALS

- A. Adhesive: Product recommended by solid surface material manufacturer.
- B. Sealant for Countertops: Comply with applicable requirements in Section 07 9200 "Joint Sealants."

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Fasten countertops by screwing through corner blocks of base units into underside of countertop. Pre-drill holes for screws as recommended by manufacturer.
- B. Fasten subtops to cabinets by screwing through subtops into cornerblocks of base cabinets. Shim as needed to align subtops in a level plane.
- C. Secure countertops to subtops with adhesive according to solid surface material manufacturer's written instructions.
- D. Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.
- E. Install aprons to backing and countertops with adhesive.
- F. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.
- G. Apply sealant to gaps at walls; comply with Section 07 9200 "Joint Sealants."

**END OF SECTION 12 3661**

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## **SECTION 22 0501 - COMMON PLUMBING REQUIREMENTS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Furnish labor, materials, and equipment necessary for completion of work as described in Contract Documents.
- B. It is the intent of these specifications that the systems specified herein are to be complete and operational before being turned over to the owner. During the bidding process, the contractor is to ask questions or call to the engineer's attention any items that are not shown or may be required to make the system complete and operational. Once the project is bid and the contractor has accepted the contract, it is his responsibility to furnish and install all equipment and parts necessary to provide a complete and operational system without additional cost to the owner.
- C. Furnish and install fire stopping materials to seal penetrations through fire rated structures and draft stops.

#### **1.3 SUBMITTALS**

- A. Substitutions: By specific designation and description, standards are established for specialties and equipment. Other makes of specialties and equipment of equal quality will be considered provided such proposed substitutions are submitted to the Architect for his approval, complete with specification data showing how it meets the specifications, at least 5 working days prior to bid opening. A list of approved substitutions will be published as an addendum, but does not relieve Contractor from meeting all requirements of the specifications.
  - 1. Submit a single copy of Manufacturer's catalog data including Manufacturer's complete specification for each proposed substitution.
  - 2. The Architect or Engineer is to be the sole judge as to the quality of any material offered as an equal.
- B. Product Data, Shop Drawings: Within 30 days after award of contract, submit 10 sets of Manufacturer's catalog data for each manufactured item.
  - 1. Literature shall include enough information to show complete compliance with Contract Document requirements.
  - 2. Mark literature to indicate specific item with applicable data underlined.
  - 3. Information shall include but not be limited to capacities, ratings, type of material used, guarantee, and such dimensions as are necessary to check space requirements.
  - 4. When accepted, submittal shall be an addition to Contract Documents and shall be in equal force. No variation shall be permitted.
  - 5. Even though the submittals have been accepted by the Engineer, it does not relieve the contractor from meeting all of the requirements of the plans and specifications and providing a complete and operational system.
- C. Drawings of Record: One complete set of blue line mechanical drawings shall be provided for the purpose of showing a complete picture of the work as actually installed.
  - 1. These drawings shall serve as work progress report sheets. Contractor shall make notations neat and legible therein daily as the work proceeds.
  - 2. The drawings shall be kept at the job at a location designated by the Mechanical Engineer.

3. At completion of the project these "as-built" drawings shall be signed by the Contractor, dated, and returned to the Architect.

D. Operating Instructions and Service Manual: The Mechanical Contractor shall prepare 2 copies of an Operation and Maintenance Manual for all mechanical systems and equipment used in this project. Manuals shall be bound in hard-backed binders and the front cover and spine of each binder shall indicate the name and location of the project. Use plastic tab indexes for all sections. Provide a section for each different type of equipment item. The following items shall be included in the manual, together with any other pertinent data. This list is not complete and is to be used as a guide.

1. Provide a master index at the beginning of the manual showing all items included.
2. The first section of the manual shall contain:
  - a. Names, addresses, and telephone numbers of Architect, Mechanical Engineer, Electrical Engineer, General Contractor, Plumbing Contractor, Sheet Metal Contractor, and Temperature Control Contractor.
  - b. List of Suppliers which shall include a complete list of each piece of equipment used with the name, address, and telephone number of vendor.
  - c. General Description of Systems including –
    - 1) Location of all major equipment
    - 2) Description of the various mechanical systems
    - 3) Description of operation and control of the mechanical systems
    - 4) Suggested maintenance schedule
  - d. Copy of contractor's written warranty
3. Provide a copy of approved submittal literature for each piece of equipment.
4. Provide maintenance and operation literature published by the manufacturer for each piece of equipment which includes: oiling, lubrication and greasing data; belt sizes, types and lengths; wiring diagrams; step-by-step procedure to follow in putting each piece of mechanical equipment in operation.
5. Include parts numbers of all replaceable items.
6. Provide control diagram and operation sequence, along with labeling of control piping and instruments to match diagram.
7. Include a valve chart indicating valve locations.
8. Include air balance and/or water balance reports.

#### 1.4 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies:

1. Perform work in accordance with applicable provisions of local and state Plumbing Code, Gas Ordinances, and adoptions thereof. Provide materials and labor necessary to comply with rules, regulations, and ordinances.
2. In case of differences between building codes, state laws, local ordinances, utility company regulations, and Contract Documents, the most stringent shall govern. Promptly notify Architect in writing of such differences.

B. Applicable Specifications: Referenced specifications, standards, and publications shall be of the issues in effect on date of Advertisement for Bid.

1. "Heating, Ventilating and Air Conditioning Guide" published by the American Society of Heating and Air Conditioning Engineers.
2. "Engineering Standards" published by the Heating, Piping, and Air Conditioning Contractors National Association.
3. "2018 International Building Code", "2018 International Mechanical Code", and "2018 International Fire Code" as published by the International Conference of Building Officials.
4. "2017 Idaho Plumbing Code" as published by the International Association of Plumbing and Mechanical Officials.
5. "National Electrical Code" as published by the National Fire Protection Association.
6. "2018 International Energy Conservation Code".

## 1.5 INSPECTIONS AND PERMITS

- A. Pay for permits, fees, or charges for inspection or other services. Local and state codes and ordinances must be properly executed without expense to Owner and are considered as minimum requirements. Local and state codes and ordinances do not relieve the Contractor from work shown that exceeds minimum requirements.

## 1.6 ADDITIONAL WORK:

- A. Design is based on equipment as described in the drawing equipment schedule. Any change in foundation bases, electrical wiring, conduit connections, piping, controls and openings required by alternate equipment submitted and approved shall be paid for by this division. All work shall be in accordance with the requirements of the applicable sections.

## **PART 2 - NOT USED**

## **PART 3 - EXECUTION**

### 3.1 EXAMINATION

- A. Site Inspection:
  - 1. Examine premises and understand the conditions which may affect performance of work of this Division before submitting proposals for this work.
  - 2. No subsequent allowance for time or money will be considered for any consequence related to failure to examine site conditions.
- B. Drawings:
  - 1. Plumbing drawings show general arrangement of piping, equipment, etc, and do not attempt to show complete details of building construction which affect installation. This Contractor shall refer to architectural, structural, mechanical, and electrical drawings for additional building detail which affect installation of his work.
    - a. Follow plumbing drawings as closely as actual building construction and work of other trades will permit.
    - b. No extra payments will be allowed where piping and/or ductwork must be offset to avoid other work or where minor changes are necessary to facilitate installation.
    - c. Everything shown on the plumbing drawings shall be the responsibility of Plumbing Contractor unless specifically noted otherwise.
  - 2. Consider architectural and structural drawings part of this work insofar as these drawings furnish information relating to design and construction of building. These drawings take precedence over mechanical drawings.
  - 3. Because of small scale plumbing drawings, it is not possible to indicate all offsets, fittings, and accessories which may be required. Investigate structural and finish conditions affecting this work and arrange work accordingly, providing such fittings, valves, and accessories required to meet conditions. Do not scale drawings for locations of equipment or piping. Refer to large scale dimensioned drawings for exact locations.
- C. Insure that items to be furnished fit space available. Make necessary field measurements to ascertain space requirements including those for connections and furnish and install equipment of size and shape so final installation shall suit true intent and meaning of Contract Documents.
  - 1. If approval is received to use other than specified items, responsibility for specified capacities and insuring that items to be furnished will fit space available lies with this Division.
  - 2. If non-specified equipment is used and it will not fit job site conditions, this Contractor assumes responsibility for replacement with items named in Contract Documents.

### 3.2 PREPARATION

- A. Cut carefully to minimize necessity for repairs to existing work. Do not cut beams, columns, or trusses.
  - 1. Patch and repair walls, floors, ceilings, and roofs with materials of same quality and appearance as adjacent surfaces unless otherwise shown. Surface finishes shall exactly match existing finishes of same materials.
  - 2. Each Section of this Division shall bear expense of cutting, patching, repairing, and replacing of work of other Sections required because of its fault, error, tardiness, or because of damage done by it.
  - 3. Cutting, patching, repairing, and replacing pavements, sidewalks, roads, and curbs to permit installation of work of this Division is responsibility of Section installing work.

### 3.3 INSTALLATION

- A. Arrange pipes, ducts, and equipment to permit ready access to valves, unions, traps, starters, motors, control components, and to clear openings of doors and access panels.

### 3.4 STORAGE AND PROTECTION OF MATERIALS:

- A. Provide storage space for storage of materials and assume complete responsibility for losses due to any cause whatsoever. Storage shall not interfere with traffic conditions in any public thoroughfare.
- B. Protect completed work, work underway, and materials against loss or damage.
- C. Close pipe openings with caps or plugs during installation. Cover fixtures and equipment and protect against dirt, or injury caused by water, chemical, or mechanical accident.

### 3.5 EXCAVATION AND BACKFILL

- A. Perform necessary excavation of whatever substance encountered for proper laying of all pipes and underground ducts.
  - 1. Excavated materials not required for fill shall be removed from site as directed by Engineer.
  - 2. Excavation shall be carried low enough to allow a minimum coverage over underground piping of 5'-0" or to be below local frost level.
  - 3. Excess excavation below required level shall be backfilled at Contractor's expense with earth, sand, or gravel as directed by Engineer. Tamp ground thoroughly.
  - 4. Ground adjacent to all excavations shall be graded to prevent water running into excavated areas.
- B. Backfill pipe trenches and allow for settlement.
  - 1. Backfill shall be mechanically compacted to same density as surrounding undisturbed earth.
  - 2. Cinders shall not be used in backfilling where steel or iron pipe is used.
  - 3. No backfilling shall be done until installation has been approved by the Engineer.

### 3.6 COOPERATION

- A. Cooperate with other crafts in coordination of work. Promptly respond when notified that construction is ready for installation of work under Division 22. Contractor will be held responsible for any delays which might be caused by his negligence or failure to cooperate with the other Contractors or crafts.

### 3.7 SUPERVISION

- A. Provide a competent superintendent in charge of the work at all times. Anyone found incompetent shall be removed at once and replaced by someone satisfactory, when requested by the Architect.

### 3.8 INSTALLATION CHECK:

- A. An experienced, competent, and authorized representative of the manufacturer or supplier of each item of equipment indicated in the equipment schedule shall visit the project to inspect, check, adjust if necessary, and approve the equipment installation. In each case, the equipment supplier's representative shall be present when the equipment is placed in operation. The equipment supplier's representative shall revisit the project as often as necessary until all trouble is corrected and the equipment installation and operation is satisfactory to the Engineer.
- B. Each equipment supplier's representative shall furnish to the Owner, through the Engineer, a written report certifying the following:
  - 1. Equipment has been properly installed and lubricated.
  - 2. Equipment is in accurate alignment.
  - 3. Equipment is free from any undue stress imposed by connecting piping or anchor bolts.
  - 4. Equipment has been operated under full load conditions.
  - 5. Equipment operated satisfactorily.
- C. All costs for this installation check shall be included in the prices quoted by equipment suppliers.

### 3.9 CLEANING EQUIPMENT AND PREMISES

- A. Properly lubricate equipment before Owner's acceptance.
- B. Clean exposed piping, equipment, and fixtures. Repair damaged finishes and leave everything in working order.
- C. Remove stickers from fixtures and adjust flush valves.
- D. Trap elements shall be removed during cleaning and flushing period. Replace trap elements and adjust after cleaning and flushing period.

### 3.10 TESTS

- A. No piping work, fixtures, or equipment shall be concealed or covered until they have been inspected and approved by the inspector. Notify inspector when the work is ready for inspection.
- B. All work shall be completely installed, tested as required by Contract Documents and the city and county ordinances and shall be leak-tight before the inspection is requested.
- C. Tests shall be repeated to the satisfaction of those making the inspections.
- D. Water piping shall be flushed out, tested at 100 psi and left under pressure of supply main or a minimum of 40 psi for the balance of the construction period.

### 3.11 WARRANTY

- A. Contractor shall guarantee work under Division 22 to be free from inherent defects for a period of one year from acceptance.
  - 1. Contractor shall repair, revise or replace any and all such leaks, failure or inoperativeness due to defective work, materials, or parts free of charge for a period of one year from final acceptance, provided such defect is not due to carelessness in operation or maintenance.
- B. In addition to warranty specified in General Conditions and plumbing systems are to be free from noise in operation that may develop from failure to construct system in accordance with Contract Documents.

### 3.12 SYSTEM START-UP, OWNER'S INSTRUCTIONS

#### A. Owner's Instructions

1. Instruct building maintenance personnel and Owner Representative in operation and maintenance of mechanical systems utilizing Operation & Maintenance Manual when so doing.
2. Minimum instruction periods shall be as follows –
  - a. Plumbing - Four hours.
3. Instruction periods shall occur after Substantial Completion inspection when systems are properly working and before final payment is made.
4. None of these instructional periods shall overlap another.

END OF SECTION 22 0501

## **SECTION 22 0502 - DEMOLITION AND REPAIR**

### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 22 0501 apply to this Section.

#### 1.2 SUMMARY

- A. Under this section remove obsolete piping and mechanical equipment and relocate, reconnect or replace existing piping affected by demolition or new construction. Remove concealed piping abandoned due to demolition or new construction, or cap piping flush with existing surfaces.

#### 1.3 DRAWINGS AND EXISTING CONDITIONS

- A. All relocations, reconnections and removals are not necessarily indicated on the drawings. As such, the Contractor shall make adequate allowance in his proposal for this work as no extra charges will be allowed for these items.

### **PART 2 - NOT USED**

### **PART 3 - EXECUTION**

#### 3.1 TEMPORARY CONNECTIONS

- A. Where existing piping must remain in service to supply occupied areas during construction, provide temporary piping, connections, and equipment to maintain service to such areas. All shall be performed in a neat and safe manner to prevent injury to the building or its occupants.

#### 3.2 EXISTING TO BE ABANDONED

- A. All Required drilling, cutting, block-outs and demolition work required for the removal and/or installation of the mechanical system is the responsibility of this Contractor.
- B. No joists, beams, girders, trusses or columns shall be cut by any Contractor without written permission from the Architect.
- C. The patching, repair, and finishing to existing or new surfaces is the responsibility of this Contractor, unless specifically called for under sections of specifications covering these materials.
- D. Disconnect all equipment that is to be removed or relocated. Relocate any existing equipment that obstructs new construction.

#### 3.3 EXISTING TO REMAIN IN USE

- A. Where affected by demolition or new construction, relocate, replace, extend, or repair piping and equipment to allow continued use of same. Use methods and materials as specified for new construction.

#### 3.4 MATERIALS AND EQUIPMENT REMOVED

- A. All obsolete materials, piping, and equipment shall become the property of the Contractor and be removed from the site promptly.



END OF SECTION 22 0502

## **SECTION 22 0503 - PIPE, PIPE FITTINGS, PIPE HANGERS & VALVES**

### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 22 05 01 apply to this Section.

#### 1.2 SUMMARY

- A. General piping and valve materials and installation procedures for all piping systems.

#### 1.3 QUALITY ASSURANCE

- A. Manufacture:
  - 1. Use domestic made valves, pipe and pipe fittings.
- B. General: Support components shall conform to Manufacturer's Standardization Society Specification SP-58.

### **PART 2 - PRODUCTS**

#### 2.1 VALVES

- A. Ball Valves:
  - 1. 2" and smaller for domestic water service:
    - a. Milwaukee BA-100, bronze, screwed, 600# WOG ball valve with Teflon seats
    - b. Victaulic S/722.
  - 2. Ball valves shall be used wherever possible.
- B. Use ball valves or butterfly valves everywhere unless noted otherwise.
- C. Approved Manufacturers:
  - 1. Crane
  - 2. Nibco
  - 3. Hammond
  - 4. Stockham
  - 5. Milwaukee
  - 6. Victaulic

#### 2.2 PIPE

- A. Exposed waste, vent and water piping connections to fixtures shall be chrome plated.

#### 2.3 PIPE HANGERS

- A. Adjustable, malleable iron clevis type of a diameter adequate to support pipe size.
- B. Approved Manufacturers:
  - 1. B-Line Systems Fig. B3100
  - 2. Grinnell No. 260
  - 3. Kin-Line 455
  - 4. Superstrut CL-710

## 2.4 INSULATING COUPLINGS

- A. Suitable for at least 175 PSIG WP at 250 deg F.
- B. Approved Manufacturers:
  - 1. Central Plastics Co
  - 2. Victaulic Co
  - 3. Watts Regulator Co

## 2.5 EXPANSION JOINTS

- A. Install at all building expansion joints and as shown on the drawings, flexible, or nipple/flexible coupling combinations for added expansion/deflection. Submit Manufacturer's data.
- B. Approved Manufacturers
  - 1. Victaulic Style 155, 150
  - 2. Grinnell - Gruv-Lok
  - 3. Garlock Garlflex 8100
  - 4. Vibration Mountings & Controls, Inc.

## 2.6 SLEEVES

- A. Sleeves shall be standard weight galvanized iron pipe, Schedule 40 PVC, or 14 gauge galvanized sheet metal two sizes larger than pipe or insulation.
- B. Steel or heavy steel metal of the telescoping type of a size to accommodate pipe and covering wherever it passes through floors, walls, or ceilings.

## 2.7 INTERMEDIATE ATTACHMENTS

- A. Continuous threaded rod may be used wherever possible.
- B. No chain, wire, or perforated strap shall be used.

## 2.8 FLOOR AND CEILING PLATES

- A. Brass chrome plated

## 2.9 APPROVED MANUFACTURERS - Grinnell and Fee/Mason

- A. Concrete Inserts: Grinnell Fig. 282
- B. Pipe Hanger Flange: Grinnell Fig. 163
- C. Vertical Pipe: Grinnell Fig. 261 or equal.
- D. Cast Iron Pipe: Grinnell Fig. 260 clevis hanger or equal
- E. Pipe Attachments for steel pipe with 1" or less of insulation:
  - 1. Grinnell Fig. 108 ring
  - 2. Grinnell Fig. 114 turnbuckle adjuster
  - 3. Or equal

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Furnish and install complete system of piping, valved as indicated or as necessary to completely control entire apparatus. Pipe drawings are diagrammatic and indicate general location and connections. Piping may have to be offset, lowered, or raised as required or directed at site. This does not relieve this Contractor from responsibility for proper erection of systems of piping in every respect.
- B. Properly support piping and make adequate provisions for expansion, contraction, slope, and anchorage.
  - 1. Cut piping accurately for fabrication to measurements established at site and work into place without springing or forcing.
  - 2. Do not use pipe hooks, chains, or perforated metal for pipe support.
  - 3. Remove burr and cutting slag from pipes.
  - 4. Make changes in direction with proper fittings.
  - 5. Insulate hangers for copper pipe from piping by means of at least two layers of Scotch 33 plastic tape.
  - 6. Support piping at 8 feet on center maximum for pipe 1-1/4 inches or larger and 6 feet on center maximum for pipe one inch or less. Provide support at each elbow. Install additional support as required.
  - 7. Suspend piping from roof trusses or clamp to vertical walls using Unistrut and clamps (except underground pipe). Laying of piping on any building member is not allowed.
- C. Arrange piping to not interfere with removal of other equipment, ducts, or devices, or block access to doors, windows, or access openings. Provide accessible, ground joint unions in piping at connections to equipment.
- D. Make connections of dissimilar metals with insulating couplings.
- E. Provide sleeves around pipes passing through floors, walls, partitions, or structural members.
  - 1. Seal sleeves with plastic or other acceptable material.
  - 2. Do not place sleeves around soil, waste, vent, or roof drain lines passing through concrete floors on grade.
- F. Cap or plug open ends of pipes and equipment to keep dirt and other foreign materials out of system. Do not use plugs of rags, wool, cotton waste, or similar materials.
- G. Install piping systems so they may be easily drained.
- H. Grade soil and waste lines within building perimeter 1/4 inch fall per ft in direction of flow.
- I. Insulate water piping buried within building perimeter.
  - 1. Do not use reducing bushings, street elbows, or close nipples.
  - 2. Bury water piping 6 inches minimum below bottom of slab and encase in 2 inches minimum of sand.
  - 3. Do not install piping in shear walls.
- J. Valves
  - a. Install all isolation shut-off valves in an accessible location.
  - b. Install isolation valves at all each branch line serving multiple plumbing fixtures.
  - c. Where valves are above hard ceilings, or in walls provide minimum 12 x 12 access door to service valves. Label door "Plumbing Valve Access."
  - d. If valves above access doors are not within "arms reach," install minimum 24 x 24 access door for access.

### 3.2 HORIZONTAL PIPING INSTALLATION

- A. Locate hangers, supports, and anchors near or at changes in piping direction and concentrated loads.
- B. Provide for vertical adjustment to maintain pitch required for proper drainage.
- C. Allow for expansion and contraction of the piping.

### 3.3 PIPE SLEEVES AND INSERTS

- A. Set sleeves before concrete is poured or floors finished.
- B. Inserts for units should be placed in the concrete or masonry during construction to avoid cutting of finished work. When and if cutting becomes necessary, it must be done in accordance with the cutting and patching specifications.

### 3.4 FLOOR AND CEILING PLATES

- A. Install on all pipes passing through floors, partitions, and ceilings.

### 3.5 UNIONS AND CONNECTIONS

- A. Install malleable ground joint unions in hot and cold water piping throughout the system so that any portion can be taken down for repairs or inspections without injury to same or covering.
- B. Running threads or long screws will not be permitted in jointing any pipe.
- C. Provide dielectric waterways Style #47 between ferrous and non-ferrous metals.

### 3.6 FIRE STOPPING

- A. Fire stop all penetrations of fire walls, fire barriers, fire petitions, and other fire rated walls and ceilings and floors as per IBC Section 711. See Specification 22 0800.

END OF SECTION 22 0503

## SECTION 22 0553 - IDENTIFICATION FOR PLUMBING PIPES AND EQUIPMENT

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Includes But Not Limited To:
1. Furnish and install identification of plumbing piping and equipment as described in Contract Documents.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. Paint:
1. One Coat Primer:
    - a. 6-2 Quick Drying Latex Primer Sealer over fabric covers.
    - b. 6-205 Metal Primer under dark color paint.
    - c. 6-6 Metal Primer under light color paint.
  2. Finish Coats: Two coats 53 Line Acrylic Enamel.
  3. Performance Standard: Paints specified are from Pittsburgh Paint & Glass (PPG), Pittsburgh, PA [www.pittsburghpaints.com](http://www.pittsburghpaints.com) or PPG Canada Inc, Mississauga, ON (800) 263-4350 or (905) 238-6441.
  4. Type Two Acceptable Products. See Section 01 6200.
    - a. Paint of equal quality from following Manufacturers may be submitted for Architect's approval before use. Maintain specified colors, shades, and contrasts.
      - 1) Benjamin Moore, Montvale, NJ [www.benjaminmoore.com](http://www.benjaminmoore.com) or Toronto, ON (800) 304-0304 or (416) 766-1176.
      - 2) ICI Dulux, Cleveland, OH or ICI Paints Canada Inc, Concord, ON [www.dulux.com](http://www.dulux.com).
      - 3) Sherwin Williams, Cleveland, OH [www.sherwin-williams.com](http://www.sherwin-williams.com).

#### 2.2 VALVE IDENTIFICATION

- A. Make a list of and tag all valves installed in this work.
1. Valve tags shall be of brass, not less than 1"x2" size, hung with brass chains.
  2. Tag shall indicate plumbing or heating service.

### PART 3 - EXECUTION

#### 3.1 SCHEDULES

- A. Pipe Identification Schedule:
1. Apply stenciled symbols as follows:

Pipe Use	Abbreviation
Domestic Cold Water	CH
Domestic Hot Water	HW

END OF SECTION 22 0553

## **SECTION 22 0703 - MECHANICAL INSULATION AND FIRE STOPPING**

### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 22 05 01 apply to this Section.

#### 1.2 SUMMARY

- A. Furnish and install mechanical insulation and fire stopping as described in Contract Documents including but not limited to the following:
  - 1. Cold Water Piping Insulation
  - 2. Hot Water Piping Insulation (Domestic)
  - 3. Fire Stopping

#### 1.3 QUALITY ASSURANCE

- A. Insulation shall have composite (insulation, jacket or facing and adhesive used to adhere facing or jacket to insulation) fire and smoke hazard ratings as tested by Procedure ASTM E-84, NFPA 255 and UL 723 not exceeding: Flame Spread of 25 and Smoke Developed of 50.
- B. Insulation Contractor shall certify in writing, prior to installation, that all products to be used will meet the above criteria.
- C. Accessories, such as adhesives, mastics, cements, and tapes, for fittings shall have the same component ratings as listed above.
- D. Products, or their shipping cartons, shall bear a label indicating that flame and smoke ratings do not exceed above requirements.
- E. Any treatment of jacket or facings to impart flame and smoke safety shall be permanent.
- F. The use of water-soluble treatments is prohibited.

END OF SECTION 22 0703

## **SECTION 22 0710 - POTABLE WATER PIPE INSULATION**

### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 22 05 01 apply to this Section.

#### 1.2 SUMMARY

- A. Furnish and install insulation on above ground hot and cold water lines, fittings, valves, pump bodies, flanges, and accessories as described in Contract Documents.

### **PART 2 - PRODUCTS**

#### 2.1 INSULATION

- A. One inch thick snap-on glass fiber pipe insulation.
- B. Heavy density pipe insulation with factory vapor jacket equal to Fiberglass ASJ may be used.
- C. Approved Manufacturers:
  - 1. CTM
  - 2. Manville
  - 3. Owens-Corning
  - 4. Knauf

#### 2.2 PVC FITTING, VALVE, & ACCESSORY COVERS

- A. Approved Manufacturers:
  - 1. Knauf
  - 2. Zeston

### **PART 3 - EXECUTION**

#### 3.1 APPLICATION

- A. Piping:
  - 1. Apply insulation to clean, dry piping with joints tightly butted.
  - 2. Adhere "factory applied vapor barrier jacket lap" smoothly and securely at longitudinal laps with a white vapor barrier adhesive.
  - 3. Adhere 3 inch wide self-sealing butt joint strips over end joints.
- B. Fittings, Valves, & Accessories:
  - 1. Insulate with same type and thickness of insulation as pipe, with ends of insulation tucked snugly into throat of fitting and edges adjacent to pipe insulation tufted and tucked in.
  - 2. Cover insulation with one piece fitting cover secured by stapling or taping ends to adjacent pipe covering.
- C. Pipe Hangers:
  - 1. Do not allow pipes to come in contact with hangers.
  - 2. Provide 16 ga x 6 inch long galvanized shields at each pipe hanger to protect pipe insulation from crushing by clevis hanger.

END OF SECTION 22 0710



## **SECTION 22 0711 - HANDICAPPED FIXTURES INSULATION**

### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, and Section 22 05 00 apply to this Section.

#### 1.2 SUMMARY

- A. Furnish and install handicapped fixtures insulation as described in Contract Documents.

#### 1.3 QUALITY ASSURANCE

- A. Insulating device must comply with UBC-85 and federal accessibility standards.
- B. Cover must meet federal standards for protection from burns and abrasions.

### **PART 2 - PRODUCTS**

#### 2.1 MANUFACTURED UNITS

- A. Insulating device shall be molded fire resistant foam, to encapsulate hot water piping, stop, and P-trap.
  - 1. Approved Manufacturers:
    - a. TCI Products' Skal+Gard SG-100B
- B. Safety cover with recloseable sealing strips which allow for removal and replacement for line maintenance may be used on drain and supply lines under lavatories.
  - 1. Approved Manufacturers:
    - a. Handy-Shield
    - b. Plumberex
- C. Color shall be white.

### **PART 3 - EXECUTION**

#### 3.1 INSTALLATION

- A. Install tamper-proof locking strap to discourage pilferage.

END OF SECTION 22 0711

## **SECTION 22 0800-- FIRE STOPPING**

### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 22 05 01 apply to this Section.

#### 1.2 SUMMARY

- A. Furnish and install fire stopping as described in Contract Documents.

#### 1.3 QUALITY ASSURANCE

- A. Fire stopping material shall meet ASTM E814, E84 and be UL listed.

### **PART 2 - PRODUCTS**

#### 2.1 MANUFACTURED UNITS

- A. Material shall be flexible, long lasting, intumescent acrylic seal to accommodate vibration and building movement.
- B. Caulk simple penetrations with gaps of 1/4" or less with:
  - 1. Dow Corning Fire Stop Sealant
  - 2. Pensil 300
- C. Caulk multiple penetrations and/or penetrations with gaps in excess of 1/4" with:
  - 1. Dow Corning Fire Stop Foam
  - 2. Pensil 200
  - 3. IPC flame safe FS-1900
  - 4. Tremco "Tremstop 1A"

### **PART 3 - EXECUTION**

#### 3.1 INSTALLATION

- A. Follow manufacturer's installation instructions explicitly.
- B. Seal penetrations of ductwork, piping, and other mechanical equipment through one-hour and two-hour rated partitions as shown on Architectural and Mechanical Drawings.
- C. Install fire stopping material on clean surfaces to assure adherence.

END OF SECTION 22 0800

## SECTION 22 1116 POTABLE WATER PIPING SYSTEMS (PEX)

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes ASTM F877 cross-linked polyethylene (PEX) tubing hot and cold water distribution systems, ASTM F876 cross-linked polyethylene (PEX) tube, ASTM F1807 fittings and ASTM F2159 fittings

#### 1.2 REFERENCES

- A. ASTM International
  1. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
  2. ASTM F876 Standard Specification for Cross-linked Polyethylene (PEX) Tubing.
  3. ASTM F877 Standard Specification for Cross-linked Polyethylene (PEX) Plastic Hot and Cold Water Distribution Systems
  4. ASTM F1807 Standard Specification for Metal Insert Fittings Utilizing a Copper Crimp Ring for SDR9 Cross-linked Polyethylene (PEX) Tubing
  5. ASTM F2159 Standard Specification for Plastic Insert Fittings Utilizing a Copper Crimp Ring for SDR9 Cross-linked Polyethylene (PEX) Tubing
- B. National Sanitation Foundation (NSF)
  1. Standard 14 Plastics Piping System Components and Related Materials
  2. Standard 61 Drinking Water System Components – Health Effects
- C. International Code Council (ICC)
  1. International Mechanical Code
  2. International Plumbing Code
- D. International Association of Plumbing Officials (IAPMO)
  1. Uniform Plumbing Code
  2. Uniform Mechanical Code
- E. Plastic Pipe Institute (PPI)
  1. Technical Report TR-3 Policies and Procedures for Developing Recommended Hydrostatic Design Stresses for Thermoplastic Pipe Materials.
  2. Technical Report TR-4 Recommended Hydrostatic Strengths and Design Stresses for Thermoplastic Piping and Fitting Compounds

#### 1.3 SYSTEM DESCRIPTION

- A. Design Requirements
  1. Standard Grade hydrostatic pressure ratings from the Plastic Pipe Institute in accordance with TR-3 and listed in TR-4. The following three standard-grade hydrostatic ratings are required;
    - a. 200 degrees F at 80 psi
    - b. 180 degrees F at 100 psi
    - c. 73 degrees F at 160 psi
  2. Tubing tested in general accordance with ASTM E84 for a flame spread/smoke developed index of 25/50 or less for the following PEX tube sizes encased with ½ inch fiberglass insulation;
    - a. 1 ¼ inch
    - b. 1 ½ inch

- c. 2 inch
3. Tubing tested in general accordance with ASTM E84 for a flame spread/smoke developed index of 25/50 or less for the following PEX tube sizes;
  - a. 3/8 inch
  - b. 1/2 inch
  - c. 5/8 inch
  - d. 3/4 inch
  - e. 1 inch

B. Performance Requirements

1. To provide a PEX tubing hot and cold potable water distribution system, which is manufactured, fabricated and installed to comply with regulatory agencies and to maintain performance criteria stated by the PEX tubing manufacturer without defects, damage or failure
  - a. Comply with NSF Standard 14
  - b. Comply with NSF Standard 61
  - c. Show compliance with ASTM F877

1.4 SUBMITTALS

A. General

1. Upon request, submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedures Section

B. Product Data

1. Upon request, submit manufacturer's product submittal data and installation instructions
2. Upon request, submit manufacturer's Professional Installation Limited Warranty

C. Shop Drawings

1. Upon request, provide installation drawings indicating tubing layout, manifold locations, plumbing fixtures supported and schedules with details required for installation of the system

D. Samples

1. Upon request, submit selection and verification samples of piping

E. Listing Certifications

1. Upon request, submit manufacturers third party listings

1.5 QUALITY ASSURANCE

A. Installer Qualifications

1. Utilize an installer having demonstrated experience on projects of similar size and complexity and possesses the skills and knowledge to install a PEX potable water distribution system
2. Installer will utilize skilled workers holding a trade qualification license or equivalent or apprentices under the supervision of a licensed tradesperson

B. Pre-installation Meetings

1. Verify project timeline requirements
2. Manufacturer's installation instruction
3. Manufacturer's warranty requirements

1.6 DELIVERY, STORAGE AND HANDLING

A. General

1. Comply with Division 1 Product Requirement Section
- B. Delivery
  1. Deliver materials in manufacture's original, unopened, undamaged containers with identification labels intact until ready for installation
- C. Storage and Protection
  1. Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer
  2. Store PEX tubing indoors, in cartons or under cover to avoid dirt or foreign material from entering the tubing
  3. Do not expose PEX tubing to direct sunlight for more than six months. If construction delays are encountered, cover the tubing that is exposed to direct sunlight

## 1.7 WARRANTY

- A. Project Warranty
  1. Refer to Conditions of the Contract for project warranty provisions
- B. Manufacturer's Warranty
  1. Shall cover the repair or replacement of properly installed tubing and fittings proven defective as well as incidental damages
  2. Warranty period for PEX tubing and subsequent system shall be 25 year non-prorated warranty against failure due to defect in material or workmanship, beginning with the date of installation
  3. It is the installer's responsibility to avoid mixing fittings manufactured by others as it will reduce the owner's warranty

## PART 2 - PRODUCTS

### 2.1 PRODUCT MANUFACTURERS

- A. Zurn
- B. Uponor
- C. Vanguard
- D. Rehau
- E. Viega

### 2.2 MATERIALS

- A. Tubing
  1. Cross-linked polyethylene (PEX).
  2. Non-barrier type.
    - a. Shall have a pressure and temperature rating of 160 PSI at 73°F, 100 PSI at 180°F and 80 PSI at 200°F.
    - b. Tubing shall have a minimum of 6 months UV protection.
  3. Manufactured in accordance with ASTM F876 and ASTM F877 and tested for compliance by an independent third-party agency.
- B. Fittings
  1. Manufactured in accordance with ASTM F1807 or ASTM F2159 and/or comply with ASTM F877 system standard as identified on the fitting

- C. Manifold
  - 1. Preassembled Manifold
  - 2. Copper Manifold System
  - 3. Multi Port Fittings
  - 4. Copper Manifold Header
  
- D. Valves
  - 1. Shall be of the metal type, meeting the requirements of ASTM F877, identified as such with the appropriate mark on the product

### **PART 3 - EXECUTION**

#### 3.1 MANUFACTURER'S INSTRUCTIONS

- A. A. Comply with manufacture's product data, including product technical bulletins, technical memo's, installation instructions and design drawings.

#### 3.2 EXAMINATION

- A. Site Verification of Conditions
  - 1. Verify that site conditions are acceptable for the installation of the PEX potable water system
  - 2. Do not proceed with installations of the PEX potable water system until unacceptable conditions are corrected

#### 3.3 INSTALLATION

- A. Install PEX tubing in accordance with tubing manufacturer's recommendations and as indicated in the PEX Plumbing Installation Guide
- B. Do not install PEX tubing within 6 inches of gas appliance vents or within 12 inches of any recessed light fixtures
- C. Do not solder within 18 inches of PEX tubing in the same waterline. Make sweat connections prior to making PEX connections
- D. Ensure no glues, solvents, sealants or chemicals come in contact with the tubing without prior permission from the tubing manufacturer
- E. Do not expose PEX tubing to direct sunlight for more than 6 months
- F. Use grommets or sleeves at the penetration for PEX tubing passing through metal studs
- G. Use a PEX manufacturer recommended fire stop sealant manufacturer
- H. Protect PEX tubing with sleeves where abrasion may occur
- I. Use nail plates where PEX tubing penetrates wall stud or joists and has the potential for being struck with a screw or nail
- J. Allow slack of approximately 1/8 inch per foot of tube length to compensate for expansion and contraction

- K. Minimum horizontal supports are to be installed not less than 32 inches between hangers in accordance with model plumbing codes.
- L. Pressurize PEX tubing in accordance with applicable codes or in the absence of applicable codes, test pressure shall be at least equal to normal system working pressure, but not less than 40 PSI water or air and not greater than 225 PSI water, 125 PSI air

#### 3.4 FIELD QUALITY CONTROL

- A. Site Tests
  - 1. To ensure system integrity, pressure test the system before covering tubing in concrete and after other trades have worked in the vicinity of the tubing
  - 2. Repair and replace any product that has been damaged according to manufacturer's recommendation

#### 3.5 PROTECTION

- A. Protect installed work from damage due to subsequent construction activity on the site

END OF SECTION 22 1116

## **SECTION 22 1118 – BACKFLOW PREVENTER VALVE**

### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 22 05 01 apply to this Section.

#### 1.2 SUMMARY

- A. Furnish and install a backflow preventer valve as described in Contract Documents.

### **PART 2 - PRODUCTS**

#### 2.1 MANUFACTURED UNITS

- A. Designed to provide separation of radiant hot water heating system water from domestic cold water supply in accordance with Code.
  - 1. Rated flow at 30 psi pressure drop rated for 175 psi inlet pressure and 140 deg. F maximum operating temperature.
  - 2. Brass body construction with 3/4 inch NPT connections.
- B. Approved Manufacturers:
  - 1. Beeco 12
  - 2. Watts 900
  - 3. Equal by Febco
  - 4. Equal by Conbraco

### **PART 3 - EXECUTION**

#### 3.1 INSTALLATION

- A. Furnish and install a drain cup and pipe the waste line to the nearest floor drain or floor sink.

END OF SECTION 22 1118



## SECTION 22 1313 – SOIL, WASTE, & VENT PIPING SYSTEMS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 22 05 01 apply to this Section.

#### 1.2 SUMMARY

- A. Furnish and install soil, waste, and vent piping systems within building and connect with outside utility lines 5 feet out from building where applicable.
- B. Perform excavation and backfill required by work of this Section.

### PART 2 - PRODUCTS

#### 2.1 BURIED LINES

- A. Service weight, single-hub type cast iron soil pipe and fittings meeting requirements of ASTM A 74-87, "Specification for Cast Iron Soil Pipe & Fittings".
  - 1. Joint Material:
    - a. Rubber gaskets meeting requirements of ASTM C 564-88, "Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings".
    - b. No hub stainless steel clamps with neoprene gasket.
- B. ABS-DWV or PVC-DWV plastic waste pipe and fittings as permitted by state and local plumbing code.

#### 2.2 ABOVE GRADE PIPING & VENT LINES

- A. Same as specified for buried lines except no-hub pipe may be used.
- B. Vent lines 2-1/2 inches or smaller may be Schedule 40 galvanized steel.
- C. Joint Material:
  - 1. Bell & Spigot Pipe - rubber gaskets meeting requirements of ASTM C 564-88, "Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings".
  - 2. No-Hub Pipe - Neoprene gaskets with stainless steel cinch bands.
  - 3. Galvanized Pipe - Screwed Durham tarred drainage fittings, or Victaulic.
  - 4. ABS-DWV solvent weld fittings

#### 2.3 TRAP PRIMERS

- A. Components:
  - 1. Drains And Drain Accessories:
    - a. Floor Drain FD-1:
      - 1) Approved types with deep seal trap and chrome plated strainer.
      - 2) Provide trap primer connection and trap primer equal to Sioux Chief 695-01.
      - 3) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
        - a) Josam: 30000-50-Z-5A.
        - b) J. R. Smith: 2010-A.
        - c) Sioux Chief: 832.
        - d) Wade: 1100.

- e) Watts: FD-200-A.
- f) Zurn: Z-415.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Do not caulk threaded work.
- B. Slope horizontal pipe at 1/4 in/ft.
- C. Cleanouts:
  - 1. Provide and set full size cleanouts at foot of each riser, and ends of branches from toilets, at points where a change of direction occurs, on exposed and accessible traps, at points where required to remove rust accumulation or other obstructions and as shown on plans. Set screw cap in cleanout with graphite paste. Cleanouts in walls shall be flush and covered with a chrome plated cleanout cover screwed into the cleanout plug. Cleanouts in floors shall be flush using Zurn, Josam, or Wade floor level cleanout fittings. Location of all cleanouts subject to approval of inspector.
- D. Each fixture and appliance discharging water into sanitary sewer or building sewer lines shall have seal trap in connection with complete venting system so gasses pass freely to atmosphere with no pressure or syphon condition on water seal.
- E. Vent entire waste system to atmosphere. Discharge 14 inches above roof. Join lines together in fewest practicable number before projecting above roof. Set back vent lines so they will not pierce roof near edge or valley.
- F. Use torque wrench to obtain proper tension in cinch bands when using hubless cast iron pipe. Butt ends of pipe against centering flange of coupling.
- G. Flash pipes passing through roof with 16 oz sheet copper flashing fitted snugly around pipes and calk between flashing and pipe with flexible waterproof compound. Flashing base shall be at least 24 inches square.
  - 1. Flashing may be 4 lb per sq ft lead flashing fitted around pipes and turned down into pipe 1/2 inch with turned edge hammered against pipe wall.

#### **3.2 FIELD QUALITY CONTROL**

- A. Before piping is covered, conduct tests for leaks and defective work. Notify Architect prior to testing. Correct leaks and defective work. Fill waste and vent system to roof level with water, 10 feet minimum, and show no leaks for two hours.

END OF SECTION 22 1313

## **SECTION 22 2600 - CONDENSATE DRAIN PIPING**

### **PART 1 - GENERAL**

#### 1.1 SUMMARY

- A. Includes But Not Limited To:
  - 1. Furnish and install condensate drain piping as described in Contract Documents.
- B. Related Requirements:
  - 1. Section 23 0501: Common HVAC Requirements.

#### 1.2 REFERENCES

- A. Reference Standards:
  - 1. ASTM International:
    - a. ASTM B 88-03, 'Standard Specification for Seamless Copper Water Tube.'

### **PART 2 - PRODUCTS**

#### 2.1 SYSTEMS

- A. Materials:
  - 1. Condensate Drains:
    - a. Schedule 40 PVC for condensate drains from furnace combustion chambers and furnace cooling coils, and auxiliary drain pans.

### **PART 3 - EXECUTION**

#### 3.1 INSTALLATION

- A. Condensate Drains:
  - 1. Support piping and protect from damage.
  - 2. Do not combine PVC condensate drain piping from furnace combustion chamber with copper condensate drain piping from cooling coil.
  - 3. Do not combine auxiliary drain pan piping with furnace / Cooling Coil Condensate drain piping.

**END OF SECTION 22 2600**

## **SECTION 22 4001 – PLUMBING FIXTURES**

### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 22 0501 apply to this Section.

#### 1.2 SUMMARY

- A. Furnish and install plumbing fixtures as described in Contract Documents.
- B. Before fixtures are ordered, the Contractor shall submit a complete list of plumbing fixtures, giving the catalog number, cut and make, for approval. Fixtures shall not be ordered until this list is approved.

### **PART 2 - PRODUCTS**

#### 2.1 GENERAL

- A. Interior exposed pipe, valves, and fixture trim shall be chrome plated.
- B. Do not use flexible water piping.
- C. Flow Control Fittings:
  - 1. Vandal proof type and fit faucet spout of fixture used. Flow shall be controlled as required by local codes.
- D. Furnish and install the necessary plumbing fixtures in quantity as shown on plans. Provide all necessary valves, chrome plated 17 gauge or cast "P" traps, stops with risers, fittings, and accessories to make the job complete with the fixtures specified on the drawings. Exposed stops to be equal to Brasscraft with compression inlet, chrome plated nipples, cross handles, ¼ turn ball valves and flexible risers.
- E. Fixtures shall be PROFLO, Kohler, Crane, Briggs, Eljer, American Standard, or an approved equal. Specialties shall be Zurn, Josam, MiFab, J. R. Smith, Wade, or Watts.
- F. Toilet seat manufacturers shall be Beneke, Church, Olsonite, or Bemis.
- G. Carrier and wall hydrant manufacturers shall be Smith, Zurn, Wade, Josam, or Watts.
- H. Stainless steel sink manufacturers shall be Elkay or Just.
- I. Drinking fountain manufacturers shall be Elkay, Halsey Taylor, Haws, Cordley, Sunroc, or Oasis.
- J. Thermostatic mixing valves shall be Powers.

### **PART 3 - EXECUTION**

#### 3.1 INSTALLATION

- A. Install fixtures including traps and accessories with accessible stop or control valve in each hot and cold water branch supply line.

- B. Make fixture floor connections with approved brand of cast iron floor flange, soldered or calked securely to waste pipe.
- C. Make joints between fixtures and floor flanges tight with approved fixture setting compound or gaskets.
- D. Caulk between fixtures and wall and floor with white butyl rubber non-absorbent caulking compound. Point edges.
- E. Cleanouts: Provide and set full size cleanouts at foot of each riser, and ends of branches from toilets, at points where a change of direction occurs, on exposed and accessible traps, at points where required to remove rust accumulation or other obstructions and as shown on plans. Set screw cap in cleanout with graphite paste. Location of all cleanouts subject to approval of inspector.
- F. Traps: Install "P" traps in branch lines from floor drains or where required. Traps installed in connection with threaded pipe shall be recess drainage pattern. Traps installed in connection with cast iron pipe shall be of the same quality and grade as the pipe. Traps installed in connection with fixtures shall have a seal of not less than 2" nor more than 4". Exposed traps shall be chrome plated cast brass or chrome plated 17 gauge tubular type. Provide trap primers as required by Code.

### 3.2 FIXTURE INSTALLATION

- A. Provide stop valves and 18" minimum air chambers on all water connections to fixtures. Furnish and install wall carriers for wall mounted fixtures, wood backing, where necessary, to be installed by General Contractor at the direction of this Contractor. Provide exact locations, including proper mounting heights, obtained from details on drawings and from manufacturer's specifications. Provide hudee rims for countertop installations.
- B. Interior exposed pipe, valves, and fixtures trim shall be chrome plated.
- C. Complete installation of each fixture including trap and accessories with accessible stop or control valve in each hot and cold water branch supply line. Make fixture floor connections with approved brand of cast iron floor flange, soldered or caulked securely to waste pipe. Make joint between fixture and floor flange tight with approved fixture setting compound or gaskets.
- D. Polish chrome finish at completion of project.
- E. Caulk between fixtures and wall and floor with white butyl rubber non-absorbent caulking compound. Paint all edges.
- F. Install fixtures and fittings as per local codes and manufacturer's instructions.

END OF SECTION 22 4001

## **SECTION 22 4703 – HANDICAP DRINKING WATER COOLING SYSTEM**

### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 22 05 01 apply to this Section.

#### 1.2 SUMMARY

- A. Furnish and install handicap drinking water cooling system as described in Contract Documents.

### **PART 2 - PRODUCTS**

#### 2.1 HANDICAPPED FOUNTAIN

- A. Vandal proof operating bar on front and both sides. 7-1/2 GPH of 50 deg F water with 90 deg F room temperature, 1/5 horsepower compressor motor, 120 V, 60 Hz, single phase. One piece stainless steel back splash and basin. Flexi-guard or chrome plated brass bubbler.
- B. Approved Manufacturers:
  - 1. Sunroc
  - 2. Halsey Taylor
  - 3. Haws
  - 4. Elkay
  - 5. Oasis

#### 2.2 HYDRATION STATION.

- A. Touchless sensor activated, 1.5 GPM Quick Fill, with automatic 20 second shut-off timer. 120V, 60 HZ single phase.
- B. Visual user interface display includes:
  - 1. Innovative Green Ticker counting number of bottles saved from waste.
  - 2. Filter moniter indicating when replacement is needed.
- C. Water Sentry Plus Filler:
  - 1. 3000 Gallon Capacity.
  - 2. Quick ¼ turn for easy installation.
  - 3. Polypropylene pre-filter mesh prevents coarse sediment from entering filter.
  - 4. Made with activated carbon and patented ATS lead-removal media.
  - 5. Final filter mesh prevents loose carbon from entering water.
  - 6. ANSI/NSF Standard 42 and 53.
- D. Approved Manufacturers:
  - 1. Sunroc
  - 2. Halsey Taylor
  - 3. Haws
  - 4. Elkay
  - 5. Oasis

### **PART 3 - EXECUTION**

#### 3.1 INSTALLATION

- A. Anchor bottom of fountain to wall.
- B. Top surface to be 32 inches above floor unless required otherwise by local code.
- C. Install 3/8 inch IPS union connection and Chicago No. 376 stop to building supply line.
- D. Install 1-1/4 inch IPS slip cast brass "P" trap. Install trap so it is concealed.

END OF SECTION 22 4703

END OF DIVISION

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## **SECTION 23 0501 – COMMON HVAC REQUIREMENTS**

### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Furnish labor, materials, and equipment necessary for completion of work as described in Contract Documents.
- B. It is the intent of these specifications that the systems specified herein are to be complete and operational before being turned over to the owner. During the bidding process, the contractor is to ask questions or call to the engineer's attention any items that are not shown or may be required to make the system complete and operational. Once the project is bid and the contractor has accepted the contract, it is his responsibility to furnish and install all equipment and parts necessary to provide a complete and operational system without additional cost to the owner.
- C. Furnish and install fire stopping materials to seal penetrations through fire rated structures and draft stops.
- D. Includes But Not Limited To:
  - 1. General procedures and requirements for HVAC.

#### 1.3 SUBMITTALS

- A. Substitutions: By specific designation and description, standards are established for specialties and equipment. Other makes of specialties and equipment of equal quality will be considered provided such proposed substitutions are submitted to the Architect for his approval, complete with specification data showing how it meets the specifications, at least 5 working days prior to bid opening. A list of approved substitutions will be published as an addendum.
  - 1. Submit a single copy of Manufacturer's catalog data including Manufacturer's complete specification for each proposed substitution.
  - 2. The Architect or Engineer is to be the sole judge as to the quality of any material offered as an equal.
- B. Product Data, Shop Drawings: Within 30 days after award of contract, submit 10 sets of Manufacturer's catalog data for each manufactured item.
  - 1. Literature shall include enough information to show complete compliance with Contract Document requirements.
  - 2. Mark literature to indicate specific item with applicable data underlined.
  - 3. Information shall include but not be limited to capacities, ratings, type of material used, guarantee, and such dimensions as are necessary to check space requirements.
  - 4. When accepted, submittal shall be an addition to Contract Documents and shall be in equal force. No variation shall be permitted.
  - 5. Even though the submittals have been accepted by the Engineer, it does not relieve the contractor from meeting all of the requirements of the plans and specifications and providing a complete and operational system.
- C. Drawings of Record: One complete sets of blue line mechanical drawings shall be provided for the purpose of showing a complete picture of the work as actually installed.
  - 1. These drawings shall serve as work progress report sheets. Contractor shall make notations neat and legible therein daily as the work proceeds.
  - 2. The drawings shall be kept at the job at a location designated by the Mechanical Engineer.

3. At completion of the project these "as-built" drawings shall be signed by the Contractor, dated, and returned to the Architect.

- D. Operating Instructions and Service Manual: The Mechanical Contractor shall prepare 2 copies of an Operation and Maintenance Manual for all mechanical systems and equipment used in this project. Manuals shall be bound in hard-backed binders and the front cover and spine of each binder shall indicate the name and location of the project. Use plastic tab indexes for all sections. Provide a section for each different type of equipment item. The following items shall be included in the manual, together with any other pertinent data. This list is not complete and is to be used as a guide.
1. Provide a master index at the beginning of the manual showing all items included.
  2. The first section of the manual shall contain:
    - a. Names, addresses, and telephone numbers of Architect, Mechanical Engineer, Electrical Engineer, General Contractor, Plumbing Contractor, Sheet Metal Contractor, and Temperature Control Contractor.
    - b. List of Suppliers which shall include a complete list of each piece of equipment used with the name, address, and telephone number of vendor.
    - c. General Description of Systems including –
      - 1) Location of all major equipment
      - 2) Description of the various mechanical systems
      - 3) Description of operation and control of the mechanical systems
      - 4) Suggested maintenance schedule
    - d. Copy of contractor's written warranty
  3. Provide a copy of approved submittal literature for each piece of equipment.
  4. Provide maintenance and operation literature published by the manufacturer for each piece of equipment which includes: oiling, lubrication and greasing data; belt sizes, types and lengths; wiring diagrams; step-by-step procedure to follow in putting each piece of mechanical equipment in operation.
  5. Include parts numbers of all replaceable items.
  6. Provide control diagram and operation sequence, along with labeling of control piping and instruments to match diagram.
  7. Include a valve chart indicating valve locations.
- E. Include air balance and/or water balance reports.

#### 1.4 SUBMITTALS FOR COMMON HVAC REQUIREMENTS

- A. Samples: Sealer and gauze proposed for sealing ductwork.
- B. Quality Assurance / Control:
1. Manufacturer's installation manuals providing detailed instructions on assembly, joint sealing, and system pressure testing for leaks.
  2. Specification data on sealer and gauze proposed for sealing ductwork.
- C. Quality Assurance
1. Requirements: Construction details not specifically called out in Contract Documents shall conform to applicable requirements of SMACNA HVAC Duct Construction Standards.
  2. Pre-Installation Conference: Schedule conference immediately before installation of ductwork.

#### 1.5 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies:
1. Perform work in accordance with applicable provisions of local and state Plumbing Code, Gas Ordinances, and adoptions thereof. Provide materials and labor necessary to comply with rules, regulations, and ordinances.
  2. In case of differences between building codes, state laws, local ordinances, utility company regulations, and Contract Documents, the most stringent shall govern. Promptly notify Architect in writing of such differences.

- B. Applicable Specifications: Referenced specifications, standards, and publications shall be of the issues in effect on date of Advertisement for Bid.
  - 1. "Heating, Ventilating and Air Conditioning Guide" published by the American Society of Heating and Air Conditioning Engineers.
  - 2. "Engineering Standards" published by the Heating, Piping, and Air Conditioning Contractors National Association.
  - 3. "2018 International Building Code", "2018 International Mechanical Code", "2018 International Plumbing Code" and "2018 International Fire Code" as published by the International Conference of Building Officials.
  - 4. "National Electrical Code" as published by the National Fire Protection Association.
  - 5. "2018 International Energy Conservation Code".
- C. Identification: Motor and equipment name plates as well as applicable UL and AGA labels shall be in place when Project is turned over to Owner.

#### 1.6 INSPECTIONS AND PERMITS

- A. Pay for permits, fees, or charges for inspection or other services. Local and state codes and ordinances must be properly executed without expense to Owner and are considered as minimum requirements. Local and state codes and ordinances do not relieve the Contractor from work shown that exceeds minimum requirements.

#### 1.7 ADDITIONAL WORK:

- A. Design is based on equipment as described in the drawing equipment schedule. Any change in foundation bases, electrical wiring, conduit connections, piping, controls and openings required by alternate equipment submitted and approved shall be paid for by this division. All work shall be in accordance with the requirements of the applicable sections.

### **PART 2 - PRODUCTS FOR COMMON HVAC REQUIREMENTS**

- A. Finishes, Where Applicable: Colors as selected by Architect.
- B. Duct Hangers:
  - 1. One inch 25 mm by 18 ga 1.27 mm galvanized steel straps or steel rods as shown on Drawings, and spaced not more than 96 inches 2 400 mm apart. Do not use wire hangers.
  - 2. Attaching screws at trusses shall be 2 inch 50 mm No. 10 round head wood screws. Nails not allowed.

### **PART 3 - EXECUTION**

#### 3.1 EXAMINATION

- A. Site Inspection:
  - 1. Examine premises and understand the conditions which may affect performance of work of this Division before submitting proposals for this work.
  - 2. No subsequent allowance for time or money will be considered for any consequence related to failure to examine site conditions.
- B. Drawings:
  - 1. Mechanical drawings show general arrangement of piping, ductwork, equipment, etc, and do not attempt to show complete details of building construction which affect installation. This Contractor shall refer to architectural, structural, and electrical drawings for additional building detail which affect installation of his work.
    - a. Follow mechanical drawings as closely as actual building construction and work of other trades will permit.

- b. No extra payments will be allowed where piping and/or ductwork must be offset to avoid other work or where minor changes are necessary to facilitate installation.
    - c. Everything shown on the mechanical drawings shall be the responsibility of Mechanical Contractor unless specifically noted otherwise.
  - 2. Consider architectural and structural drawings part of this work insofar as these drawings furnish information relating to design and construction of building. These drawings take precedence over mechanical drawings.
  - 3. Because of small scale of mechanical drawings, it is not possible to indicate all offsets, fittings, and accessories which may be required. Investigate structural and finish conditions affecting this work and arrange work accordingly, providing such fittings, valves, and accessories required to meet conditions. Do not scale drawings for locations of equipment or piping. Refer to large scale dimensioned drawings for exact locations.
- C. Insure that items to be furnished fit space available. Make necessary field measurements to ascertain space requirements including those for connections and furnish and install equipment of size and shape so final installation shall suit true intent and meaning of Contract Documents.
  - 1. If approval is received to use other than specified items, responsibility for specified capacities and insuring that items to be furnished will fit space available lies with this Division.
  - 2. If non-specified equipment is used and it will not fit job site conditions, this Contractor assumes responsibility for replacement with items named in Contract Documents.

### 3.2 PREPARATION

- A. Cut carefully to minimize necessity for repairs to existing work. Do not cut beams, columns, or trusses.
  - 1. Patch and repair walls, floors, ceilings, and roofs with materials of same quality and appearance as adjacent surfaces unless otherwise shown. Surface finishes shall exactly match existing finishes of same materials.
  - 2. Each Section of this Division shall bear expense of cutting, patching, repairing, and replacing of work of other Sections required because of its fault, error, tardiness, or because of damage done by it.
  - 3. Cutting, patching, repairing, and replacing pavements, sidewalks, roads, and curbs to permit installation of work of this Division is responsibility of Section installing work.

### 3.3 INSTALLATION

- A. Arrange pipes, ducts, and equipment to permit ready access to valves, unions, traps, starters, motors, control components, and to clear openings of doors and access panels.

### 3.4 STORAGE AND PROTECTION OF MATERIALS:

- A. Provide storage space for storage of materials and assume complete responsibility for losses due to any cause whatsoever. Storage shall not interfere with traffic conditions in any public thoroughfare.
- B. Protect completed work, work underway, and materials against loss or damage.
- C. Close pipe openings with caps or plugs during installation. Cover fixtures and equipment and protect against dirt, or injury caused by water, chemical, or mechanical accident.

### 3.5 EXCAVATION AND BACKFILL

- A. Perform necessary excavation of whatever substance encountered for proper laying of all pipes and underground ducts.
  - 1. Excavated materials not required for fill shall be removed from site as directed by Engineer.
  - 2. Excavation shall be carried low enough to allow a minimum coverage over underground piping of 5'-0" or to be below local frost level.
  - 3. Excess excavation below required level shall be backfilled at Contractor's expense with earth, sand, or gravel as directed by Engineer. Tamp ground thoroughly.

4. Ground adjacent to all excavations shall be graded to prevent water running into excavated areas.

B. Backfill pipe trenches and allow for settlement.

1. Backfill shall be mechanically compacted to same density as surrounding undisturbed earth.
2. Cinders shall not be used in backfilling where steel or iron pipe is used.
3. No backfilling shall be done until installation has been approved by the Engineer.

### 3.6 COOPERATION

- A. Cooperate with other crafts in coordination of work. Promptly respond when notified that construction is ready for installation of work under Division 23000. Contractor will be held responsible for any delays which might be caused by his negligence or failure to cooperate with the other Contractors or crafts.

### 3.7 SUPERVISION

- A. Provide a competent superintendent in charge of the work at all times. Anyone found incompetent shall be removed at once and replaced by someone satisfactory, when requested by the Architect.

### 3.8 INSTALLATION CHECK:

- A. An experienced, competent, and authorized representative of the manufacturer or supplier of each item of equipment indicated in the equipment schedule shall visit the project to inspect, check, adjust if necessary, and approve the equipment installation. In each case, the equipment supplier's representative shall be present when the equipment is placed in operation. The equipment supplier's representative shall revisit the project as often as necessary until all trouble is corrected and the equipment installation and operation is satisfactory to the Engineer.
- B. Each equipment supplier's representative shall furnish to the Owner, through the Engineer, a written report certifying the following:
1. Equipment has been properly installed and lubricated.
  2. Equipment is in accurate alignment.
  3. Equipment is free from any undue stress imposed by connecting piping or anchor bolts.
  4. Equipment has been operated under full load conditions.
  5. Equipment operated satisfactorily.
- C. All costs for this installation check shall be included in the prices quoted by equipment suppliers.

### 3.9 CLEANING EQUIPMENT AND PREMISES

- A. Properly lubricate equipment before Owner's acceptance.
- B. Clean exposed piping, ductwork, equipment, and fixtures. Repair damaged finishes and leave everything in working order.
- C. Remove stickers from fixtures and adjust flush valves.
- D. At date of Substantial Completion, air filters shall be new, clean, and approved by Owner's representative.
- E. Trap elements shall be removed during cleaning and flushing period. Replace trap elements and adjust after cleaning and flushing period.

### 3.10 TESTS

- A. No piping work, fixtures, or equipment shall be concealed or covered until they have been inspected and approved by the inspector. Notify inspector when the work is ready for inspection.
- B. All work shall be completely installed, tested as required by Contract Documents and the city and county

ordinances and shall be leak-tight before the inspection is requested.

- C. Tests shall be repeated to the satisfaction of those making the inspections.
- D. Water piping shall be flushed out, tested at 100 psi and left under pressure of supply main or a minimum of 40 psi for the balance of the construction period.

### 3.11 WARRANTY

- A. Contractor shall guarantee work under Division 23 to be free from inherent defects for a period of one year from acceptance.
  - 1. Contractor shall repair, revise or replace any and all such leaks, failure or inoperativeness due to defective work, materials, or parts free of charge for a period of one year from final acceptance, provided such defect is not due to carelessness in operation or maintenance.
  - 2. In addition, the Contractor shall furnish all refrigeration emergency repairs, emergency service and all refrigerant required due to defective workmanship, materials, or parts for a period of one year from final acceptance at no cost to the Owner, provided such repairs, service and refrigerant are not caused by lack of proper operation and maintenance.
- B. In addition to warranty specified in General Conditions, heating, cooling, and plumbing systems are to be free from noise in operation that may develop from failure to construct system in accordance with Contract Documents.

### 3.12 SYSTEM START-UP, OWNER'S INSTRUCTIONS

- A. Off-Season Start-up
  - 1. If Substantial Completion inspection occurs during heating season, schedule spring start-up of cooling systems. If inspection occurs during cooling season, schedule autumn start-up for heating systems.
  - 2. Notify Owner 7 days minimum before scheduled start-up.
  - 3. Time will be allowed to completely service, test, check, and off-season start systems. During allowed time, train Owner's representatives in operation and maintenance of system.
  - 4. At end of off-season start-up, furnish Owner with letter confirming that above work has been satisfactorily completed.
- B. Owner's Instructions
  - 1. Instruct building maintenance personnel and Owner Representative in operation and maintenance of mechanical systems utilizing Operation & Maintenance Manual when so doing.
  - 2. Minimum instruction periods shall be as follows –
    - a. Mechanical - Four hours.
    - b. Temperature Control - Four hours.
    - c. Refrigeration - Two hours.
  - 3. Instruction periods shall occur after Substantial Completion inspection when systems are properly working and before final payment is made.
  - 4. None of these instructional periods shall overlap another.

### 3.13 PROTECTION

- A. Do not run heat pump, air handling units, fan coil units, or other pieces of equipment used for moving supply air without proper air filters installed properly in system.
- B. The mechanical systems are not designed to be used for temporary construction heat. If any equipment is to be started prior to testing and substantial completion, such equipment will be returned to new condition with full one year warranties, from date of substantial completion after any construction use. This includes, but is not necessarily limited to: Equipment, filters, ductwork, fixtures, etc.

### 3.14 COMMON HVAC REQUIREMENTS:

#### A. INSTALLATION

1. During installation, protect open ends of ducts by covering with plastic sheet tied in place to prevent entrance of debris and dirt.
2. Make necessary allowances and provisions in installation of sheet metal ducts for structural conditions of building. Revisions in layout and configuration may be allowed, with prior written approval of Architect. Maintain required airflows in suggesting revisions.
3. Hangers And Supports:
  - a. Install pair of hangers close to each transverse joint and elsewhere as required by spacing indicated in table on Drawings.
  - b. Install upper ends of hanger securely to floor or roof construction above by method shown on Drawings.
  - c. Attach strap hangers to ducts with cadmium-plated screws. Use of pop rivets or other means will not be accepted.
  - d. Where hangers are secured to forms before concrete slabs are poured, cut off flush all nails, strap ends, and other projections after forms are removed.
  - e. Secure vertical ducts passing through floors by extending bracing angles to rest firmly on floors without loose blocking or shimming. Support vertical ducts, which do not pass through floors, by using bands bolted to walls, columns, etc. Size, spacing, and method of attachment to vertical ducts shall be same as specified for hanger bands on horizontal ducts.

#### B. CLEANING

1. Clean interior of duct systems before final completion.

END OF SECTION 23 0501



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## **SECTION 23 0502 - DEMOLITION AND REPAIR**

### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 23 0501 apply to this Section.

#### 1.2 SUMMARY

- A. Under this section remove obsolete piping and mechanical equipment and relocate, reconnect or replace existing piping affected by demolition or new construction. Remove concealed piping abandoned due to demolition or new construction, or cap piping flush with existing surfaces.

#### 1.3 DRAWINGS AND EXISTING CONDITIONS

- A. All relocations, reconnections and removals are not necessarily indicated on the drawings. As such, the Contractor shall make adequate allowance in his proposal for this work as no extra charges will be allowed for these items.

### **PART 2 - NOT USED**

### **PART 3 - EXECUTION**

#### 3.1 TEMPORARY CONNECTIONS

- A. Where existing piping must remain in service to supply occupied areas during construction, provide temporary piping, connections, and equipment to maintain service to such areas. All shall be performed in a neat and safe manner to prevent injury to the building or its occupants.

#### 3.2 EXISTING TO BE ABANDONED

- A. All required drilling, cutting, block-outs and demolition work required for the removal and/or installation of the mechanical system is the responsibility of this Contractor.
- B. No joists, beams, girders, trusses or columns shall be cut by any Contractor without written permission from the Architect.
- C. The patching, repair, and finishing to existing or new surfaces is the responsibility of this Contractor, unless specifically called for under sections of specifications covering these materials.
- D. Disconnect all equipment that is to be removed or relocated. Relocate any existing equipment that obstructs new construction.

#### 3.3 EXISTING TO REMAIN IN USE

- A. Where affected by demolition or new construction, relocate, replace, extend, or repair piping and equipment to allow continued use of same. Use methods and materials as specified for new construction.

#### 3.4 MATERIALS AND EQUIPMENT REMOVED

- A. All obsolete materials, piping, and equipment shall become the property of the Contractor and be removed from the site promptly.

END OF SECTION 23 0502

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## **SECTION 23 0553 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT**

### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 23 0501 apply to this Section.

#### 1.2 SUMMARY

- A. Furnish and install identification of equipment and piping as described in Contract Documents.
- B. Mechanical Contractor shall touch-up equipment where factory paint has been damaged. Repaint entire item where more than 20 percent of the surface is involved.
- C. Primary painting of walls, ceilings, ductwork, piping and plenums is covered in the general painting section of these Contract Documents.

### **PART 2 - PRODUCTS**

#### 2.1 PAINT

- A. Benjamin Moore Impervo or equivalent by Paint Manufacturer approved in Section 09 900.
- B. Use appropriate primer.

#### 2.2 LABELS

- A. Black Formica with white reveal on engraving.

#### 2.3 CODED BANDS

- A. Using colored bands and arrows to indicate supply and return, with colored reflective tape, color code all piping installed in this contract at not more than 20-foot intervals, at equipment, at walls, etc., in accordance with ANSI Standards.
- B. Approved Manufacturers:
  - 1. Seton
  - 2. Craftmark

#### 2.4 PIPE IDENTIFICATION

- A. In addition to the colored bands, stencil with black paint in 1/2 inch high letters a symbol and directional arrow for all fluids handled or use Seaton coded and colored pipe markers and arrows to meet ANSI Standards.

#### 2.5 EQUIPMENT IDENTIFICATION

- A. Provide an engraved plastic plate for each piece of equipment stating the name of the item, symbol number, area served, and capacity. Label all control components with plastic embossed mechanically attached labels. Sample:
  - 1. Supply Fan SF-1 - North Classrooms
  - 2. 10,000 CFM @ 2.5"

## 2.6 VALVE IDENTIFICATION

- A. Make a list of and tag all valves installed in this work.
  - 1. Valve tags shall be of brass, not less than 1"x2" size, hung with brass chains.
  - 2. Tag shall indicate plumbing or heating service.

## PART 3 - EXECUTION

### 3.1 APPLICATION

- A. Engraved Plates:
  - 1. Identify thermostats and control panels in mechanical rooms, furnaces, boilers and hot water heating specialties, duct furnaces, air handling units, electric duct heaters, and condensing units with following data engraved and fastened to equipment with screws –
    - a. Equipment mark noted on Drawings (i.e., SF-1)
    - b. Area served (i.e., North Classrooms)
    - c. Capacity (10,000 CFM @ 2.5)
- B. Stenciling:
  - 1. Locate identifying legends and directional arrows at following points on each piping system –
    - a. Adjacent to each item of equipment and special fitting.
    - b. At point of entry and exit where piping goes through wall.
    - c. On each riser and junction.
    - d. Every 50 feet on long continuous lines.
  - 2. Steam Pipe, Hot Water Heating, Chilled Water, Gas, & Valve Identification –
    - a. Identify specific pipe contents by stenciling pipe with written legend and placing of arrows to indicate direction of flow.
- C. Painting:
  - 1. Background Color - Provide by continuous painting of piping.

Symbol	Name	Color
STM	Steam Lines	Orange
COND	Steam Condensate Return Line	Lt Orange

- 2. Identification stenciling and flow arrows shall be following colors for proper contrast:

<u>Arrows &amp; ID Stenciling</u>	<u>Color Shade of Pipe</u>
White	Red, Grays, & black
Black	Yellows, Oranges, Greens, & White

END OF SECTION 23 0553

## **SECTION 23 0710 - MECHANICAL INSULATION AND FIRE STOPPING**

### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 23 0501 apply to this Section.

#### 1.2 SUMMARY

- A. Furnish and install mechanical insulation and fire stopping as described in Contract Documents including but not limited to the following:
  1. Ductwork Insulation
  2. Heating Piping Insulation
  3. Refrigerant Piping
  4. Fire Stopping

#### 1.3 QUALITY ASSURANCE

- A. Insulation shall have composite (insulation, jacket or facing and adhesive used to adhere facing or jacket to insulation) fire and smoke hazard ratings as tested by Procedure ASTM E-84, NFPA 255 and UL 723 not exceeding: Flame Spread of 25 and Smoke Developed of 50.
- B. Insulation Contractor shall certify in writing, prior to installation, that all products to be used will meet the above criteria.
- C. Accessories, such as adhesives, mastics, cements, and tapes, for fittings shall have the same component ratings as listed above.
- D. Products, or their shipping cartons, shall bear a label indicating that flame and smoke ratings do not exceed above requirements.
- E. Any treatment of jacket or facings to impart flame and smoke safety shall be permanent.
- F. The use of water-soluble treatments is prohibited.

END OF SECTION 23 0710

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## **SECTION 23 0716 - DUCTWORK INSULATION**

### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, and Section 23 0501 apply to this Section.

#### 1.2 SUMMARY

- A. Furnish and install insulation on air ducts outside building insulation envelope as described in Contract Documents.
- B. Furnish and install insulation on fresh air ducts and combustion air ducts within building insulation envelope as described in Contract Documents.
- C. Furnish and install insulation on other air ducts where indicated on Drawings.

### **PART 2 - PRODUCTS**

#### 2.1 INSULATION

- A. 1-1/2 inch thick fiberglass with aluminum foil scrim kraft facing and have a density of one lb/cu ft.
- B. Approved Manufacturers:
  - 1. Manville Microlite FSK
  - 2. CSG Type IV standard duct insulation
  - 3. Owens-Corning FRK
  - 4. Knauf (Duct Wrap FSK)

### **PART 3 - EXECUTION**

#### 3.1 INSTALLATION

- A. Install duct wrap in accordance with Manufacturer's recommendations.
- B. Do not compress insulation except in areas of structural interference.
- C. Completely seal joints.

END OF SECTION 23 0716



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## **SECTION 23 0717 – ROUND SUPPLY DUCT INSULATION**

### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 23 0501 apply to this Section.

#### 1.2 SUMMARY

- A. Furnish and install round supply duct insulation as described in Contract Documents.

#### 1.3 QUALITY ASSURANCE

- A. Insulation shall be UL rated with FSK (foil-skrim-kraft) facing.

### **PART 2 - PRODUCTS**

#### 2.1 MANUFACTURED UNITS

- A. Fiberglass blanket insulation
- B. Approved Manufacturers:
  - 1. Johns-Manville R-4 Microlite (R-4 does not include the vapor barrier material).
  - 2. Owens-Corning faced duct wrap insulation FRK-25 ED-150
  - 3. Certainteed Standard Duct Wrap.

### **PART 3 - EXECUTION**

#### 3.1 INSTALLATION

- A. Insulate round air supply ducts.
- B. Facing shall overlap 2" at joints and shall be secured with outward clinch staples on 4" centers.
- C. Ducts over 30" in width shall have spot application of adhesive, weld pins or metal screws and caps on not more than 18" centers applied to underside.
- D. 3" wide vapor barrier paper shall be applied over seams and sealed with vapor barrier adhesive.
- E. Insulate attenuators.
- F. Insulate high and low pressure flex ducts.

END OF SECTION 23 0717

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## **SECTION 23 0718 - DUCT LINING**

### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, and Section 23 0501 apply to this Section.

#### 1.2 SUMMARY

- A. Furnish and install acoustic lining in following above ground metal ductwork as described in Contract Documents unless detailed otherwise:
  1. Outside air
  2. Supply air
  3. Return air
  4. Mixed air
  5. Transfer air
  6. Relief air
  7. Elbows, fittings, and diffuser drops greater than 12 inches in length.

#### 1.3 SYSTEM DESCRIPTION

- A. Duct dimensions shown on Drawings are for free area inside insulation. Allowance must be made for insulation, where applicable.

#### 1.4 RATINGS:

- A. Material shall have maximum air friction correction factor of 1.10 at 1000 FPM velocity and have a minimum sound absorption coefficient NRC of .60.

### **PART 2 - PRODUCTS**

#### 2.1 DUCT LINER

- A. One inch thick, 1-1/2 lb density fiberglass, factory edge coated.
- B. Duct lining materials are to meet the requirements of UL 181 for mold, humidity, and erosion resistance.
- C. Approved Manufacturers:
  1. Certaineed Ultralite 150 Certa Edge Coat
  2. Knauf - Type M
  3. Manville - Lina-Coustic
  4. Owen Corning Fiberglas - Aeroflex

#### 2.2 ADHESIVE

- A. Water Base Type:
  1. Cain - Hydrotak
  2. Duro Dyne - WSA
  3. Kingco - 10-568
  4. Miracle - PF-101
  5. Mon-Eco - 22-67
  6. Techno Adhesive - 133
- B. Solvent Base (non-flammable) Type:

1. Cain - Safetak
2. Duro Dyne - FPG
3. Kingco - 15-137
4. Miracle - PF-91
5. Mon-Eco - 22-24
6. Techno Adhesive - 'Non-Flam' 106

C. Solvent Base (flammable) Type:

1. Cain - HV200
2. Duro Dyne - MPG
3. Kingco - 15-146
4. Miracle - PF-96
5. Mon-Eco - 22-22
6. Techno Adhesive - 'Flammable' 106

### 2.3 FASTENERS

A. Adhesively secured fasteners not allowed.

B. Approved Manufacturers:

1. AGM Industries Inc - "DynaPoint" Series DD-9 pin
2. Cain
3. Duro Dyne
4. Omark dished head "Insul-Pins"
5. Grip nails may be used if each nail is installed by "Grip Nail Air Hammer" or by "Automatic Fastener Equipment" in accordance with Manufacturer's recommendations.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install mat finish surface on air stream side. Secure insulation to cleaned sheet metal duct with continuous 100% coat of adhesive and with 3/4 inch long mechanical fasteners 12 inches on center maximum unless detailed otherwise on Drawings. Pin all duct liner.
- B. Accurately cut liner and thoroughly coat ends with adhesive. Butt joints tightly. Top and bottom sections of insulation shall overlap sides. If liner is all one piece, folded corners shall be tight against metal. Ends shall butt tightly together.
- C. In casings and plenums further contain insulation with wire mesh.

### 3.2 FIELD QUALITY CONTROL

- A. If insulation is installed without longitudinal and end joints butted together, installation will be rejected and work removed and replaced with work that conforms to this Specification.
- B. Insulation shall be installed in accordance with Duct Liner Application Standard SMACNA Manual 15.

### 3.3 ADJUSTING, CLEANING

- A. Keep duct liner clean and free from dust. At completion of project, vacuum duct liner if it is dirty or dusty.

END OF SECTION 23 0718

## **SECTION 23 0720 - REFRIGERANT PIPING INSULATION**

### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 23 0501 apply to this Section.

#### 1.2 SUMMARY

- A. Furnish and install insulation on above ground refrigerant suction piping and fittings, including thermal bulb, from thermal expansion valve as described in Contract Documents.

#### 1.3 QUALITY ASSURANCE

- A. Insulation shall have flame-spread rating of 25 or less and a smoke density rating of 50 or less as tested by ASTM E-84 method.
- B. Ratings:
  - 1. Upper rating of =210 deg. F.
  - 2. Lower rating of -110 deg. F.
  - 3. UV stabilized for ten year life.
  - 4. Thermal conductivity of 0.24.
  - 5. Water vapor transmission of .03 perms per inch.
  - 6. Material to be polyolefin food grade.

### **PART 2 - PRODUCTS**

#### 2.1 FLEXIBLE FOAMED PIPE INSULATION

- A. Thickness:
  - 1. 1/2 inch for one inch outside diameter and smaller pipe.
  - 2. 3/4 inch for 1-1/8 through 2 inch outside diameter pipe.
  - 3. One inch for 2-1/8 inches outside diameter and larger pipe (two layers of 1/2 inch).
  - 4. One inch sheet for fittings as recommended by Manufacturer.
- B. Approved Manufacturers:
  - 1. Armaflex
  - 2. Halstead "Insul-tube"
  - 3. Rubatex
  - 4. Therma-Cel

#### 2.2 JOINT SEALER

- A. Approved Manufacturers:
  - 1. Armaflex 520
  - 2. BFG Construction Adhesive #105
  - 3. Therma-Cel 950.

#### 2.3 MANUFACTURED UNITS

- A. Nominal 3/4" wall thickness
- B. Approved Manufacturers:
  - 1. ImcoLock Pipe Insulation

2. or approved equal

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Install insulation in snug contact with pipe and in accordance with Manufacturer's recommendations.
- B. Insulation shall be slipped onto pipe prior to connection or applied after pipe is installed, at contractor's option.
- C. Close butt joints and miter joints.
  1. Approved Manufacturers:
    - a. IMCOA's Fuse-Seal joining system
    - b. or factory approved contact adhesive
- D. Insulation shall be installed according to manufacturer's recommended procedures.
- E. Exterior exposed Insulation shall be finished with two coats of factory approved finish. Color shall be selected by the Owner's representative.
- F. Stagger joints on layered insulation.
- G. Slip insulation on tubing before tubing sections and fittings are assembled keeping slitting of insulation to a minimum.
- H. Seal joints in insulation.
- I. Insulate flexible pipe connectors.
- J. Insulate thermal expansion valves with insulating tape.
- K. Insulation exposed outside building shall have "slit" joint seams placed on bottom of pipe.
- L. Insulate fittings with sheet insulation and as recommended by Manufacturer.

END OF SECTION 23 0720

## **SECTION 23 0768 - STEAM SUPPLY AND CONDENSATE RETURN PIPING INSULATION**

### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, and Section 15055 apply to this Section.

#### 1.2 SUMMARY

- A. Furnish and install insulation on piping mains, branches, risers, fittings, and valves, pump bodies and flanges as described in Contract Documents.

### **PART 2 - PRODUCTS**

#### 2.1 MATERIAL

- A. 6 lb./cu.ft. heavy density fiberglass with fire retardant vapor barrier jacket with self sealing laps. Thickness shall be 1-1/2 inches on heating supply and return lines.
- B. Approved Manufacturers:
  - 1. Owens-Corning Fiberglass heavy density with ASJ-SSL jacket
  - 2. Equals by Johns-Manville or CTM.
  - 3. Zeston covers for valves and fittings.

### **PART 3 - EXECUTION**

#### 3.1 INSTALLATION

- A. Pipes:
  - 1. Install in accordance with manufacturer's directions on clean dry pipes.
  - 2. Butt joints firmly together.
  - 3. Seal vapor barrier longitudinal seam overlap with vapor barrier adhesive.
  - 4. Wrap butt joints with four inch strip of vapor barrier jacket material cemented with vapor barrier adhesive.
  - 5. Finish with bands applied at mid-section and at each end of insulation.
- B. Valves & Fittings:
  - 1. Insulate and finish by one of following methods -
  - 2. With hydraulic setting insulating cement, or equal, to thickness equal to adjoining pipe insulation.
  - 3. With segments of molded insulation securely wired in place.
  - 4. With prefabricated covers made from molded pipe insulation finished with vapor barrier adhesive.
  - 5. With Zeston covers and factory supplied insulation diapers.
  - 6. Finish fittings and valves with four ounce canvas and coat with vapor barrier adhesive or Zeston covers.

END OF SECTION 23 0768



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## **SECTION 23 0800 – FIRE STOPPING**

### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 23 0501 apply to this Section.

#### 1.2 SUMMARY

- A. Furnish and install fire stopping as described in Contract Documents.

#### 1.3 QUALITY ASSURANCE

- A. Fire stopping material shall meet ASTM E814, E84 and be UL listed.

### **PART 2 - PRODUCTS**

#### 2.1 MANUFACTURED UNITS

- A. Material shall be flexible, long lasting, intumescent acrylic seal to accommodate vibration and building movement.
- B. Caulk simple penetrations with gaps of 1/4" or less with:
  - 1. Dow Corning Fire Stop Sealant
  - 2. Pensil 300
- C. Caulk multiple penetrations and/or penetrations with gaps in excess of 1/4" with:
  - 1. Dow Corning Fire Stop Foam
  - 2. Pensil 200
  - 3. IPC flame safe FS-1900
  - 4. Tremco "Tremstop 1A"

### **PART 3 - EXECUTION**

#### 3.1 INSTALLATION

- A. Follow manufacturer's installation instructions explicitly.
- B. Seal penetrations of ductwork, piping, and other mechanical equipment through one-hour and two-hour rated partitions as shown on Architectural and Mechanical Drawings.
- C. Install fire stopping material on clean surfaces to assure adherence.

END OF SECTION 23 0800

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## **SECTION 23 2112 - STEAM AND CONDENSATE PIPING**

### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, and Section 22 0100 apply to this Section.

#### 1.2 SUMMARY

- A. Furnish and install steam and condensate piping as described in Contract Documents.

#### 1.3 QUALITY ASSURANCE

- A. Cleaning System:
  - 1. Thoroughly clean equipment, piping, and other material under this contract.
  - 2. Remove rust, scale, and other dirt before painting or covering.
  - 3. Remove rust, scale, and other dirt before operating the system.
- B. Operate heating system at 10 psi for at least 6 hours, then -
  - 1. Fill boiler to the top with water to wash any film, oil or grease over the top.
  - 2. Drain boiler and refill to proper level with fresh water.
  - 3. Use 1 pound tri-sodium phosphate for every 100 gallons of water during cleaning operation.
- C. Tests:
  - 1. No piping systems shall be covered or concealed until hydraulically tested at 50 psi in excess of maximum working pressure (100 psi minimum) and inspected and approved by Architect and any local inspector having jurisdiction.
  - 2. When directed by Architect or Engineer, Contractor shall conduct an operating test on any piece of equipment to demonstrate its capacity and operating characteristics.

### **PART 2 - PRODUCTS**

#### 2.1 MANUFACTURED UNITS

- A. Steam Supply Piping
  - 1. Schedule 40-316 Stainless pipe and fittings.
  - 2. Pipe ends shall be reamed out before being made up into fittings.
  - 3. Fittings shall be 316 Stainless full weld.
- B. Condensate Piping:
  - 1. Schedule 40 316 Stainless Pipe and fittings.
  - 2. Pipe ends shall be reamed out before being made up into fittings.
  - 3. Fittings shall be 316 Stainless Full Weld..

### **PART 3 - EXECUTION**

#### 3.1 INSTALLATION

- A. Heating piping shall run generally as indicated on the Drawings.
- B. Pipe ends shall be reamed and burrs removed.

- C. Unions shall be installed where necessary and on both sides of equipment and drip traps.
- D. Install float and thermostatic drip traps in sizes shown on drawings.
  - 1. Install at ends of steam mains.
  - 2. Install on raises in steam mains.
  - 3. Install dirt strainer and gate valve ahead of each drip trap.
- E. Runs of main piping shall start as high as possible.
- F. Keep as close to the ceiling as possible.
- G. Make sufficient allowance for grade and branches to be taken off top at 45 degree angles.
- H. Steam and return mains shall be graded downward in direction of flow 1 inch in 20 feet.
- I. Runouts and branches that grade back against flow of steam shall be graded 1/4 inch per foot.

END OF SECTION 23 2112

## SECTION 23 2166 - SPLIT SYSTEM HEAT PUMP UNITS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Includes But Not Limited To
  - 1. Furnish and install heat pumps as described in Contract Documents.
- B. Related Sections
  - 1. Section 02776 - Concrete pads
  - 2. Section 23 0501 - Common HVAC Requirements

#### 1.2 SUBMITTALS

- A. Quality Assurance / Control - Equipment check-out sheets

#### 1.3 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies - Each unit shall be UL or ETL labeled.

#### 1.4 WARRANTY

- A. Provide five year warranty on compressors beginning from date of start-up. Record start-up date on warranty certificate for each unit.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURED UNITS

- A. Heat Pumps
  - 1. Indoor Units -
    - a. Compact wall mounted units.
    - b. Supplementary electric heater, size as scheduled.
    - c. Cabinet finish as selected by Architect.
    - d. Isolate moving parts from cabinets to reduce noise.
  - 2. Outdoor Units -
    - a. Compressor shall be of rotary or scroll design.
    - b. Fans shall be direct driven and discharge horizontally.
    - c. Casing shall be fully weatherproof for outdoor installations.
    - d. Microprocessor Controls shall be factory wired with field installed remote pendant station.
    - e. Refrigerant shall be R-410A.
    - f. Isolate moving parts from cabinets to reduce noise.
    - g. Use dry-charged tubing for connection of unit's refrigerant system.
  - 3. Approved Products -
    - a. Carrier Corp, Syracuse, NY (800) 227-7437 or (315) 432-6000 [www.carrier-commercial.com](http://www.carrier-commercial.com)
    - b. Friedrich Air Conditioning Co, Austin, TX (800) 541-6645 or (210) 225-2000 [www.friedrich.com](http://www.friedrich.com)
    - c. Mitsubishi Electronics America Inc, HVAC Div, Norcross, GA (800) 421-1140 or (770) 448-1268
    - d. Sanyo Air Conditioning Products, Chatsworth, CA (818) 998-7322 [www.sanyo.com](http://www.sanyo.com)
    - e. L.G. Electronics, USA, Englewood Cliffs, NJ (201) 585-0018, [www.lghvac.com](http://www.lghvac.com)

### **PART 3 - EXECUTION**

#### 3.1 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service - Units shall be started up, checked out, and adjusted by Unit Manufacturer's authorized factory trained service mechanic. Use equipment check-out sheet provided by Manufacturer. Complete and sign all items on sheet.

END OF SECTION 23 2166

## **SECTION 23 2300 - REFRIGERANT PIPING SYSTEMS**

### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 23 0501 apply to this Section.

#### 1.2 SUMMARY

- A. Furnish and install piping for refrigeration systems as described in Contract Documents.

#### 1.3 QUALITY ASSURANCE

- A. Qualifications:
  - 1. Refrigerant piping shall be installed by a refrigeration contractor licensed by State.

### **PART 2 - PRODUCTS**

#### 2.1 REFRIGERANT PIPING

- A. Meet requirements of ASTM B 280-88, "Specification for Seamless Copper Tube for Air Conditioning & Refrigeration Field Service", hard drawn straight lengths.
- B. Do not use pre-charged refrigerant lines.

#### 2.2 REFRIGERANT FITTINGS

- A. Wrought copper with long radius elbows.
- B. Approved Manufacturers:
  - 1. Mueller Streamline
  - 2. Nibco Inc
  - 3. Grinnell
  - 4. Elkhart Products Corp

#### 2.3 SUCTION LINE TRAPS

- A. Manufactured standard one-piece traps.

#### 2.4 CONNECTION MATERIAL

- A. Brazing Rods:
  - 1. Copper to Copper Connections:
  - 2. AWS Classification BCuP-4 Copper Phosphorus (6% silver).
  - 3. AWS Classification BCuP-5 Copper Phosphorus (15% silver).
  - 4. Copper to Brass or Copper to Steel Connections:
  - 5. AWS Classification BAg-5 Silver (45% silver).
  - 6. Do not use rods containing Cadmium.

#### 2.5 FLUX

- A. Approved Manufacturers:
  - 1. "Stay-Silv white brazing flux" by J W Harris Co



2. High quality silver solder flux by Handy & Harmon

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Do not install refrigerant piping underground or in tunnels.
- B. Slope suction lines down toward compressor one inch/10 feet. Locate traps at vertical rises against flow in suction lines.
- C. Refrigeration system connections shall be copper-to-copper, copper-to-brass, or copper-to-steel type properly cleaned and brazed with specified rods. Use flux only where necessary.
  1. No soft solder (tin, lead, antimony) connections will be allowed in system.
- D. Braze valve, sight glass, and flexible connections.
- E. Circulate dry nitrogen through tubes being brazed to eliminate formation of copper oxide during brazing operation.

#### **3.2 FIELD QUALITY CONTROL**

- A. Make evacuation and leak tests in presence of Architect's Engineer after completing refrigeration piping systems. Positive pressure test will not suffice for procedure outlined below.
  1. Draw vacuum on each entire system with vacuum pump to 200 microns using vacuum gauge calibrated in microns. Do not use cooling compressor to evacuate system nor operate it while system is under high vacuum. Isolate compressor from system piping using shut-off valves prior to pulling vacuum.
  2. Break vacuum with freon to be used and re-establish vacuum test. Vacuum shall hold for 24 hours at 200 microns without compressor running.
  3. Conduct tests at 70 deg F ambient temperature minimum.
  4. Do not run systems until above tests have been made and systems started up as specified. Inform Owner's Representative of status of systems at time of final inspection and schedule start-up and testing if prevented by outdoor conditions before this time.
  5. After testing, fully charge system with refrigerant and conduct test with Halide Leak Detector.

END OF SECTION 23 2300

## **SECTION 23 2310 - REFRIGERANT SPECIALTIES**

### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 23 0501 apply to this Section.

#### 1.2 SUMMARY

- A. Furnish and install refrigeration specialties as described in Contract Documents except for expansion valves on 2 through 5 ton condensing units.

### **PART 2 - PRODUCTS**

#### 2.1 EXPANSION VALVES

- A. For pressure type distributors, externally equalized with stainless steel diaphragm, and same refrigerant in thermostatic elements as in system.
- B. Size valves to provide full rated capacity of cooling coil served. Coordinate selection with evaporator coil and condensing unit.
- C. Approved Manufacturers:
  - 1. Alco
  - 2. Henry
  - 3. Mueller
  - 4. Parker
  - 5. Singer
  - 6. Sporlan

#### 2.2 FILTER-DRIER

- A. On lines 3/4 inch outside diameter and larger, filter-drier shall be replaceable core type with Schraeder type valve.
- B. On lines smaller than 3/4 inch outside diameter, filter-drier shall be sealed type using flared copper fittings.
- C. Size shall be full line size.
- D. Approved Manufacturers:
  - 1. Alco
  - 2. Mueller
  - 3. Parker
  - 4. Sporlan
  - 5. Virginia

#### 2.3 SIGHT GLASS

- A. Combination moisture and liquid indicator with protection cap.
- B. Sight glass shall be full line size.

- C. Sight glass connections shall be solid copper or brass, no copper-coated steel sight glasses allowed.
- D. Approved Manufacturers:
  - 1. Alco
  - 2. Mueller
  - 3. Parker
  - 4. Superior
  - 5. Virginia

#### 2.4 MANUAL REFRIGERANT SHUT-OFF VALVE

- A. Ball valves designed for refrigeration service and full line size.
- B. Valve shall have cap seals.
- C. Valves with hand wheels are not acceptable.
- D. Provide service valve on each liquid and suction line at compressor.
- E. If service valves come as integral part of condensing unit, additional service valves shall not be required.
- F. Approved Manufacturers:
  - 1. ConBraCo (Apollo)
  - 2. Henry
  - 3. Mueller
  - 4. Superior
  - 5. Virginia

### **PART 3 - EXECUTION**

#### 3.1 INSTALLATION

- A. Install valves and specialties in accessible locations. Install refrigeration distributors and suction outlet at same end of coil.

END OF SECTION 23 2310

## **SECTION 23 3114 - LOW-PRESSURE STEEL DUCTWORK**

### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 23 0501 apply to this Section.

#### 1.2 SUMMARY

- A. Furnish and install above-grade ductwork and related items as described in Contract Documents.

### **PART 2 - PRODUCTS**

#### 2.1 DUCTS

- A. Fabricate of zinc-coated lockforming quality steel sheets meeting requirements of ASTM 653A/653M, "Specification for Sheet Steel Zinc-Coated (Galvanized) by the Hot-Dip Process, Lock Forming Quality", with G 60 coating.
- B. Use of aluminum, non-metallic, or round ducts is not permitted. [Specification writer: Use of aluminum ducts in areas with high chlorine content (eg.: ventilation for pools, spas, etc.) should be considered on a per job basis.]

#### 2.2 DUCT JOINTS

- A. Ducts with sides up to and including 36 inches shall be as detailed in the SMACNA manual.
- B. Duct sizes over 36 inches shall be fabricated using SMACNA T-24 flange joints or pre-fabricated systems as follows:
  - 1. Ducts with sides over 36 inches to 48 inches:
    - a. transverse duct joint system by Ductmate/25, Nexus, Ward, or WDCI (Lite) (SMACNA "E" or "G" Type connection).
  - 2. Ducts 48 inches & larger:
    - a. Ductmate/35, Nexus, or WDCI (Heavy) (SMACNA "J" Type connection).
  - 3. Approved Manufacturers:
    - a. Ductmate Industries Inc, 10760 Bay Meadows Drive, Sandy, UT 84092 (801) 571-5308
    - b. Nexus, Exanno Corp, P O Box 729, Buffalo, NY 14206 (716) 849-0545
    - c. Ward Industries Inc, 1661 Lebanon Church Road, Pittsburg, PA 15236 (800) 466-9374
    - d. WDCI, P O Box 10868, Pittsburg, PA 15236 (800) 245-3188

#### 2.3 ACCESS DOORS IN DUCTS

- A. At each manual outside air damper and at each motorized damper, install factory built insulated access door with hinges and sash locks. Locate doors within 6 inches of installed dampers. Construction shall be galvanized sheet metal, 24 ga minimum.
- B. Fire and smoke damper access doors shall have a minimum clear opening of 12" x 12" or as specified on Drawings to easily service fire or smoke damper. Doors shall be within 6 inches of fire and smoke dampers and in Mechanical Room if possible.
- C. Identify each door with 1/2" high letters reading "smoke damper" or "fire damper".
- D. Approved Manufacturers:

1. AirBalance - Fire/Seal #FSA 100
2. Air Control Products - HAD-10
3. Cesco-Advanced Air - HAD-10
4. Elgen - Model 85 A
5. Kees Inc - ADH-D.
6. Louvers & Dampers - #SMD-G-F
7. Nailor-Hart Industries Inc - Series 0831
8. National Controlled Air Inc - Model AD-FL-1

#### 2.4 FLEXIBLE EQUIPMENT CONNECTIONS

- A. 30 oz closely woven UL approved glass fabric, double coated with neoprene.
- B. Fire retardant, waterproof, air-tight, resistant to acids and grease, and withstand constant temperatures of 250 deg F.
- C. Approved Manufacturers:
  1. Cain - N-100
  2. Duro Dyne - MFN
  3. Elgen - ZLN
  4. Ventfabrics - Ventglas

#### 2.5 CONCEALED CEILING DAMPER REGULATORS

- A. Approved Manufacturers:
  1. Cain
  2. Duro Dyne
  3. Metco Inc
  4. Vent-Lock - #666
  5. Young - #303

#### 2.6 VOLUME DAMPERS

- A. In Main Ducts:
  1. 16 gauge galvanized steel, opposed blade type with 3/8 inch pins and end bearings. Blades shall have 1/8 inch clearance all around.
  2. Damper shall operate within acoustical duct liner.
  3. Provide channel spacer equal to thickness of duct liner.
  4. Approved Manufacturers:
    - a. Air Balance - Model AC-2
    - b. Air Control Products - CD-OB
    - c. American Warming - VC-2-AA
    - d. Greenheck - VCD-1100
    - e. NCA, Safe Air
    - f. Vent Products - 5100
- B. In Sheet Metal Branch Ducts:
  1. Extruded aluminum, opposed blade type. When in open position, shall not extend beyond damper frame.
  2. Maximum blade length 12 inches.
  3. Damper Regulator shall be concealed type with operation from bottom or with 90 deg miter gear assembly from side.
  4. Approved Manufacturers:
    - a. Air Control Products - TCD-OB
    - b. Air Guide - OB
    - c. Arrow - OBDAF-207
    - d. CESCO - CDA

- e. Reliable Metals - OBD-RO
- f. Tuttle & Bailey - A7RDDM
- g. Safe Air
- h. Young - 820-AC

- C. Dampers above removable ceiling and in Mechanical Rooms shall have locking quadrant on bottom or side of duct. Otherwise, provide concealed ceiling damper regulator and cover plate.

## 2.7 MOTORIZED OUTSIDE AIR DAMPERS

- A. Damper Blades:
  - 1. 18 gauge galvanized steel or equivalent aluminum with replaceable rubber blade edges, 9 inches wide maximum.
  - 2. End seals shall be flexible metal compression type.
  - 3. Opposed blade type.
- B. Make provision for damper actuators and actuator linkages to be mounted external of air flow.
- C. Approved Manufacturers & Models:
  - 1. Air Balance - AC-2
  - 2. American Warming - VC-2-AAVA
  - 3. Arrow - OBDAF-207
  - 4. Greenheck - VCD-2100
  - 5. Honeywell - D641
  - 6. Johnson - D1300
  - 7. Louvers & Dampers - TSD400
  - 8. Ruskin - CD36 or CD60
  - 9. Safe Air - 610
  - 10. Vent Products - 5800

## 2.8 BACKDRAFT DAMPER

- A. Backdraft blades shall be nonmetallic and shall be neoprene coated fiberglass.
- B. Stop shall be galvanized steel screen or expanded metal, 1/2 inch mesh.
- C. Frame shall be galvanized steel or extruded aluminum alloy.
- D. Approved Models & Manufacturers:
  - 1. Air Control Products - FBD
  - 2. American Warming - BD-15
  - 3. CESCO - FBD 101
  - 4. Ruskin - NMS2
  - 5. Safe Air

## 2.9 DUCT HANGERS

- A. 1" x 18 gauge galvanized steel straps or steel rods as shown on Drawings, and spaced not more than 8 feet apart. Do not use wire hangers.
- B. Attaching screws at trusses shall be 1-1/2 inch No. 10 round head wood screws. Nails not allowed.

## 2.10 DUCT SEALER

- A. Cain - Duct Butter or Butter Tak

- B. Design Polymerics - DP 1010
- C. DSC - Stretch Coat
- D. Duro Dyne - S2
- E. Hardcast - #601 Iron-Grip or Peel-N-Seal Tape
  - 1. Kingco - 15-325
  - 2. Mon-Eco - 44-41
  - 3. Trans-Continental Equipment Co - Multipurpose Duct Sealant
  - 4. United - Sheet Metal duct-sealer

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Ducts:
  - 1. Straight and smooth on inside with joints neatly finished unless otherwise directed.
  - 2. Duct panels through 48 inch dimension having acoustic duct liner need not be crossbroken or beaded.
  - 3. Crossbreak unlined ducts and duct panels larger than 48 inch or bead 12 inches on center.
  - 4. Securely anchor ducts to building structure with specified duct hangers attached with screws. Do not hang more than one duct from a duct hanger.
  - 5. Brace and install ducts so they shall be free of vibration under all conditions of operation.
  - 6. Ducts shall not bear on top of structural members.
  - 7. Make duct take-offs to branches, registers, grilles, and diffusers as detailed on Drawings.
  - 8. Ducts shall be large enough to accommodate inside acoustic duct liner. Dimensions shown on Drawings are net clear inside dimensions after duct liner has been installed.
  - 9. Properly flash where ducts protrude above roof.
  - 10. Install internal ends of slip joints in direction of flow. Make joints air tight using specified duct sealer.
  - 11. Cover horizontal and longitudinal joints on exterior ducts with two layers of Hardcast tape installed with Hardcast HC-20 adhesive according to Manufacturer's recommendations.
  - 12. Paint ductwork visible through registers, grilles, and diffusers flat black.
- B. Install flexible inlet and outlet duct connections to each furnace, fan, fan coil unit, and air handling unit.
- C. Install concealed ceiling damper regulators.
  - 1. Paint cover plates to match ceiling tile.
  - 2. Damper regulators will not be required for dampers located directly above removable ceilings or in Mechanical Rooms.
- D. Provide each take-off with an adjustable volume damper to balance that branch.
  - 1. Anchor dampers securely to duct.
  - 2. Install dampers in main ducts within insulation.
  - 3. Dampers in branch ducts shall fit against sheet metal walls, bottom and top of duct, and be securely fastened. Cut duct liner to allow damper to fit against sheet metal.
  - 4. Where concealed ceiling damper regulators are installed, provide a cover plate.
- E. Install grilles, registers, and diffusers. Level floor registers and anchor securely into floor.
- F. Air Turns:
  - 1. Permanently installed, consisting of single thickness curved metal blades with one inch straight trailing edge to permit air to make abrupt turn without appreciable turbulence, in 90 degree elbows of above ground supply and return ductwork.
  - 2. 4-1/2 inch wide minimum vane rail. Do not use junior vane rails.
  - 3. Double thickness vanes not acceptable.

4. Quiet and free from vibration when system is in operation. See SMACNA Manual
- G. Dirty Filter Manometer or Magnehelic Gauge:
1. Install on each air-handling unit housing adjacent to filters.
  2. Provide pressure sensing tips with connecting tubing on each side of filter.
  3. Provide required oil for manometer.
- H. Install motorized dampers

END OF SECTION 23 3114



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## **SECTION 23 3713 - AIR OUTLETS & INLETS**

### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 23 0501 apply to this Section.

#### 1.2 SUMMARY

- A. Furnish and install wall supply registers, transfer grilles, return air grilles, soffit grilles, ceiling diffusers, louvers connected to ductwork, and registers as described in Contract Documents.

### **PART 2 - PRODUCTS**

#### 2.1 GRILLES & REGISTERS

- A. Approved Manufacturers:
  - 1. Price
  - 2. Anemostat
  - 3. Krueger
  - 4. Titus
  - 5. Tuttle & Bailey

#### 2.2 SPIN-IN FITTINGS

- A. Low pressure round take-offs to diffusers shall be made with spin-in fittings. They shall incorporate a manual balancing damper. The damper shall be spring loaded and a positive locking wing nut shall secure the damper position.
- B. Approved Manufacturers:
  - 1. Sheet metal fittings: Genflex DB-1DEL, Hercules

### **PART 3 - EXECUTION**

#### 3.1 INSTALLATION

- A. Anchor securely into openings.
- B. Install with screws to match color and finish of grilles and registers.
- C. Touch-up any scratched finish surfaces.
- D. Install in accordance with manufacturer's instructions.
- E. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.
- F. Install diffusers to ductwork with air tight connection.
- G. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, despite whether dampers are specified as part of the diffuser, or grille and register assembly.
- H. Paint ductwork visible behind air outlets and inlets matte black. Refer to Section 09 9000.

END OF SECTION 23 3713

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## **SECTION 23 5540 - ELECTRIC RADIANT WALL HEATERS**

### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, and Section 23 0501 apply to this Section.

#### 1.2 SUMMARY

- A. Furnish and install wall heaters as described in Contract Documents.

#### 1.3 QUALITY ASSURANCE

- A. Units shall be UL listed and comply with NEC.

### **PART 2 - PRODUCTS**

#### 2.1 MANUFACTURED UNITS

- A. Fan type for recess mounting in wall.
- B. 20 gauge minimum sheet metal casing.
- C. Heating element shall be encased in steel finned casting and protected by thermal switch.
- D. Fan motor shall be heavy duty enclosed and permanently lubricated.
- E. Fan shall be precision balanced and fan-motor assembly mounted to be vibration free.
- F. Units shall be controlled automatically by integral thermostat when heater is in "ON" position.
- G. Heater shall have built-in fan delay.
- H. Finish - Baked-on enamel.
- I. Approved Manufacturers:
  - 1. Q' Mark
  - 2. Berko
  - 3. Thermador
  - 4. Markel

END OF SECTION 23 5540

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## SECTION 23 5726 - STEAM FAN COIL UNITS

### PART 1 - GENERAL

#### 1.1 SYSTEM DESCRIPTION

- A. Vertical, Direct Drive, 2-pipe or 4-pipe (or electric heat as available), room fan coil unit with painted finish cabinet for exposed installation or ducting.

#### 1.2 QUALITY ASSURANCE

- A. Unit shall be tested in accordance with ARI Standard 440 and ETL listed to US and Canadian safety standards. Each coil shall be factory tested for leakage at 600 psig air pressure with coil submerged in water. Insulation and adhesive shall meet NFPA-90A requirements for flame spread and smoke generation. All equipment wiring shall comply with NEC requirements.

#### 1.3 DELIVERY, STORAGE AND HANDLING

- A. Each unit shall be individually packaged from point of manufacture. Unit shall be handled and stored in accordance with the manufacturer's instructions.

### PART 2 - PRODUCT

#### 2.1 EQUIPMENT

##### A. General:

Factory-assembled, vertical, draw-thru type fan coil for exposed or concealed installations, ducted or free discharge with plenum. Unit shall be complete with water or DX cooling coil, water heating coil, fan(s), motor(s), drain pan, and all required wiring, piping, controls and special features.

##### B. Base Unit:

1. Units shall be fabricated of galvanized or galvanized steel, 19gauge, exterior panels with 19gauge interior panels. Internal insulation is 1" fiberglass with 1.5 pound density, providing effective acoustical and thermal control and fire safety. Cabinet shall include a removable bottom access panel with a ducted return air, filter rack and 2-in. fiberglass throwaway filter or 2-in. pleated MERV 8 filter. Cabinet exterior has a baked on polyester powder-coated finish for corrosion and scratch resistance while providing an enhanced appearance. Painted panels shall pass 500 hour salt spray test as described in ASTM B-117. Fan access and filter doors shall be hinged and utilize ¼-turn or ½-turn slot head latches for service convenience. Optional: coated inner liner panels have average 3mil thick antimicrobial coating that provides 750hr salt spray rating per ASTM B117.
2. The drain pan shall extend the entire length and width of the coil, with primary and auxiliary connections that are ¾" FPT.
  - a. Standard – double-sloped polymer with zinc plated carbon steel connections.
  - b. Optional – 20ga 304 stainless steel. Drain pan shall have average 3mil thick antimicrobial coating that provides 750hr salt spray rating per ASTM B117.

##### C. Fans:

1. Direct-driven, double-width fan wheels with forward curved blades shall be statically and dynamically balanced. The housing shall be constructed of heavy gauge galvanized steel with die-formed inlet cones. Fan wheels shall be constructed of galvanized steel.
2. Backward curved fans shall be welded construction, statically and dynamically balanced with motor integrated into the wheel.

##### D. Coils:

1. Standard base unit shall be equipped with a 3 or 4-row CW or DX coil for installation in a 2 or 4-pipe system.

2. Hot water heating coils in a 4 pipe system shall be 2-row or 3-row water coils, slab style perpendicular to airflow, factory installed. Coil fin spacing shall be 10, 12 or 14 fins per inch (FPI). Tube diameter options are 3/8" OD and 1/2" OD.
3. Steam coils are tube-in-tube steam distributing type coils with copper tubes and aluminum fins, single row, with copper or red brass headers and connections; vent/vacuum breaker connection provided, vacuum breaker assembly/valve is field-provided and installed. Fins are minimum 0.0045-in and fin spacing is 8FPI (standard capacity option) or 12 FPI (high capacity option). Coil operating pressure is 6psig max steam pressure.
4. Field installed electric resistance heater shall be 1.0 to 20.0kW, depending on unit size and voltage, for mounting on unit discharge opening. Heaters shall include manual reset and automatic reset high limit switches, heat contactor, airflow proving switch and fan contactor.
5. Cooling coil options include a 3-row or 4-row DX coil with TXV or without TXV (R22 or R-410A).
6. All coils shall have copper tubes and aluminum fins. Coil fins are mechanically bonded to tubes. The copper tubes comply with ASTM B-75. The fin thickness is 0.0045-in. All coils are tested with air under water.

E. Controls and Safeties:

1. Fan Controls: Unit shall be furnished with 24V fan controls to allow control by field-provided and installed 24V thermostat. Options include:
  - a. ECM-Premium or Integrated ECM motor controls: variable speed driven by unit-mounted potentiometer
  - b. ECM-Premium or Integrated ECM motor controls: variable speed driven by customer-provided 4-20mA fan signal
  - c. ECM-Premium or Integrated ECM motor controls: variable speed driven by customer-provided 0-10VDC fan signal
2. Optional factory-wired selections:
  - a. Integral door disconnect switch
  - b. Fan current switch (dry contacts)
  - c. Condensate overflow switch (shipped loose, field wired to factory-wired harness)

F. Operating Characteristics:

1. A unit with single hydronic coil installed in a 2-pipe system shall be capable of providing heating or cooling as determined by the operating mode of the central water supply system and as determined by field-provided and installed valves and controls.
2. A unit with two hydronic coils installed in a 4-pipe system shall be capable of providing heating and cooling, controlled as determined by field-provided and installed valves and controls.
3. A unit with single DX coil installed in a standard split system shall be capable of providing cooling when field-supplied and installed condensing unit is in cooling mode. Also capable of heating when heat pump condensing unit is operating in heating mode.
4. In all arrangements, the temperature controls are field-provided and installed and can interface with the unit per section "Controls and Safeties."

G. Electrical Requirements:

1. The unit power supply shall be 60 Hz, with standard construction 115V/1-phase. Other factory options are 208/240V/1-phase or 277V/1-phase.

H. Motor(s):

1. Fan motor options are:
  - a. ECM-Premium electrically commutated motor, up to 40% more efficient than permanent split-capacitor type induction motors, with control options including field-adjustable fixed speed and continuously variable speed options.

- b. Integral ECM electrically commutated motor built into the plenum fan wheel assembly, up to 40% more efficient than permanent split-capacitor type induction motors, with field-adjustable fixed speed and continuously variable speed options.
- I. Field Installed Accessories:
1. Return Plenum – single wall plenum, 16” high with options: return grille, outside air damper for up to 30% OA airflow at full open position, with factory installed 24V 25in-lb actuator ready for 0-10VDC field provided position signal; ¾” closed cell insulation, 19ga galvanized steel cabinet, cabinet exterior has a baked on polyester powder-coated finish for corrosion and scratch resistance while providing an enhanced appearance. Painted panels shall pass 500 hour salt spray test as described in ASTM B-117. Fan access and filter doors shall be hinged and utilize ¼-turn or ½-turn slot head latches for service convenience. Foam seals and flanged sides allow easy field connection to the NDB unit. Plenum may be used as a discharge plenum when installed on the top of the unit.
  2. Return Plenum with Filter – same as Return Plenum but 20” high and with 4” MERV 13 filter and hinged front access door with tool-less hardware for ease of service. Not for discharge service.
  3. Condensate Overflow Switch – thread-in PVC housing with liquid level sensing overflow switch, field installed, for use in 24VAC or 24VDC control systems and thermostats; switch assembly is pre-wired to easily interface with the NDB unit controls and is field installed in the ¾” FPT auxiliary condensate drain connection on the unit exterior.

END OF SECTION 23 5726



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## SECTION 23 7223

### PACKAGED AIR-TO-AIR ENERGY RECOVERY UNITS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Includes But Not Limited To:
  - 1. Furnish and install air-to-air Energy Recovery Ventilation (Energy Recovery Ventilator) units as described in Contract Documents
- B. Related Requirements:
  - 1. Section 23 0501: 'Common HVAC Requirements'.
  - 2. Section 23 3114: 'Low-Pressure Metal Ducts'.
  - 3. Section 23 4100: 'Air filters'.

##### 1.2 REFERENCES

- A. Reference Standard:
  - 1. American National Standards Institute (ANSI) / American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE):
    - a. ANSI/ASHRAE 84-2013, 'Method of Testing Air-to-Air Heat/Energy Exchangers'.
  - 2. National Fire Protection Association / American National Standards Institute:
    - a. NFPA 90A: 'Standard for the Installation of Air-Conditioning and Ventilating Systems' (2018 Edition).
    - b. NFPA 90B: 'Standard for the Installation of Warm Air Heating and Air-Conditioning Systems' 2018 Edition).

##### 1.3 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
  - 1. ASHRAE Compliance:
    - a. Capacity ratings for air-to-air energy recovery equipment shall comply with ANSI/ASHRAE 84, 'Method of Testing Air-to-Air Heat Exchangers'.

##### 1.4 WARRANTY

- A. Special Warranty:
  - 1. Warranty energy transfer element for ten years from date of substantial completion of Project.

#### PART 2 - PRODUCTS

##### 2.1 MANUFACTURER

- A. Category Four Approved Manufactures. See Section 01 6200 for definitions of Categories:
  - 1. RenewAire LLC, Madison, WI [www.renewaire.com](http://www.renewaire.com).
  - 2. Greenheck Fan Corporation, Schofield, WI, [www.greenheck.com](http://www.greenheck.com).

3. S&P USA Ventilation System, LLC, Jacksonville, FL, [www.solerpalau-usa.com](http://www.solerpalau-usa.com).

## 2.2 MANUFACTURED UNITS

### A. Energy Recovery Units:

1. Basis of Design Product:
  - a. Basis of design for this Project is Energy Recovery Ventilation by RenewAire (model number(s) as shown on Contract Drawings).
  - b. Approved Equivalent Product:
    - 1) Energy Recovery Module Model ECV by Greenheck.
    - 2) Total Recovery Model TRC by S&P USA Ventilation System.
2. Performance:
  - a. Capacities:
    - 1) Element rated by Manufacturer using method described in ANSI/ASHRAE 84. Exceed 70 percent temperature efficiency.
    - 2) Applicable for range of ventilation up to 1100 CFM in each air stream without disposition of dust in elements.
3. Construction:
  - a. Fixed plate element.
  - b. 20 ga (0.95 mm) galvanized steel case with lapped corners.
  - c. Leveling legs.
  - d. Access door to blowers, energy transfer elements, and filters.
    - 1) Gasketed to provide air tight seal.
    - 2) Insulated with 1/4 inch (6.4 mm) Rubatex.
    - 3) Attached to unit using stainless steel fasteners.
4. Duct Openings: Four each 1/2 inch (12.7 mm) by 1/2 inch (12.7 mm) square duct collars suitable for connection to duct work.
5. Duct Openings: Four each 12 inch (305 mm) round duct collars suitable for connection to duct work.
6. Blowers:
  - a. Forward curved blades directionally driven by open, drip-proof PSC motor rated for continuous duty.
  - b. Motor: 2-3/4 horse power, 115 VAC, single phase, 60 hertz.
  - c. Baked enamel finish.
7. 24 VAC control voltage.

## 2.3 SOURCE QUALITY CONTROL

### A. Tests:

1. Provide evidence of independent testing of core by Underwriters Laboratory (UL), verifying maximum flame spread index (FSI) of 25 and maximum smoke development index (SDI) of 50. Meet NFPA 90A and NFPA 90B requirements.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

#### A. Basis of Design Product:

1. RenewAire:
  - a. Suspend Energy Recovery Units from structure.

#### B. Approved Equivalent Product (Greenheck and S&P USA Ventilation System):

1. Suspend Energy Recovery Units from structure.

2. Coordinate with other Trades to ensure scheduled performance with Contract Drawings and specified performance is met and any installation changes required but not limited to following:
  - a. Structural supports for units.
  - b. Ductwork sizes and connection locations.
  - c. Service clearances.
  - d. Interference with existing or planned ductwork, piping, conduit, or wiring.
  - e. Electric power requirements and wire-conduit and over-current protection sizes.
  - f. Low voltage controls as shown on Contract Drawings.
3. Installer responsible for any additional costs incurred by other affected Trades and Consulting Engineer for work of this section.

END OF SECTION 23 8129

END OF DIVISION 23

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26 0526	GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS
26 0533	RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS
26 0553	IDENTIFICATION FOR ELECTRICAL SYSTEMS
26 2726	WIRING DEVICES
26 5100	INTERIOR LIGHTING
26 5200	EMERGENCY LIGHTING

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## **SECTION 26 0500 - COMMON WORK RESULTS FOR ELECTRICAL**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
1. Supporting Devices for Electrical Components
  2. Electricity-Metering Components
  3. Concrete Equipment Bases
  4. Electrical Demolition
  5. Cutting and Patching For Electrical Construction
  6. Touchup Painting

#### **1.2 REFERENCES**

- A. ASTM International (ASTM) Publications:
1. A53 "Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless"
- B. American Welding Society (AWS) Publications:
1. D1.1 "Structural Welding Code - Steel"
- C. National Fire Protection Association (NFPA) Publications:
1. 70 "National Electric Code"
- D. National Electrical Manufacturers Association (NEMA) Publications:
1. 250 "Enclosures for Electrical Equipment (1000 Volts Maximum)"

#### **1.3 SUBMITTALS**

- A. General: Submit the following in accordance with Conditions of Contract and Division 01 Specification Sections:
1. Product Data: For electricity-metering equipment.
  2. Shop Drawings:
    - a. Do not purchase equipment before completion of shop drawing review.
    - b. Dimensioned plans and sections or elevation layouts of electricity-metering equipment.
    - c. Dimensioned plans and sections or elevation layouts of electricity-metering equipment.
    - d. Engineer will not review shop drawings before the contractor has reviewed the shop drawings. The contractor shall stamp all drawings with a statement that he has reviewed all shop drawings and that they conform to the intent of the drawings and specifications.
  3. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

#### **1.4 PRIOR APPROVAL**

- A. General:
1. Catalog and manufacturer's numbers are for the purpose of establishing standards of quality and types of materials to be used. Products of other manufacturers may be used if equal in quality and design in the opinion of the Engineer and are specifically approved by the Engineer, in writing, 10 days prior to close of bidding.
  2. Any conflict arising from the use of substituted equipment shall be the responsibility of the supplier of that equipment. The contractor and his supplier shall bear all costs required to make equipment comply with the intent of the plans and specifications.

#### **1.5 QUALITY ASSURANCE**

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.



- C. All work to be in accordance with latest requirements of the NEC and all other applicable codes and regulations of authorities having jurisdiction over the work.

## 1.6 COORDINATION

- A. Coordinate chases, slots, inserts, sleeves, and openings with general construction work and arrange in building structure during progress of construction to facilitate the electrical installations that follow.
  - 1. Set inserts and sleeves in poured-in-place concrete, masonry work, and other structural components as they are constructed.
- B. Sequence, coordinate, and integrate installing electrical materials and equipment for efficient flow of the Work. Coordinate installing large equipment requiring positioning before closing in the building.
- C. Coordinate electrical service connections to components furnished by utility companies.
  - 1. Coordinate installation and connection of exterior underground and overhead utilities and services, including provision for electricity-metering components.
  - 2. Comply with requirements of authorities having jurisdiction and of utility company providing electrical power and other services.
  - 3. Schedule utility interruptions in accordance with Division 01 of the specifications.
- D. Coordinate location of access panels and doors for electrical items that are concealed by finished surfaces. Access doors and panels are specified in Section 08 31 00 - "Access Doors."
- E. Coordinate all work with Division 21, 22, & 23. Electrical Contractor shall provide all wiring and final connection to all line voltage thermostats. Thermostat provided and installed by Division 23.
- F. All electrical drawings are to be read in conjunction with the project specifications and all other related contract drawings.
- G. The contractor shall examine the site and observe the conditions under which the work will be done or other circumstances which will affect the contemplated work. No allowance will be made subsequently in the connection for any error or negligence on the contractor's part.
- H. The contractor shall verify exact location, size and extent of all existing utilities, obstructions and/or other conditions which may affect the proposed work under the project. The contractor shall take every precaution to prevent damage to existing work and shall repair any damage as a result of this work.
- I. The contractor shall verify all door swings in the field and mount switches on knob side of doors or as approved by the engineer.
- J. The contractor shall carefully examine all contract drawings/specifications and be responsible for the proper fittings of materials and equipment at each location as indicated without substantial alteration. The drawings are generally diagrammatic and because of the small scale of the drawings, it is not possible to indicate all offsets, fittings and accessories which may be required. Furnishing such fittings that are required to meet such conditions shall be furnished and installed at no cost.

## PART 2 - PRODUCTS

### 2.1 SUPPORTING DEVICES

- A. Material: Cold-formed steel, with corrosion-resistant coating acceptable to authorities having jurisdiction.
- B. Metal Items for Use Outdoors or in Damp Locations: Hot-dip galvanized steel.
- C. Slotted-Steel Channel Supports: Flange edges turned toward web, and 9/16-inch diameter slotted holes at a maximum of 2 inches o.c., in webs.
  - 1. Channel Thickness: Selected to suit structural loading.
  - 2. Fittings and Accessories: Products of the same manufacturer as channel supports.
- D. Raceway and Cable Supports: Manufactured clevis hangers, riser clamps, straps, threaded C-clamps with retainers, ceiling trapeze hangers, wall brackets, and spring-steel clamps or click-type hangers.

- E. Pipe Sleeves: ASTM A53, Type E, Grade A, Schedule 40, galvanized steel, plain ends.
- F. Cable Supports for Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug for nonarmored electrical cables in riser conduits. Plugs have number and size of conductor gripping holes as required to suit individual risers. Body constructed of malleable-iron casting with hot-dip galvanized finish.
- G. Expansion Anchors: Carbon-steel wedge or sleeve type.
- H. Toggle Bolts: All-steel springhead type.

## **2.2 EQUIPMENT FOR UTILITY COMPANY'S ELECTRICITY METERING**

- A. Meter Sockets: Comply with requirements of electrical power utility company.

## **2.3 TOUCHUP PAINT**

- A. For Equipment: Equipment manufacturer's paint selected to match installed equipment finish.
- B. Galvanized Surfaces: Zinc-rich paint recommended by item manufacturer.

## **PART 3 - EXECUTION**

### **3.1 ELECTRICAL EQUIPMENT INSTALLATION**

- A. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide the maximum possible headroom.
- B. Materials and Components: Install level, plumb, and parallel and perpendicular to other building systems and components, unless otherwise indicated.
- C. Equipment: Install to facilitate service, maintenance, and repair or replacement of components. Connect for ease of disconnecting, with minimum interference with other installations.
- D. Right of Way: Give to raceways and piping systems installed at a required slope.
- E. Coordinate work with other trades and install conduit and boxes to clear embedded ducts, openings, etc. and all structural features.
- F. Unless otherwise noted, mounting heights, as shown, are from finished floor to top of panelboard and to centerline of other equipment. Coordinate all mounting heights with contract drawings, local code requirements, and all A.D.A. requirements.
  - 1. Toggle (snap) switch: 4'-0"
  - 2. Enclosed circuit breaker: 5'-0"
  - 3. Disconnect (safety) switch: 5'-0"
  - 4. Motor starter: 5'-0"
  - 5. Panelboard: 6'-6"

### **3.2 ELECTRICAL SUPPORTING DEVICE APPLICATION**

- A. Damp Locations, Pool Equipment Rooms, Storage Rooms and Outdoors: Hot-dip galvanized materials or nonmetallic, U-channel system components.
- B. Dry Locations: Steel materials.
- C. Support Clamps for PVC Raceways: Click-type clamp system.
- D. Selection of Supports: Comply with manufacturer's written instructions.
- E. Strength of Supports: Adequate to carry present and future loads, times a safety factor of at least four; minimum of 200-lb design load.

### 3.3 SUPPORT INSTALLATION

- A. Install support devices to securely and permanently fasten and support electrical components.
- B. Install individual and multiple raceway hangers and riser clamps to support raceways. Provide U-bolts, clamps, attachments, and other hardware necessary for hanger assemblies and for securing hanger rods and conduits.
- C. Support parallel runs of horizontal raceways together on trapeze- or bracket-type hangers.
- D. Size supports for multiple raceway installations so capacity can be increased by a 25 percent minimum in the future.
- E. Support individual horizontal raceways with separate, malleable-iron pipe hangers or clamps.
- F. Install 1/4-inch- diameter or larger threaded steel hanger rods, unless otherwise indicated.
- G. Spring-steel fasteners specifically designed for supporting single conduits or tubing may be used instead of malleable-iron hangers for 1-1/2-inch and smaller raceways serving lighting and receptacle branch circuits above suspended ceilings and for fastening raceways to slotted channel and angle supports.
- H. Arrange supports in vertical runs so the weight of raceways and enclosed conductors is carried entirely by raceway supports, with no weight load on raceway terminals.
- I. Simultaneously install vertical conductor supports with conductors.
- J. Separately support cast boxes that are threaded to raceways and used for fixture support. Support sheet-metal boxes directly from the building structure or by bar hangers. If bar hangers are used, attach bar to raceways on opposite sides of the box and support the raceway with an approved fastener not more than 24 inches from the box.
- K. Install metal channel racks for mounting cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices unless components are mounted directly to structural elements of adequate strength.
- L. Install sleeves for cable and raceway penetrations of concrete slabs and walls unless core-drilled holes are used. Install sleeves for cable and raceway penetrations of masonry and fire-rated gypsum walls and of all other fire-rated floor and wall assemblies. Install sleeves during erection of concrete and masonry walls.
- M. Securely fasten electrical items and their supports to the building structure, unless otherwise indicated. Perform fastening according to the following unless other fastening methods are indicated:
  - 1. Wood: Fasten with wood screws or screw-type nails.
  - 2. Masonry: Toggle bolts on hollow masonry units and expansion bolts on solid masonry units.
  - 3. New Concrete: Concrete inserts with machine screws and bolts.
  - 4. Existing Concrete: Expansion bolts.
  - 5. Steel: Welded threaded studs or spring-tension clamps on steel.
  - 6. Field Welding: Comply with AWS D1.1.
  - 7. Welding to steel structure may be used only for threaded studs, not for conduits, pipe straps, or other items.
  - 8. Light Steel: Sheet-metal screws.
  - 9. Fasteners: Select so the load applied to each fastener does not exceed 25 percent of its proof-test load.

### 3.4 UTILITY COMPANY ELECTRICITY-METERING EQUIPMENT

- A. Install equipment according to utility company's written requirements. Provide grounding and empty conduits as required by utility company.

### 3.5 CONCRETE BASES

- A. Construct concrete bases of dimensions indicated, but not less than 4 inches larger, in both directions, than supported unit. Follow supported equipment manufacturer's anchorage recommendations and setting templates for anchor-bolt and tie locations, unless otherwise indicated.

### 3.6 CUTTING AND PATCHING

- A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces required to permit electrical installations. Perform cutting by skilled mechanics of trades involved.
- B. Repair and refinish disturbed finish materials and other surfaces to match adjacent undisturbed surfaces. Install new fire-proofing where existing firestopping has been disturbed. Repair and refinish materials and other surfaces by skilled mechanics of trades involved.

### **3.7 FIELD QUALITY CONTROL**

- A. Inspect installed components for damage and faulty work, including the following:
  - 1. Supporting devices for electrical components.
  - 2. Electricity-metering components.
  - 3. Concrete bases.
  - 4. Electrical demolition.
  - 5. Cutting and patching for electrical construction.
  - 6. Touchup painting.

### **3.8 REFINISHING AND TOUCHUP PAINTING**

- A. Refinish and touch up paint. Paint materials and application requirements are specified in Section 09 90 00 - "Painting."

### **3.9 CLEANING AND PROTECTION**

- A. On completion of installation, including outlets, fittings, and devices, inspect exposed finish. Remove burrs, dirt, paint spots, and construction debris.

Protect equipment and installations and maintain conditions to ensure that coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

**END OF SECTION 260500**

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## **SECTION 26 0503 - EQUIPMENT WIRING CONNECTIONS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes electrical connections to equipment.
- B. Related Sections:
  - 1. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables.
  - 2. Section 26 0533 - Raceway and Boxes for Electrical Systems.

#### **1.2 REFERENCES**

- A. National Electrical Manufacturers Association:
  - 1. NEMA WD 1 - General Requirements for Wiring Devices.
  - 2. NEMA WD 6 - Wiring Devices-Dimensional Requirements.

#### **1.3 SUBMITTALS**

- A. Section 01 3300 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit wiring device manufacturer's catalog information showing dimensions, configurations, and construction.
- C. Manufacturer's installation instructions.

#### **1.4 PRIOR APPROVAL**

- A. General:
  - 1. Catalog and manufacturer's numbers are for the purpose of establishing standards of quality and types of materials to be used. Products of other manufacturers may be used if equal in quality and design in the opinion of the Engineer and are specifically approved by the Engineer, in writing, 10 days prior to close of bidding.
  - 2. Any conflict arising from the use of substituted equipment shall be the responsibility of the supplier of that equipment. The contractor and his supplier shall bear all costs required to make equipment comply with the intent of the plans and specifications.

#### **1.5 CLOSEOUT SUBMITTALS**

- A. Section 01 7000 - Execution and Closeout Requirements: Submittal procedures.
- B. Project Record Documents: Record actual locations, sizes, and configurations of equipment connections.

#### **1.6 COORDINATION**

- A. Section 01 3000 - Administrative Requirements: Coordination and project conditions.
- B. Obtain and review shop drawings, product data, manufacturer's wiring diagrams, and manufacturer's instructions for equipment furnished under other sections.
- C. Determine connection locations and requirements.
- D. Sequence rough-in of electrical connections to coordinate with installation of equipment.
- E. Sequence electrical connections to coordinate with start-up of equipment.

## **PART 2 - PRODUCTS**

### **2.1 CORD AND PLUGS**

- A. Furnish and install equipment as required to make all connections to building and mechanical equipment.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Section 01 3000 - Administrative Requirements: Coordination and project conditions.
- B. Verify equipment is ready for electrical connection, for wiring, and to be energized.

### **3.2 INSTALLATION**

- A. Make electrical connections.
- B. Make conduit connections to equipment using flexible conduit. Use liquidtight flexible conduit with watertight connectors in damp or wet locations.
- C. Connect heat producing equipment using wire and cable with insulation suitable for temperatures encountered.
- D. Install receptacle outlet to accommodate connection with attachment plug.
- E. Install cord and cap for field-supplied attachment plug.
- F. Install suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.
- G. Install disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.
- H. Install terminal block jumpers to complete equipment wiring requirements.
- I. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.
- J. Coolers and Freezers: Cut and seal conduit openings in freezer and cooler walls, floor, and ceilings.

### **3.3 ADJUSTING**

- A. Cooperate with utilization equipment installers and field service personnel during checkout and starting of equipment to allow testing and balancing and other startup operations. Provide personnel to operate electrical system and checkout wiring connection components and configurations.

**END OF SECTION 260503**

## **SECTION 26 0519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
- B. Building wires and cables and associated connectors, splices, and terminations for wiring systems rated 600 V and less.

#### **1.2 REFERENCES**

- A. National Electrical Manufacturer's Association (NEMA) Publications:
- B. WC 26 "Binational Wire and Cable Packaging Standard"
- C. WC 70 "Nonshielded Power Cables Rated 2000 Volts or less for the Distribution of Electrical Energy"
- D. National Fire Protection Association (NFPA) Publications:
- E. 70 "National Electric Code"
- F. Underwriter's Laboratories, Inc. (UL) Publications:
- G. 486A "Standard For Wire Connectors and Soldering Lugs for Use with Copper Conductors"
- H. 486B "Standard for Wire Connectors for Use With Aluminum Conductors"

#### **1.3 SUBMITTALS**

- A. General: Submit the following in accordance with Conditions of Contract and Division 01 Specification Sections:
- B. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

#### **1.4 PRIOR APPROVAL**

- A. General:
- B. Catalog and manufacturer's numbers are for the purpose of establishing standards of quality and types of materials to be used. Products of other manufacturers may be used if equal in quality and design in the opinion of the Engineer and are specifically approved by the Engineer, in writing, 10 days prior to close of bidding.
- C. Any conflict arising from the use of substituted equipment shall be the responsibility of the supplier of that equipment. The contractor and his supplier shall bear all costs required to make equipment comply with the intent of the plans and specifications.

#### **1.5 QUALITY ASSURANCE**

- A. Listing and Labeling: Provide wires and cables specified in this Section that are listed and labeled.
- B. The Terms "Listed" and "Labeled": As defined in NFPA 70, Article 100.
- C. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" as defined in OSHA Regulation 1910.7.
- D. Comply with NFPA 70.



## **1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver wires and cables according to NEMA WC 26.

## **1.7 COORDINATION**

- A. Coordinate layout and installation of cables with other installations.
- B. Revise locations and elevations from those indicated, as required to suit field conditions and as approved by Owner's Representative.

## **PART 2 - PRODUCTS**

### **2.1 BUILDING WIRES AND CABLES**

- A. Approved Manufacturers:
- B. American Insulated Wire Corp.; Leviton Manufacturing Co. (800-366-2492)
- C. Carol Cable Co., Inc. (401-728-7000)
- D. Southwire Company (800-444-1700)
- E. Alcan Cable Division of Alcan Aluminum Corporation (770-392-2368)
- F. UL-listed building wires and cables with conductor material, insulation type, cable construction, and rating as specified in Part 3 "Wire and Insulation Applications" Article.
- G. Rubber Insulation Material: Comply with NEMA WC 70.
- H. Thermoplastic Insulation Material: Comply with NEMA WC 70.
- I. Cross-Linked Polyethylene Insulation Material: Comply with NEMA WC 70.
- J. Ethylene Propylene Rubber Insulation Material: Comply with NEMA WC 70.
- K. Conductor Material: Copper
- L. Stranding: Solid conductor for No. 10 AWG and smaller; stranded conductor for larger than No. 10 AWG.

### **2.2 CONNECTORS AND SPLICES**

- A. Approved Manufacturers:
- B. AMP Incorporated (800-522-6752)
- C. General Signal; O-Z/Gedney Unit (203-584-0571)
- D. Square D Co.; a Division of Groupe Schneider (888-778-2733)
- E. Alcan Cable Division of Alcan Aluminum Corporation (770-392-2368)
- F. UL-listed, factory-fabricated wiring connectors of size, ampacity rating, material, type, and class for application and service indicated. Comply with Project's installation requirements and as specified in Part 3 "Wire and Insulation Applications" Article.

## **PART 3 - EXECUTION**

### 3.1 EXAMINATION

- A. Examine raceways and building finishes to receive wires and cables for compliance with requirements for installation tolerances and other conditions affecting performance of wires and cables. Do not proceed with installation until unsatisfactory conditions have been corrected.

### 3.2 WIRE AND INSULATION APPLICATIONS

- A. Service Entrance: Type RHW or THWN, in raceway
- B. Horizontal Feeders: Type THHN/THWN, in raceway
- C. Vertical Feeders: Type THHN/THWN in raceway
- D. Horizontal Branch Circuits: Type THHN/THWN, in raceway
- E. Vertical Branch Circuits: Type THNN/THWW in raceway

### 3.3 INSTALLATION

- A. Install wires and cables as indicated, according to manufacturer's written instructions and NECA's "Standard of Installation."
- B. Pull Conductors: Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- D. Install exposed cables, parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- E. Support cables according to Section 26 0500 - "Common Work Results for Electrical."
- F. Identify wires and cables according to Section 26 0553 "Identification for Electrical Systems."

### 3.4 CONNECTIONS

- A. Conductor Splices: Keep to minimum.
- B. Install splices and tapes that possess equivalent or better mechanical strength and insulation ratings than conductors being spliced.
- C. Use splice and tap connectors compatible with conductor material.
- D. Use oxide inhibitor in each splice and tap connector for aluminum conductors.
- E. Wiring at Outlets: Install conductor at each outlet, with at least 12 inches of slack.
- F. Connect outlets and components to wiring and to ground as indicated and instructed by manufacturer.
- G. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

### 3.5 FIELD QUALITY CONTROL

- A. Testing: On installation of wires and cables and before electrical circuitry has been energized, demonstrate product capability

and compliance with requirements.

- B. Perform meggar and continuity tests on all conductors.
- C. Correct malfunctioning conductors and cables at Project site, where possible, and retest to demonstrate compliance; otherwise, remove and replace with new units and retest.

**END OF SECTION 260519**

## **SECTION 26 0526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
1. Grounding of Electrical Systems and Equipment.
    - a. Grounding requirements specified in this Section may be supplemented by special requirements of systems described in other Sections.

#### **1.2 REFERENCES**

- A. ASTM International (ASTM) Publications:
1. B3 "Standard Specification for Soft or Annealed Copper Wire"
  2. B8 "Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft"
  3. B33 "Standard Specification for Tinned Soft or Annealed Copper Wire for Electrical Purposes"
- B. Institute of Electrical and Electronics Engineers, Inc. (IEEE) Publications:
1. C2 "ASC C2 Eighth Interim Collection of the National Electrical Safety Code®"
  2. 81 "Instrumentation and Measurement"
  3. 837 "Substations"
- C. National Fire Protection Association (NFPA) Publications:
1. 70 "National Electric Code"
  2. 780 "Standard for the Installation of Lightning Protection Systems"
- D. Underwriter's Laboratories, Inc. (UL) Publications:
1. 96 "Standard for Safety for Lightning Protection Components"
  2. 467 "Grounding and Bonding Equipment"
  3. 486A "Standard For Wire Connectors and Soldering Lugs for Use with Copper Conductors"

#### **1.3 SUBMITTALS**

- A. General: Submit the following in accordance with Conditions of Contract and Division 01 Specification Sections:
1. Product Data: For the following:
    - b. Ground rods.

#### **1.4 PRIOR APPROVAL**

- A. General:
1. Catalog and manufacturer's numbers are for the purpose of establishing standards of quality and types of materials to be used. Products of other manufacturers may be used if equal in quality and design in the opinion of the Engineer and are specifically approved by the Engineer, in writing, 10 days prior to close of bidding.
  2. Any conflict arising from the use of substituted equipment shall be the responsibility of the supplier of that equipment. The contractor and his supplier shall bear all costs required to make equipment comply with the intent of the plans and specifications.

#### **1.5 QUALITY ASSURANCE**

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
1. Comply with UL 467.
- B. Comply with NFPA 70; for overhead-line construction and medium-voltage underground construction, comply with IEEE C2.
- C. Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Approved Manufacturers:
  - 1. Grounding Conductors, Cables, Connectors, and Rods:
    - a. Chance/Hubbell (573-682-5521)
    - b. Copperweld Corp. (931-433-7177)
    - c. Thomas & Betts, Electrical (800-816-7809)

### **2.2 GROUNDING CONDUCTORS**

- A. For insulated conductors, comply with Section 26 05 19 - "Low-Voltage Electrical Power Conductors and Cables."
- B. Material: Copper.
- C. Equipment Grounding Conductors: Insulated with green-colored insulation.
- D. Isolated Ground Conductors: Insulated with green-colored insulation with yellow stripe. On feeders with isolated ground, use colored tape, alternating bands of green and yellow tape to provide a minimum of three bands of green and two bands of yellow.
- E. Grounding Electrode Conductors: Stranded cable.
- F. Underground Conductors: Bare, tinned, stranded, unless otherwise indicated.
- G. Bare Copper Conductors: Comply with the following:
  - 1. Solid Conductors: ASTM B3.
  - 2. Assembly of Stranded Conductors: ASTM B8.
  - 3. Tinned Conductors: ASTM B33.
- H. Copper Bonding Conductors: As follows:
  - 1. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG copper conductor, 1/4 inch in diameter.
  - 2. Bonding Conductor: No. 4 or No. 6 AWG, stranded copper conductor.
  - 3. Bonding Jumper: Bare copper tape, braided bare copper conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
  - 4. Tinned Bonding Jumper: Tinned-copper tape, braided copper conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
- I. Grounding Bus: Bare, annealed copper bars of rectangular cross section, with insulators.
- J. Equipment Ground Conductor (Green) shall be included with all circuit conductors where shown. In addition, provide a neutral conductor where applicable.

### **2.3 CONNECTOR PRODUCTS**

- A. Comply with IEEE 837 and UL 467; listed for use for specific types, sizes, and combinations of conductors and connected items.
- B. Bolted Connectors: Bolted-pressure-type connectors, or compression type.
- C. Welded Connectors: Exothermic-welded type, in kit form, and selected per manufacturer's written instructions.

### **2.4 GROUNDING ELECTRODES**

- A. Ground Rods: copper-clad steel.
  - 1. Size: 120" long by 3/4" in diameter.

### **PART 3 - EXECUTION**

#### **3.1 APPLICATION**

- A. Use only copper conductors for both insulated and bare grounding conductors in direct contact with earth, concrete, masonry, crushed stone, and similar materials.
- B. In raceways, use insulated equipment grounding conductors.
- C. Exothermic-Welded Connections: Use for connections to structural steel and for underground connections, except those at test wells.
- D. Equipment Grounding Conductor Terminations: Use bolted pressure clamps.
- E. Grounding Bus: Install in electrical and telephone equipment rooms, in rooms housing service equipment, and elsewhere as indicated.
  - 1. Use insulated spacer; space 1 inch from wall and support from wall 6 inches above finished floor, unless otherwise indicated.
  - 2. At doors, route the bus up to the top of the door frame, across the top of the doorway, and down to the specified height above the floor.

#### **3.2 EQUIPMENT GROUNDING CONDUCTORS**

- A. Comply with NFPA 70, Article 250, for types, sizes, and quantities of equipment grounding conductors, unless specific types, larger sizes, or more conductors than required by NFPA 70 are indicated.
- B. Install equipment grounding conductors in all feeders and circuits.
- C. Computer Outlet Circuits: Install insulated equipment grounding conductor in branch-circuit runs from computer-area power panels or power-distribution units.
- D. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate grounding conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.
- E. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply raceway with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure, and install a separate equipment grounding conductor. Isolate equipment grounding conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.
- F. Nonmetallic Raceways: Install an equipment grounding conductor in nonmetallic raceways unless they are designated for telephone or data cables.
- G. Air-Duct Equipment Circuits: Install an equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners and heaters. Bond conductor to each unit and to air duct.
- H. Signal and Communication Systems: For telephone, alarm, voice and data, and other communication systems, provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.
  - 1. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-by-2-by-12-inch grounding bus.
  - 2. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.

#### **3.3 INSTALLATION**

- A. Ground Rods: Install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes.

1. Drive ground rods until tops are 2 inches below finished floor or final grade, unless otherwise indicated.
  2. Interconnect ground rods with grounding electrode conductors. Use exothermic welds, except at test wells and as otherwise indicated. Make connections without exposing steel or damaging copper coating.
- B. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- C. Bonding Straps and Jumpers: Install so vibration by equipment mounted on vibration isolation hangers and supports is not transmitted to rigidly mounted equipment. Use exothermic-welded connectors for outdoor locations, unless a disconnect-type connection is required; then, use a bolted clamp. Bond straps directly to the basic structure taking care not to penetrate any adjacent parts. Install straps only in locations accessible for maintenance.
- D. Metal Water Service Pipe: Provide insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes by grounding clamp connectors. Where a dielectric main water fitting is installed, connect grounding conductor to street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
- E. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with grounding clamp connectors.
- F. Bond each aboveground portion of gas piping system upstream from equipment shutoff valve.
- G. UFER ground: Install UFER ground system as shown on the drawings.

### 3.4 CONNECTIONS

- A. General: Make connections so galvanic action or electrolysis possibility is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer to order of galvanic series.
  2. Make connections with clean, bare metal at points of contact.
  3. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.
- B. Exothermic-Welded Connections: Comply with manufacturer's written instructions. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.
- C. Equipment Grounding Conductor Terminations: For No. 8 AWG and larger, use pressure-type grounding lugs. No. 10 AWG and smaller grounding conductors may be terminated with winged pressure-type connectors.
- D. Noncontact Metal Raceway Terminations: If metallic raceways terminate at metal housings without mechanical and electrical connection to housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to grounding bus or terminal in housing. Bond electrically noncontinuous conduits at entrances and exits with grounding bushings and bare grounding conductors, unless otherwise indicated.
- E. Tighten screws and bolts for grounding and bonding connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A .
- F. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by connector manufacturer. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.
- G. Moisture Protection: If insulated grounding conductors are connected to ground rods or grounding buses, insulate entire area of connection and seal against moisture penetration of insulation and cable.

### 3.5 TRANSFORMER GROUNDING

- A. Install ground rods at transformer in accordance with Idaho Power standards.

### **3.6 FIELD QUALITY CONTROL**

- A. Testing: Perform the following field quality-control testing:
1. After installing grounding system but before permanent electrical circuitry has been energized, test for compliance with requirements.
  2. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, and at ground test wells. Measure ground resistance not less than two full days after the last trace of precipitation, and without the soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance. Perform tests, by the fall-of-potential method according to IEEE 81.
  3. Provide drawings locating each ground rod and ground rod assembly and other grounding electrodes, identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.
  4. Equipment Rated 500 kVA and less: 10 ohms.
  5. Equipment Rated 500 to 1000 kVA: 5 ohms.
  6. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Owner representative promptly and include recommendations to reduce ground resistance such as a chemical ground system or others that are available and approved by the Consulting Engineer.

**END OF SECTION 260526**



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## **SECTION 26 0533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
1. Raceways include the following:
    - a. RMC
    - b. PVC, schedule 40 or 80
    - c. EMT
    - d. FMC
    - e. LFMC
    - f. LFNC
    - g. RNC
    - h. Wireways
    - i. Surface raceways
    - j. MC cable for branch circuit wiring, may be used
  2. Boxes, enclosures, and cabinets include the following:
    - a. Device boxes
    - b. Floor boxes
    - c. Outlet boxes
    - d. Pull and junction boxes
    - e. Cabinets and hinged-cover enclosures

#### **1.2 REFERENCES**

- A. National Electrical Contractors Association (NECA) Publications:
1. 111 "Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC) (ANSI)"
- B. National Electrical Manufacturer's Association (NEMA) Publications:
1. 250 "Enclosures for Electrical Equipment (1000 Volts Maximum)"
  2. ANSI/NEMA FB 1 "Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable"
  3. ANSI/NEMA OS 1 "Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports"
  4. RN 1 "Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit"
  5. TC 2 "Electrical Polyvinyl Chloride (PVC) Tubing and Conduit"
  6. TC 3 "Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing"
- C. National Fire Protection Association (NFPA) Publications:
1. 70 "National Electric Code"
- D. Underwriter's Laboratories, Inc. (UL) Publications:
1. 1660 "Liquid-Tight Flexible Nonmetallic Conduit"

#### **1.3 DEFINITIONS**

- A. EMT: Electrical metallic tubing.
- B. FMC: Flexible metal conduit.
- C. IMC: Intermediate metal conduit.
- D. LFMC: Liquidtight flexible metal conduit.
- E. LFNC: Liquidtight flexible nonmetallic conduit.

- F. RMC: Rigid metal conduit.
- G. RNC: Rigid nonmetallic conduit.

#### **1.4 SUBMITTALS**

- A. General: Submit the following in accordance with Conditions of Contract and Division 01 Specification Sections:
  - 1. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

#### **1.5 PRIOR APPROVAL**

- A. General:
  - 1. Catalog and manufacturer's numbers are for the purpose of establishing standards of quality and types of materials to be used. Products of other manufacturers may be used if equal in quality and design in the opinion of the Engineer and are specifically approved by the Engineer, in writing, 10 days prior to close of bidding.
  - 2. Any conflict arising from the use of substituted equipment shall be the responsibility of the supplier of that equipment. The contractor and his supplier shall bear all costs required to make equipment comply with the intent of the plans and specifications.

#### **1.6 QUALITY ASSURANCE**

- A. Listing and Labeling: Provide raceways and boxes specified in this Section that are listed and labeled.
  - 1. The Terms "Listed" and "Labeled": As defined in NFPA 70, Article 100.
  - 2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" as defined in OSHA Regulation 1910.7.
- B. Comply with NECA's "Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC) (ANSI)."
- C. Comply with NFPA 70.

#### **1.7 COORDINATION**

- A. Coordinate layout and installation of raceways and boxes with other construction elements to ensure adequate headroom, working clearance, and access.

### **PART 2 - PRODUCTS**

#### **2.1 MANUFACTURERS**

- A. Approved Manufacturers:
  - 1. Metal Conduit and Tubing:
    - a. Anixter Brothers, Inc. (800-323-8166)
    - b. Carol Cable Co., Inc. (401-728-7000)
    - c. Wheatland Tube Co. (800-257-8128)
  - 2. Flexible Conduit:
    - a. Carol Cable Co., Inc. (401-728-7000)
    - b. Electri-Flex Co. (800-323-6174)
  - 3. Nonmetallic Conduit and Tubing:
    - a. Hubbell, Inc.; Raco, Inc. (800-722-6437)
    - b. Lamson & Sessions; Carlon Electrical Products (800-322-7566)
    - c. Thomas & Betts Corp. (800-816-7809)
  - 4. Conduit Bodies and Fittings:
    - a. Emerson Electric Co.; Appleton Electric Co. (800-727-5102)
    - b. Hubbell, Inc.; Killark Electric Manufacturing Co. (314-531-0460)
    - c. Lamson & Sessions; Carlon Electrical Products (800-322-7566)
  - 5. Metal Wireways:
    - a. Hoffman Engineering Co. (203-425-8900)

- b. Keystone/Rees, Inc. (219-495-9811)
- c. Square D Co.; a Division of Groupe Schneider (888-778-2733)
- 6. Nonmetallic Wireways:
  - a. Hoffman Engineering Co. (203-425-8900)
  - b. Lamson & Sessions; Carlon Electrical Products (800-322-7566)
- 7. Surface Metal Raceways:
  - a. Airey-Thompson Co., Inc.; A-T Power Systems (800-421-6196)
  - b. Butler Manufacturing Co.; Walker Division (304-485-1611)
  - c. Wiremold Co. (The); Electrical Sales Division (800-621-0049)
- 8. Surface Nonmetallic Raceways:
  - a. Hubbell, Inc.; Wiring Device Division (203-882-4900)
  - b. Panduit Corp. (800-777-3300)
  - c. Wiremold Co. (The); Electrical Sales Division (800-621-0049)
- 9. Boxes, Enclosures, and Cabinets:
  - a. Hoffman Engineering Co.; Federal-Hoffman, Inc. (203-425-8900)
  - b. Hubbell Inc.; Killark Electric Manufacturing Co. (314-531-0460)
  - c. Thomas & Betts Corp. (800-816-7809)
- 10. MC cable:
  - a. Afc Cable Systems (508) 998-1131
  - b. Southwire (801) 486-4778
  - c. Encore Wire Corp (972) 562-9473

## **2.2 METAL CONDUIT AND TUBING**

- A. Rigid Steel Conduit: ANSI C80.1.
- B. Plastic-Coated Steel Conduit and Fittings: NEMA RN 1.
- C. EMT and Fittings: ANSI C80.3.
  - 1. Fittings: Set-screw or compression type.
- D. FMC: Zinc-coated steel.
- E. LFMC: Flexible steel conduit with PVC jacket.
- F. Fittings: NEMA FB 1; compatible with conduit/tubing materials.

## **2.3 NONMETALLIC CONDUIT AND TUBING**

- A. RNC: NEMA TC 2, Schedule 40 or 80 PVC.
- B. RNC Fittings: NEMA TC 3; match to conduit or conduit/tubing type and material.
- C. LFNC: UL 1660.

## **2.4 METAL WIREWAYS**

- A. Material: Sheet metal sized and shaped as indicated.
- B. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- C. Select features, unless otherwise indicated, as required to complete wiring system and to comply with NFPA 70.
- D. Wireway Covers: As indicated

- E. Finish: Manufacturer's standard enamel finish.

## **2.5 NONMETALLIC WIREWAYS**

- A. Description: PVC plastic, extruded and fabricated to size and shape indicated, with snap-on cover and mechanically coupled connections using plastic fasteners.
- B. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- C. Select features, unless otherwise indicated, as required to complete wiring system and to comply with NFPA 70.

## **2.6 SURFACE RACEWAYS**

- A. Surface Metal Raceways: Galvanized steel with snap-on covers. Finish with manufacturer's standard prime coating.
- B. Surface Nonmetallic Raceways: 2-piece construction, manufactured of rigid PVC compound with matte texture and manufacturer's standard color.
- C. Types, sizes, and channels as indicated and required for each application, with fittings that match and mate with raceways.

## **2.7 OUTLET AND DEVICE BOXES**

- A. Sheet Metal Boxes: NEMA OS 1.

## **2.8 FLOOR BOXES**

- A. Floor Boxes: Cast metal, fully adjustable, rectangular.

## **2.9 PULL AND JUNCTION BOXES**

- A. Small Sheet Metal Boxes: NEMA OS 1.
- B. Cast-Metal Boxes: NEMA FB 1, cast aluminum with gasketed cover.

## **2.10 ENCLOSURES AND CABINETS**

- A. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous hinge cover and flush latch.
  - 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
  - 2. Nonmetallic Enclosures: Plastic, finished inside with radio-frequency-resistant paint.
- B. Cabinets: NEMA 250, Type 1, galvanized steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel. Hinged door in front cover with flush latch and concealed hinge. Key latch to match panelboards. Include metal barriers to separate wiring of different systems and voltage, and include accessory feet where required for freestanding equipment.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine surfaces to receive raceways, boxes, enclosures, and cabinets for compliance with installation tolerances and other conditions affecting performance of raceway installation. Do not proceed with installation until unsatisfactory conditions have been corrected.

### **3.2 WIRING METHODS**

- A. Outdoors: Use the following wiring methods:
  - 1. Exposed: Rigid steel.
  - 2. Concealed: Rigid steel.
  - 3. Underground, Single Run: RNC.
  - 4. Underground, Grouped: RNC.
  - 5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
  - 6. Boxes and Enclosures: NEMA 250, Type 3R or Type 4.
  
- B. Indoors: Use the following wiring methods:
  - 1. Exposed on ceilings and wall in Mechanical Equipment Rooms galvanized rigid steel conduit.
  - 2. Concealed in spaces above hung ceiling and wall: Electrical Metallic Tubing (EMT).
  - 3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC; except in wet or damp locations, use LFMC.
  - 4. Damp or Wet Locations: Rigid steel conduit.
  - 5. Boxes and Enclosures: NEMA 250, Type 1, except as follows:
    - a. Damp or Wet Locations: NEMA 250, Type 4, stainless steel.
  
- C. Underground or concrete encased:
  - 1. Schedule 40 PVC.

### 3.3 INSTALLATION

- A. Install raceways, boxes, enclosures, and cabinets as indicated, according to manufacturer's written instructions.
- B. Minimum Raceway Size: 3/4-inch trade size (DN21).
- C. Conceal conduit and EMT, unless otherwise indicated, within finished walls, ceilings, and floors.
- D. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- E. Install raceways level and square and at proper elevations. Provide adequate headroom.
- F. Complete raceway installation before starting conductor installation.
- G. Support raceways as specified in Section 26 0500 - "Common Work Results for Electrical."
- H. Use temporary closures to prevent foreign matter from entering raceways.
- I. Protect stub-ups from damage where conduits rise through floor slabs. Arrange so curved portion of bends is not visible above the finished slab.
- J. Make bends and offsets so ID is not reduced. Keep legs of bends in the same plane and straight legs of offsets parallel, unless otherwise indicated.
- K. Use raceway fittings compatible with raceways and suitable for use and location. For intermediate steel conduit, use threaded rigid steel conduit fittings, unless otherwise indicated.
- L. Run concealed raceways, with a minimum of bends, in the shortest practical distance considering the type of building construction and obstructions, unless otherwise indicated.
- M. Raceways Embedded in Slabs: Install in middle third of slab thickness where practical, and leave at least 1-inch concrete cover.
  - 1. Secure raceways to reinforcing rods to prevent sagging or shifting during concrete placement.
  - 2. Space raceways laterally to prevent voids in concrete.

3. Run conduit larger than 1-inch trade size (DN27) parallel to or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
  4. Transition from nonmetallic tubing to Schedule 80 nonmetallic conduit or rigid steel conduit, before rising above floor.
- N. Install exposed raceways parallel to or at right angles to nearby surfaces or structural members, and follow the surface contours as much as practical.
1. Run parallel or banked raceways together, on common supports where practical.
  2. Make bends in parallel or banked runs from same centerline to make bends parallel. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for parallel raceways.
- O. Join raceways with fittings designed and approved for the purpose and make joints tight.
1. Make raceway terminations tight. Use bonding bushings or wedges at connections subject to vibration. Use bonding jumpers where joints cannot be made tight.
  2. Use insulating bushings to protect conductors.
- P. Tighten set screws of threadless fittings with suitable tools.
- Q. Terminations: Where raceways are terminated with locknuts and bushings, align raceways to enter squarely and install locknuts with dished part against the box. Where terminations are not secure with one locknut, use two locknuts: one inside and one outside the box.
- R. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into the hub so the end bears against the wire protection shoulder. Where chase nipples are used, align raceways so the coupling is square to the box and tighten the chase nipple so no threads are exposed.
- S. Install pull wires in empty raceways. Use No. 14 AWG zinc-coated steel or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches (300 mm) of slack at each end of the pull wire.
- T. Telephone and Signal System Raceways, 2-Inch Trade Size (DN53) and Smaller: In addition to the above requirements, install raceways in maximum lengths of 150 feet and with a maximum of two 90-degree bends or equivalent. Separate lengths with pull or junction boxes where necessary to comply with these requirements.
- U. Install raceway sealing fittings according to manufacturer's written instructions. Locate fittings at suitable, approved, and accessible locations and fill them with UL-listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:
1. Where conduits pass from warm to cold locations, such as the boundaries of refrigerated spaces.
  2. Where otherwise required by NFPA 70.
- V. Stub-up Connections: Extend conduits through concrete floor for connection to freestanding equipment. Install with an adjustable top or coupling threaded inside for plugs set flush with the finished floor. Extend conductors to equipment with rigid steel conduit; FMC may be used 6 inches above the floor. Install screwdriver-operated, threaded flush plugs flush with floor for future equipment connections.
- W. Flexible Connections: Use maximum of 6 feet of flexible conduit for recessed and semirecessed lighting fixtures; for equipment subject to vibration, noise transmission, or movement; and for all motors. Use liquidtight flexible conduit in wet or damp locations. Install separate ground conductor across flexible connections.
- X. Do not install aluminum conduits embedded in or in contact with concrete.
- Y. PVC Externally Coated, Rigid Steel Conduits: Use only fittings approved for use with that material. Patch all nicks and scrapes in PVC coating after installing conduits.
- Z. Surface Raceways: Install a separate, green, ground conductor in raceways from junction box supplying the raceways to receptacle or fixture ground terminals.
1. Select each surface raceway outlet box, to which a lighting fixture is attached, of sufficient diameter to provide a seat for the fixture canopy.

2. Where a surface raceway is used to supply a fluorescent lighting fixture having central-stem suspension with a backplate and a canopy (with or without extension ring), no separate outlet box is required.
  3. Provide surface metal raceway outlet box, and the backplate and canopy, at the feed-in location of each fluorescent lighting fixture having end-stem suspension.
  4. Where a surface metal raceway extension is made from an existing outlet box on which a lighting fixture is installed, no additional surface-mounted outlet box is required. Provide a backplate slightly smaller than the fixture canopy.
- AA. Set floor boxes level and adjust to finished floor surface.
- BB. Install hinged-cover enclosures and cabinets plumb. Support at each corner.
- CC. Size all conduits supplying motors and associated control equipment to include equipment grounding conductor sized per NFPA 70 whether or not shown on the drawings or specified.
- DD. Unless otherwise noted, terminate all conduits stubbing up inside rooms or roof as follows:
1. Conduits for AC power: Stub up 6" above finished floor and provide concrete sill to protect stub-ups.
  2. On PVC conduit for AC power and control cable, provide PVC to galvanized steel rigid conduit adaptor.
  3. Plug or cap all conduits during construction or until permanent conductors are installed. Taped ends will not be allowed.
- EE. In exposed conduit runs longer than 300 feet, expansion fittings shall be installed. Where embedded conduit crosses a structural expansion joint, expansion and deflection fitting shall be installed.
- FF. MC Cable Installation:
1. MC cable may be installed for branch circuit wiring for switches, lights and receptacles from the point of the home run. All home runs shall be in conduit. Support all MC cable per NEC.

### **3.4 PROTECTION**

- A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure coatings, finishes, and cabinets are without damage or deterioration at the time of Substantial Completion.
1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
  2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

### **3.5 CLEANING**

- A. On completion of installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finish, including chips, scratches, and abrasions.

**END OF SECTION 260533**



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## **SECTION 26 0553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Electrical identification materials and devices required to comply with ANSI C2, NFPA 70, OSHA standards, and authorities having jurisdiction.

#### **1.2 REFERENCES**

- A. American National Standards Institute (ANSI) Publications.
- B. National Fire Protection Association (NFPA) Publications:
  - 1. 70 "National Electric Code"

#### **1.3 SUBMITTALS**

- A. General: Submit the following in accordance with Conditions of Contract and Division 01 Specification Sections:
  - 1. Product Data: For each electrical identification product indicated.

#### **1.4 PRIOR APPROVAL**

- A. General:
  - 1. Catalog and manufacturer's numbers are for the purpose of establishing standards of quality and types of materials to be used. Products of other manufacturers may be used if equal in quality and design in the opinion of the Engineer and are specifically approved by the Engineer, in writing, 10 days prior to close of bidding.
  - 2. Any conflict arising from the use of substituted equipment shall be the responsibility of the supplier of that equipment. The contractor and his supplier shall bear all costs required to make equipment comply with the intent of the plans and specifications.

#### **1.5 QUALITY ASSURANCE**

- A. Comply with ANSI C2.
- B. Comply with NFPA 70.
- C. Comply with ANSI A13.1 and NFPA 70 for color-coding.

### **PART 2 - PRODUCTS**

#### **2.1 MANUFACTURERS**

- A. Approved Manufacturers:
  - 1. Brady USA, Inc. (800-541-1686)
  - 2. Panduit corp. (800-777-3300)
  - 3. Seton Identification Products (800-571-2596)

#### **2.2 RACEWAY AND CABLE LABELS**

- A. Comply with ANSI A13.1, Table 3, for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.
  - 1. Color: Black letters on orange field.
  - 2. Legend: Indicates voltage
- B. Pretensioned, Wraparound Plastic Sleeves: Flexible, preprinted, color-coded, acrylic band sized to suit the diameter of the

line it identifies and arranged to stay in place by pretensioned gripping action when placed in position.

- C. Colored Adhesive Tape: Self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.
- D. Underground-Line Warning Tape: Permanent, bright-colored, continuous-printed, vinyl tape.
  - 1. Not less than 6 inches wide by 4 mils thick.
  - 2. Compounded for permanent direct-burial service.
  - 3. Embedded continuous metallic strip or core.
  - 4. Printed legend indicating type of underground line.
- E. Tape Markers: Vinyl or vinyl-cloth, self-adhesive, wraparound type with preprinted numbers and letters.
- F. Aluminum, Wraparound Marker Bands: Bands cut from 0.014-inch thick aluminum sheet, with stamped or embossed legend, and fitted with slots or ears for permanently securing around wire or cable jacket or around groups of conductors.
- G. Plasticized Card-Stock Tags: Vinyl cloth with preprinted and field-printed legends. Orange background, unless otherwise indicated, with eyelet for fastener.
- H. Aluminum-Faced, Card-Stock Tags: Weather-resistant, 18-point minimum card stock faced on both sides with embossable aluminum sheet, 0.002 inch thick, laminated with moisture-resistant acrylic adhesive, punched for fasteners, and preprinted with legends to suit each application.

### 2.3 NAMEPLATES AND SIGNS

- A. Safety Signs: Comply with 29 CFR, Chapter XVII, Part 1910.145.
- B. Engraved Plastic Nameplates and Signs: Engraving stock, melamine plastic laminate, minimum 1/16 inch thick for signs up to 20 sq. in. and 1/8 inch thick for larger sizes.
  - 1. Engraved legend with black letters on white face.
  - 2. Punched or drilled for mechanical fasteners.
- C. Baked-Enamel Signs for Interior Use: Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for the application. 1/4-inch grommets in corners for mounting.
- D. Exterior, Metal-Backed, Butyrate Signs: Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch galvanized-steel backing; and with colors, legend, and size required for the application. 1/4-inch grommets in corners for mounting.
- E. Fasteners for Nameplates and Signs: Self-tapping, stainless-steel screws or No. 10/32, stainless-steel machine screws with nuts and flat and lock washers.

### 2.4 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Cable Ties: Fungus-inert, self-extinguishing, one-piece, self-locking, Type 6/6 nylon cable ties.
  - 1. Minimum Width: 3/16 inch.
  - 2. Tensile Strength: 50 lb minimum.
  - 3. Temperature Range: Minus 40 to plus 185 deg F.
  - 4. Color: According to color-coding.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Identification Materials and Devices: Install at locations for most convenient viewing without interference with operation and maintenance of equipment.
- B. Lettering, Colors, and Graphics: Coordinate names, abbreviations, colors, and other designations with corresponding designations in the Contract Documents or with those required by codes and standards. Use consistent designations throughout

Project.

- C. Sequence of Work: If identification is applied to surfaces that require finish, install identification after completing finish work.
- D. Self-Adhesive Identification Products: Clean surfaces before applying.
- E. Caution Labels for Indoor Boxes and Enclosures for Power and Lighting: Install pressure-sensitive, self-adhesive labels identifying system voltage with black letters on orange background. Install on exterior of door or cover.
- F. Circuit Identification Labels on Boxes: Install labels externally.
  - 1. Exposed Boxes: Pressure-sensitive, self-adhesive plastic label on cover.
  - 2. Concealed Boxes: Plasticized card-stock tags.
  - 3. Labeling Legend: Permanent, waterproof listing of panel and circuit number or equivalent.
- G. Paths of Underground Electrical Lines: During trench backfilling, for exterior underground power, control, signal, and communication lines, install continuous underground plastic line marker located directly above line at 6 to 8 inches below finished grade. Where width of multiple lines installed in a common trench or concrete envelope does not exceed 16 inches overall, use a single line marker. Install line marker for underground wiring, both direct-buried cables and cables in raceway.
- H. Secondary Service, Feeder, and Branch-Circuit Conductors: Color-code throughout the secondary electrical system.
  - 1. Wire color code:
    - a. Color code for 240/120V system shall be as follows:
      - 1) Phase A: Black
      - 2) Phase B: Red
      - 3) Neutral: White
      - 4) Ground: Green
    - b. Color-code for 208/120V system shall be as follows:
      - 1) Phase A: Black
      - 2) Phase B: Red
      - 3) Phase C: Blue
      - 4) Neutral: White
      - 5) Ground: Green
    - c. Color-code for 480/277V system shall be as follows:
      - 1) Phase A: Brown
      - 2) Phase B: Orange
      - 3) Phase C: Yellow
      - 4) Neutral: Gray
      - 5) Ground: Green with yellow stripe
  - 2. Factory apply color the entire length of conductors, except the following field-applied, color-coding methods may be used instead of factory-coded wire for sizes larger than No. 10 AWG:
    - a. Colored, pressure-sensitive plastic tape in half-lapped turns for a distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Use 1-inch wide tape in colors specified. Adjust tape bands to avoid obscuring cable identification markings.
    - b. Colored cable ties applied in groups of three ties of specified color to each wire at each terminal or splice point starting 3 inches from the terminal and spaced 3 inches apart. Apply with a special tool or pliers, tighten to a snug fit, and cut off excess length.
- I. Power-Circuit Identification: Metal tags or aluminum, wraparound marker bands for cables, feeders, and power circuits in vaults, pull and junction boxes, manholes, and switchboard rooms.
  - 1. Legend: 1/4-inch steel letter and number stamping or embossing with legend corresponding to indicated circuit designations.
  - 2. Tag Fasteners: Nylon cable ties.
  - 3. Band Fasteners: Integral ears.
- J. Apply identification to conductors as follows:
  - 1. Conductors to Be Extended in the Future: Indicate source and circuit numbers.
  - 2. Multiple Power or Lighting Circuits in the Same Enclosure: Identify each conductor with source, voltage, circuit number, and phase. Use color-coding to identify circuits' voltage and phase.

3. Multiple Control and Communication Circuits in the Same Enclosure: Identify each conductor by its system and circuit designation. Use a consistent system of tags, color-coding, or cable marking tape.
- K. Apply warning, caution, and instruction signs as follows:
1. Warnings, Cautions, and Instructions: Install to ensure safe operation and maintenance of electrical systems and of items to which they connect. Install engraved plastic-laminated instruction signs with approved legend where instructions are needed for system or equipment operation. Install metal-backed butyrate signs for outdoor items.
  2. Emergency Operation: Install engraved laminated signs with white legend on red background with minimum 3/8-inch high lettering for emergency instructions on power transfer, load shedding, and other emergency operations.
- L. Equipment Identification Labels: Engraved plastic laminate. Install on each unit of equipment, including central or master unit of each system. This includes power, lighting, communication, signal, and alarm systems, unless units are specified with their own self-explanatory identification. Unless otherwise indicated, provide a single line of text with 1/2-inch high lettering on 1-1/2-inch high label; where two lines of text are required, use labels 2 inches high. Use white lettering on black field. Apply labels for each unit of the following categories of equipment using mechanical fasteners:
1. Panelboards, electrical cabinets, and enclosures.
  2. Access doors and panels for concealed electrical items.
  3. Electrical switchgear and switchboards.
  4. Emergency system boxes and enclosures.
  5. Disconnect switches.
  6. Enclosed circuit breakers.
  7. Motor starters.
  8. Dimmers.
  9. Control devices.
  10. Telephone switching equipment.
  11. Label inside of all switch plates and cover plates with panel and circuit numbers.

**END OF SECTION 260553**

## **SECTION 26 2726 - WIRING DEVICES**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Receptacles, Connectors, Switches, and Finish Plates.
- B. Related Sections:
  - 1. Section 26 05 53 - Identification for Electrical Systems.

#### **1.2 DEFINITIONS**

- A. GFCI: Ground-fault circuit interrupter.

#### **1.3 PRIOR APPROVAL**

- A. General:
  - 1. Catalog and manufacturer's numbers are for the purpose of establishing standards of quality and types of materials to be used. Products of other manufacturers may be used if equal in quality and design in the opinion of the Engineer and are specifically approved by the Engineer, in writing, 10 days prior to close of bidding.
  - 2. Any conflict arising from the use of substituted equipment shall be the responsibility of the supplier of that equipment. The contractor and his supplier shall bear all costs required to make equipment comply with the intent of the plans and specifications.

#### **1.4 SUBMITTALS**

- A. General: Submit the following in accordance with Conditions of Contract and Division 01 Specification Sections:
  - 1. Prior approval
    - a. Catalog and manufacturer's numbers are for the purpose of establishing standards of quality and types of materials to be used. Products of other manufacturers may be used if equal in quality and design in the opinion of the Engineer and are specifically approved by the Engineer, in writing, 10 days prior to close of bidding.
    - b. Any conflict arising from the use of substituted equipment shall be the responsibility of the supplier of that equipment. The contractor and his supplier shall bear all costs required to make equipment comply with the intent of the plans and specifications.
  - 2. Product Data: For each electrical product indicated.
  - 3. Shop Drawings:
    - a. Product Data: Submit manufacturer's catalog information showing dimensions, colors, and configurations.
    - b. Do not purchase equipment before completion of shop drawing review.
    - c. Engineer will not review shop drawings before the contractor has reviewed the shop drawings. The contractor shall stamp all drawings with a statement that he has reviewed all shop drawings and that they conform to the intent of the drawings and specifications.
  - 4. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.
- B. Submit "Letter of Conformance" in accordance with Section 01 33 00 indicating specified items selected for use in Project with the following supporting data:
  - 1. Maintenance Data: For materials and products to include in maintenance manuals specified in Division 01.

#### **1.5 QUALITY ASSURANCE**

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.
- B. Comply with NEMA WD 1.
  - 1. Comply with NFPA 70 "National Electric Code"

#### **1.6 COORDINATION**

- A. Receptacles for Owner-Furnished Equipment: Match plug configurations.
- B. Cord and Plug Sets: Match equipment requirements.

**1.7 EXTRA MATERIALS**

- A. Furnish extra materials described in Section 01 78 43 "Spare Parts and Materials" that match products installed and that are packaged with protective covering for storage and identified with labels describing contents. Deliver extra materials to Owner.

**PART 2 - PRODUCTS**

**2.1 RECEPTACLES**

- A. Straight Blade and Locking Type Receptacles: General duty grade, NEMA 5-20R duplex type.
- B. GFCI Receptacles: Feed-through type, with integral NEMA WD 6, Configuration 5-20R duplex receptacle arranged to protect connected downstream receptacles on same circuit. Design units for installation in a 2-3/4-inch- deep outlet box without an adapter.
- C. Isolated-Ground Receptacles: Equipment grounding contacts connected only to the green grounding screw terminal of the device with inherent electrical isolation from mounting strap.
  - 1. Devices: Listed and labeled as isolated-ground receptacles.
  - 2. Isolation Method: Integral to receptacle construction and not dependent on removable parts.
  - 3. Approved Manufacturers for Receptacles –

	15A <u>Recept.</u>	20A <u>Recept.</u>	15A GFCI <u>Recept.</u>	15A <u>Surge Protected</u>
Cooper Wiring Devices	5262	5362	GF15A/XGF15A	5250/1208
Hubbell	5262	5362	GF5262	5262S
Leviton	5262	5362	6598	
a. Pass & Seymour	5262	5362	1595-I	

- D. Toggle Switches:
  - 1. Snap Switches: General-duty, quiet type.
- E. Combination Switch and Receptacle: Both devices in a single gang unit with plaster ears and removable tab connector that permit separate or common feed connection.
  - a. Switch: 20 A, 120/277-VAC.
  - b. Receptacle: NEMA WD 6, Configuration 5-15R.
  - 2. Where more than one switch occurs at the same location, they shall be ganged under one plate. Where space does not permit horizontal ganging, interchangeable type switches may be used, only with approval of the Owner's Representative.
  - 3. Approved Manufacturers for Switches -

	15A <u>Switches</u>	20A <u>Switches</u>	15A Three-Way <u>Switches</u>
Cooper Wiring Devices	1201	2221	1203
Hubbell	HBL1201	HBL1221	HBL1203
Leviton	1201	1202	1203
Pass & Seymour	15AC-1	20AC-1	15AC-3

- 4. Dimmer Switches: Modular, full-wave, solid-state units with integral, quiet on/off switches and audible and electromagnetic noise filters.
  - a. Control: Continuously adjustable slide. Single-pole or three-way switch to suit connections.
  - b. Incandescent Lamp Dimmers: Modular, 120 V, 60 Hz with continuously adjustable slide; single pole with soft tap or other quiet switch; electromagnetic filter to eliminate noise, RF, and TV interference; and 5-inch wire connecting leads.
  - c. Fluorescent Lamp Dimmers: Modular; compatible with dimmer ballasts; trim potentiometer to adjust low-end dimming; dimmer-ballast combination capable of consistent dimming to a maximum of 1 percent of full

brightness, with filters to reduce audible noise, RF and TV interference.

## **2.2 WALL PLATES**

- A. Single and combination types match corresponding wiring devices.
  - 1. Plate-Securing Screws: Metal with head color to match plate finish.
  - 2. Provide plates for all devices and outlets with opening configuration suitable for devices to be covered.
  - 3. Plates shall be smooth urea plastic secured in place with screws finished to match the plates. Back of the house areas, such as equipment spaces, shall have steel plates. Stainless steel plates shall be used in kitchens. In use rated weather-proof plates shall be used where exposed to the weather.
  - 4. Color:
    - a. White
    - b. Color of devices shall match cover plates.

## **2.3 FLOOR SERVICE FITTINGS**

- A. Type: Modular, flush-type, dual-service units suitable for wiring method used.
- B. Compartmentation: Barrier separates power and signal compartments.
- C. Housing Material: Die-cast aluminum, satin finished.
- D. Power Receptacle: NEMA WD 6, Configuration 5-20R, gray finish, unless otherwise indicated.
- E. Signal Outlet: Blank cover with bushed cable opening, unless otherwise indicated.

## **2.4 MULTIOUTLET ASSEMBLIES**

- A. Components of Assemblies: Products from a single manufacturer designed for use as a complete, matching assembly of raceways and receptacles.
- B. Raceway Material: Metal, with manufacturer's standard finish.
- C. Wire: No. 12 AWG.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Install devices and assemblies plumb and secure.
- B. Protect devices and assemblies during painting. Install wall plates when painting is complete.
- C. Install wall dimmers to achieve indicated rating after derating for ganging as instructed by manufacturer.
- D. Do not share neutral conductor on load side of dimmers.
- E. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical, and grounding terminal of receptacles on top. Group adjacent switches under single, multi-gang wall plates.
- F. Adjust locations at which floor service outlets and telephone/power service poles are installed to suit arrangement of partitions and furnishings.

### **3.2 IDENTIFICATION**

- A. Comply with Section 26 05 53 "Identification for Electrical Systems."
  - 1. Switches: Where three or more switches are ganged, and elsewhere as indicated, identify each switch with approved legend engraved on wall plate.
  - 2. Receptacles: Identify panelboard and circuit number from which served. Use machine-printed, pressure-sensitive,



abrasion-resistant label tape on face of plate and durable wire markers or tags within outlet boxes.

### **3.3 CONNECTIONS**

- A. Connect wiring device grounding terminal to branch-circuit equipment grounding conductor.
- B. Isolated-Ground Receptacles: Connect to isolated-ground conductor routed to designated isolated equipment ground terminal of electrical system.
- C. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

### **3.4 FIELD QUALITY CONTROL**

- A. Test wiring devices for proper polarity and ground continuity. Operate each device at least six times.
- B. Check TVSS receptacle indicating lights for normal indication.
- C. Test GFCI operation with both local and remote fault simulations according to manufacturer's written instructions.
- D. Replace damaged or defective components.

### **3.5 CLEANING**

- A. Internally clean devices, device outlet boxes, and enclosures. Replace stained or improperly painted wall plates or devices.

**END OF SECTION 262726**

## **SECTION 26 5100 - INTERIOR LIGHTING**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Interior Lighting Fixtures
  - 2. Emergency Lighting Units
  - 3. Accessories

#### **1.2 REFERENCES**

- A. Institute of Electrical and Electronics Engineers, Inc. (IEEE) Publications:
  - 1. C62.41 "Surge Voltages in Low-Voltage AC Power Circuits"
- B. National Fire Protection Association (NFPA) Publications:
  - 1. NFPA 70 "National Electric Code"
  - 2. NFPA 101 "Life Safety Code®"
- C. Underwriter's Laboratories, Inc. (UL) Publications:
  - 1. 486A "Standard For Wire Connectors and Soldering Lugs for Use with Copper Conductors"
  - 2. 486B "Standard for Wire Connectors for Use with Aluminum Conductors"
  - 3. 924 "Emergency Lighting and Power Equipment"

#### **1.3 PRIOR APPROVAL**

- A. General:
  - 1. Catalog and manufacturer's numbers are for the purpose of establishing standards of quality and types of materials to be used. Products of other manufacturers may be used if equal in quality and design in the opinion of the Engineer and are specifically approved by the Engineer, in writing, 10 days prior to close of bidding.
  - 2. Any conflict arising from the use of substituted equipment shall be the responsibility of the supplier of that equipment. The contractor and his supplier shall bear all costs required to make equipment comply with the intent of the plans and specifications.

#### **1.4 SUBMITTALS**

- A. General: Submit the following in accordance with Conditions of Contract and Division 01 Specification Sections:
  - 1. For each type of lighting fixture indicated, arranged in order of fixture designation. Include data on features, accessories, and the following:
    - a. Dimensions of fixtures.
    - b. Certified results of laboratory tests for fixtures and lamps for photometric performance.
    - c. Emergency lighting unit battery and charger.
    - d. Fluorescent and high-intensity-discharge ballasts.
    - e. Types of lamps.
    - f. Photometric data.
  - 2. Dimming Ballast Compatibility Certificates: Signed by manufacturer of ballast certifying that ballasts are compatible with dimming systems and equipment with which they are used.
  - 3. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.
  - 4. Maintenance Data: For lighting fixtures to include in maintenance manuals specified in Division 01.

#### **1.5 QUALITY ASSURANCE**

- A. Fixtures, Emergency Lighting Units, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.
- B. Comply with NFPA 70.
- C. NFPA 101 Compliance: Comply with visibility and luminance requirements for exit signs.

## 1.6 COORDINATION

- A. Fixtures, Mounting Hardware, and Trim: Coordinate layout and installation of lighting fixtures with ceiling system and other construction.

## 1.7 EXTRA MATERIALS

- A. Deliver extra materials to Owner. Furnish extra materials described in Division 01 Section that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.

## PART 2 - PRODUCTS

### 2.1 FIXTURES AND FIXTURE COMPONENTS, GENERAL

- A. Approved Manufacturers:
  - 1. Subject to compliance with requirements, provide the products indicated for each designation in Lighting Fixture Schedule as shown on drawings.
  - 2. All alternate light fixture packages shall be submitted a minimum of 10 days prior to bid for approval.
- B. Metal Parts: Free from burrs, sharp corners, and edges.
- C. Sheet Metal Components: Steel, unless otherwise indicated. Form and support to prevent warping and sagging.
- D. Doors, Frames, and Other Internal Access: Smooth operating, free from light leakage under operating conditions, and arranged to permit maintaining without use of tools. Arrange doors, frames, lenses, diffusers, and other pieces to prevent accidental falling during maintenance and when secured in operating position.
- E. Reflecting Surfaces: Minimum reflectance as follows, unless otherwise indicated:
  - 1. White Surfaces: 85 percent.
  - 2. Specular Surfaces: 83 percent.
  - 3. Diffusing Specular Surfaces: 75 percent.
  - 4. Laminated Silver Metallized Film: 90 percent.
- F. Lenses, Diffusers, Covers, and Globes: 100 percent virgin acrylic plastic or annealed crystal glass, unless otherwise indicated.
  - 1. Plastic: High resistance to yellowing and other changes due to aging, exposure to heat, and ultraviolet radiation.
  - 2. Lens Thickness: 0.125 inch minimum, unless greater thickness is indicated.

### 2.2 LED LIGHTING FIXTURES

- A. General Requirements:
  - 1. See lighting fixtures schedule for specifications.

### 2.3 EXIT SIGNS

- A. General Requirements: Comply with UL 924 and the following:
  - 1. Sign Colors and Lettering Size: Comply with authorities having jurisdiction.
- B. Internally Lighted Signs: As follows:
  - 1. Lamps for AC Operation: Light-emitting diodes, 70,000 hours minimum rated lamp life.
- C. Self-Powered Exit Signs (Battery Type): Integral automatic charger in a self-contained power pack.
  - 1. Battery: Sealed, maintenance-free, nickel-cadmium type with special warranty.
  - 2. Charger: Fully automatic, solid-state type with sealed transfer relay.
  - 3. Operation: Relay automatically energizes lamp from unit when circuit voltage drops to 80 percent of nominal or below. When normal voltage is restored, relay disconnects lamps, and battery is automatically recharged and floated on charger.

### 2.4 EMERGENCY LIGHTING UNITS

- A. General Requirements: Self-contained units. Comply with UL 924. Units include the following features:
  - 1. Battery: Sealed, maintenance-free, lead-acid type with minimum 10-year nominal life and special warranty.
  - 2. Charger: Fully automatic, solid-state type with sealed transfer relay.
  - 3. Operation: Relay automatically turns lamp on when supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. When normal voltage is restored, relay disconnects lamps, and battery is automatically recharged and floated on charger.
  - 4. Integral Time-Delay Relay: Arranged to hold unit on for fixed interval after restoring power after an outage. Provides adequate time delay to permit high-intensity-discharge lamps to restrike and develop adequate output.

## 2.5 FIXTURE SUPPORT COMPONENTS

- A. Comply with Section 26 0500 "Common Work Results for Electrical".
- B. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fitting and ceiling canopy. Finish same as fixture.
- C. Twin-Stem Hangers: Two, 1/2-inch steel tubes with single canopy arranged to mount a single fixture. Finish same as fixture.
- D. Rod Hangers: 3/16-inch- minimum diameter, cadmium-plated, threaded steel rod.
- E. Hook Hangers: Integrated assembly matched to fixture and line voltage and equipped with threaded attachment, cord, and locking-type plug.
- F. Aircraft Cable Support: Use cable, anchorages, and intermediate supports recommended by fixture manufacturer.

## 2.6 FINISHES

- A. Fixtures: Manufacturer's standard, unless otherwise indicated.
  - 1. Paint Finish: Applied over corrosion-resistant treatment or primer, free of defects.
  - 2. Metallic Finish: Corrosion resistant.
  - 3. Colors as indicated in Light Fixture Schedule.

## 2.7 LAMPS

- A. Approved Manufacturers:
  - 1. LED:
    - a. See lighting fixture Schedule
- B. Color Temperature and Minimum Color-Rendering Index: 4000 K and 85 CRI, unless otherwise indicated.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Fixtures: Set level, plumb, and square with ceiling and walls, and secure according to manufacturer's written instructions and approved submittal materials. Install lamps in each fixture.
- B. Support for Fixtures in or on Grid-Type Suspended Ceilings:
  - 1. Recessed lighting fixtures shall be supported independently from the suspended ceiling system. Number 8 gauge galvanized steel wire or approved type hangers from the overhead building structures shall be provided for fixture support.

### 3.2 LIGHT FIXTURE ATTACHMENT:

- A. Light fixtures (all types) shall be mechanically attached to grid per NEC 410-16 (two per fixture unless independently supported).
  - 1. Surface-mounted fixtures shall be attached to grid.
  - 2. Pendant-hung fixtures shall be directly supported from structure with 9-gauge wire (or approved alternative).
  - 3. Rigid lay-in or can light fixtures:
    - a. <10 lbs. - one wire to structure (may be slack).
    - b. 11 to 56 lbs. - two wires from housing to structure (may be slack).

- c. >57 lbs. - supported directly to structure by approved method.

### **3.3 CONNECTIONS**

- A. Ground Equipment:
  - 1. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

### **3.4 FIELD QUALITY CONTROL**

- A. Inspect each installed fixture for damage. Replace damaged fixtures and components.
- B. Advance Notice: Give dates and times for field tests.
- C. Provide instruments to make and record test results.
- D. Tests: As follows:
  - 1. Verify normal operation of each fixture after installation.
  - 2. Emergency Lighting: Interrupt electrical supply to demonstrate proper operation.
  - 3. Verify normal transfer to battery source and retransfer to normal.
  - 4. Report results in writing.
- E. Malfunctioning Fixtures and Components: Replace or repair, then retest. Repeat procedure until units operate properly.
- F. Corrosive Fixtures: Replace during warranty period.

### **3.5 CLEANING AND ADJUSTING**

- A. Clean fixtures internally and externally after installation. Use methods and materials recommended by manufacturer.
- B. Adjust aimable fixtures to provide required light intensities.

**END OF SECTION 265100**

## **SECTION 26 5200 - EMERGENCY LIGHTING**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes emergency lighting units and exit signs.

#### **1.2 REFERENCES**

- A. National Electrical Manufacturers Association:
- B. NEMA WD 6 - Wiring Devices-Dimensional Requirements.

#### **1.3 SYSTEM DESCRIPTION**

- A. Emergency lighting to comply with requirements.

#### **1.4 PRIOR APPROVAL**

- A. General:
  - 1. Catalog and manufacturer's numbers are for the purpose of establishing standards of quality and types of materials to be used. Products of other manufacturers may be used if equal in quality and design in the opinion of the Engineer and are specifically approved by the Engineer, in writing, 10 days prior to close of bidding.
  - 2. Any conflict arising from the use of substituted equipment shall be the responsibility of the supplier of that equipment. The contractor and his supplier shall bear all costs required to make equipment comply with the intent of the plans and specifications.

#### **1.5 SUBMITTALS**

- A. Section 01 3300 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit dimensions, ratings, and performance data.
- C. Samples: Submit two color chips 3 x 3 inch in size illustrating unit finish color.

#### **1.6 QUALIFICATIONS**

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years' experience.

#### **1.7 MAINTENANCE MATERIALS**

- A. Section 01 7000 - Execution and Closeout Requirements: Spare parts and maintenance products.
- B. Furnish one replacement lamps for each lamp installed.
- C. Furnish one replacement battery for each battery type and size.

### **PART 2 - PRODUCTS**

#### **2.1 EMERGENCY LIGHTING UNITS**

- A. As shown on the Fixture Schedule.
- B. All alternate emergency light fixtures shall be submitted a minimum of 7 days prior to bid for approval.

## **2.2 EXIT SIGNS**

- A. As shown on the drawings.
- B. All alternate exit light fixtures shall be submitted a minimum of 7 days prior to bid for approval.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Install suspended exit signs using pendants supported from swivel hangers. Install pendant length required to suspend sign at indicated height.
- B. Install surface-mounted exit signs plumb and adjust to align with building lines and with each other. Secure to prevent movement.
- C. Install accessories furnished with each emergency lighting unit.
- D. Connect emergency lighting units and exit signs to branch circuit out as indicated on Drawings.
- E. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within unit.
- F. Ground and bond emergency lighting units and exit signs in accordance with Section 26 0526.

### **3.2 FIELD QUALITY CONTROL**

- A. Section 01 4000 - Quality Requirements, 01 7000 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Operate each unit after installation and connection. Inspect for proper connection and operation.

### **3.3 ADJUSTING**

- A. Section 01 7000 - Execution and Closeout Requirements: Testing, adjusting, and balancing.
- B. Position exit sign directional arrows as indicated on Drawings.

### **3.4 PROTECTION OF FINISHED WORK**

- A. Section 01 7000 - Execution and Closeout Requirements: Protecting finished work.
- B. Replace emergency lighting units and exit signs having failed lamps at Substantial Completion.

## **END OF SECTION 265200**

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**DIVISION 27 - COMMUNICATIONS**

27 1343 COMMUNICATION SERVICES CABLING



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## SECTION 27 1343 - ISU COMMUNICATION SERVICES CABLING

### PART 1 - GENERAL

#### 1.1 SCOPE

- A. Provide/install Superior Essex nCompass 1G Channel Solution and 1000Base TX/FX intra-building backbone to locations and shown on drawings. Number cabling as directed by ISU NetCom.

1.2 Telecommunications contractor shall perform the above scope of work while adhering to the appropriate specifications and parts list as contained in this document.

#### 1.3 GENERAL

- A. This specification may impact other trades. When there is a conflict in the construction documents between trades this telecommunications specification prevails.

#### 1.4 STANDARDS

- A. Building structured wiring systems shall meet the cabling conventions of Idaho State University (ISU) Networking & Telecommunications Department (NetCom) to include adherence to the most currently available Building Industry Consulting Service International (BICSI) Telecommunications Distribution Methods Manual (TDMM 12th Edition), ANSI/TIA/EIA Telecommunications Building Wiring Standards ISBN: 0-9112702-73-7, National Electrical Manufacturer's Association (NEMA) NEMA WC 26, and National Electrical Code 2008 NFPA 70 manuals as adopted by ISU. In projects involving new construction, ISU NetCom recommends architectural and engineering firms use CSI Master Format 2004, Division 27 - Communications, for construction documents.
- B. Telecommunications contractor shall be fully acquainted with the above referenced standards and be fully qualified, as outlined in the Telecommunications contractor qualifications. Telecommunications contractor shall have demonstrated manufacturer authorization, qualifications and certifications to install and test a Category 5E (CAT 5E) Ortronics/Superior Essex nCompass 1G Channel Solution and 1000BaseTX/FX intra-building backbone. The network cabling infrastructure must be installed by manufacturer approved designers and certified Telecommunications contractors at the Certified Installer Plus-Enterprise Solutions Partner (CIP-ESP) tier or Certified Installer Plus (CIP) tier in accordance with manufacturer's installation instructions and specifications.
- C. All station and riser cabling shall be tested and certified by successful Telecommunications contractor to support 1000BaseTX/FX technology. The Telecommunications contractor will be required to meet with and coordinate with a representative of ISU NetCom prior to work beginning, and weekly, during the installation process. Weekly meetings will include a site inspection to ensure compliance with the defined standards contained in this document. The successful electrical and telecommunications contractor(s) shall follow appropriate installation guidelines, as contained in the most currently available BICSI TDMM, ANSI/TIA/EIA, NEMA WC 26, and NFPA 70 manuals.

#### 1.5 TELECOMMUNICATIONS CONTRACTOR QUALIFICATIONS

- A. ISU requires only qualified and experienced Telecommunications contractors perform design, project management, and installation services in the construction of the ISU structured cabling infrastructure. Pursuant to this, ISU wants to ensure that successful contractors have the manufacturer authorizations, capabilities, qualifications, financial stability, and experience to complete Telecommunications installations using common industry practices (i.e. BICSI TDMM, ANSI/TIA/EIA, NEMA, NFPA, etc.) while meeting all ISU guidelines.
- B. Telecommunications contractor must meet the requirement of having continuously performed Telecommunications installation work for a period of at least five (5) years. The Telecommunications contractor must be an approved Ortronics Certified Installer at a Plus tier (CIP, CIP-ESP). The Telecommunications contractor is responsible for workmanship and installation practices in accordance with the Ortronics CIP Program. Ortronics/Superior Essex will extend a 25-Year nCompass Limited Lifetime Warranty to the ISU NetCom once the Telecommunications contractor fulfills all requirements under Ortronics CIP Program. At least 30 percent of the copper installation and termination crew must be certified by BICSI and Ortronics, with a BICSI Technician's Certification.

- C. ISU requires references from projects of a similar size and nature. Names of the officers of the company and resumes of those to be assigned to the project, including subcontractors, must be provided. Telecommunications contractor shall, at all times during performance of work, and until work is completed and accepted, have on the premises a competent with authority to act for the Telecommunications contractor regarding work schedules and any changes to the scope of work. The supervisor must be a BICSI certified Technician and a BICSI member in good standing.
- D. Telecommunications contractor shall have currently trained, registered, and certified BICSI Technicians and at least (1) Registered Communication Distribution Designer (RCDD) on staff as full-time employees. A copy of the RCDD certifications and BICSI member number must be provided with submittal documents prior to start of work.
- E. Telecommunications contractor must provide at least one project manager or lead technician on site at all times during project whom is a BICSI trained, certified, and registered Technician and a BICSI member in good standing. Weekly inspections and approval of all work performed shall be conducted by an ISU BICSI Registered Communications Distribution Designer (RCDD).
- F. Telecommunication contractor must be skilled and proficient in both inside cable plant (copper and fiber optics) installation, as well as outside cable plant (copper and fiber optics) installation, termination, splicing, and testing. Telecommunications contractor must be certified by the manufacture of the structured cable system specified in this document. (See 1.5 Materials)

#### 1.6 PROGRESS MEETINGS

- A. Telecommunications contractor will be required to meet with and coordinate with a representative of ISU NetCom in the presence of the general contractor prior to work beginning, and weekly, during the installation process. Weekly meetings will include a site inspection to ensure compliance with established standards. The successful electrical and Telecommunications contractor(s) will follow appropriate installation guidelines, as contained in the most currently available BICSI TDMM, ANSI/TIA/EIA Wiring Standards, NEMA and NFPA 70 National Electrical Code manuals. Additionally, Telecommunications contractor will work with ISU NetCom to ensure proper placement, routing, labeling, and documentation of cable and support hardware.

#### 1.7 DOCUMENTATION

- A. Prior to system acceptance, the Telecommunications contractor shall submit to the owner fully documented 8.5-in. x 11-in. scale drawings of the entire fiber optic and copper distribution system. Documentation shall be provided in both a hard copy binder and a soft copy on CD capable of being viewed and edited in MS Visio. This will include building and floor layouts with appropriate labeling and locations of workstation Telecommunications Outlet (TO), Equipment Room/Telecommunications Room (ER/TR), Main Cross Connect/Intermediate Cross Connect (MC/IC), cable routes, interconnect locations, riser locations, and all other information pertinent to the installation.
- B. Telecommunications contractor will be responsible for accurately labeling and identifying all relevant components of the cabling system, including, but not limited to: Telecommunications Outlet (TO) face plate labeling; patch panel and block labeling and color-coding; backbone cable labeling at entrance to MC, BEF/IC/ER, and HC/TR; fiber optic patch panel labeling and color-coding, cables at each end, conduits at each end, and grounding system. Reference BICSI TDMM, 12th Edition, Chapter 14 Telecommunications Administration.

#### 1.8 MATERIALS

Idaho State University, through an exhaustive selection process, has selected the Ortronics/Superior Essex nCompass Structured Cabling Solution for all campus cabling. ISU desires to protect its investment in training, certifications, and inventory, therefore, all new construction and remodel projects shall include the Ortronics/Superior Essex nCompass Cabling Solution products as specified.

The Telecommunications contractor must be an approved Ortronics Certified Installer at a Plus tier (CIP, CIP-ESP). A copy of certification documents must be submitted with submittals. The Telecommunications contractor is responsible for workmanship and installation practices in accordance with the Ortronics CIP Program. Ortronics/Superior Essex will extend a nCompass Limited Lifetime Warranty to ISU NetCom once the Telecommunications contractor fulfills all requirements under the Ortronics CIP Program. At least 30 percent of the copper installation and termination crew must be certified by BICSI and Ortronics, with a BICSI Technician Certification.

Telecommunications contractor shall be authorized and certified, by the manufacturer's representative, to install, certify and warranty the structured cabling system. The specified Ortronics/Superior Essex nCompass channel solution is not substitutable. Ortronics/Superior Essex will extend a nCompass Limited Lifetime Warranty to ISU NetCom once the

Telecommunications contractor fulfills all requirements under Ortronics CIP Program.

A. Horizontal Work Station Cable:

1. Superior Essex Cobra CAT 5e+, POP Box, CMP, Category 5E, 4 twisted pair, 24 AWG, FEP, Station Wire for Plenum air return systems.

<u>Flame Rating</u>	<u>Jacket</u>	<u>Color</u>	<u>Part No.</u>
CMP Plenum	PVC Alloy	Blue	Cobra CAT 5e+52-241-28
		Yellow	Cobra CAT 5e+52-241-68
		Light Gray	Cobra CAT 5e+52-241-38

2. NOTE: Irrespective of air handling space, ISU requires the use of CMP Plenum rated cable for smoke and fire mitigation.

B. Intra-Building Backbone Cable-

1. Superior Essex Power Sum CMP, 51-478-48 Category 5e, 25 twisted pair, 24 AWG, FEP, Riser Cable for Plenum riser systems.
2. Corning fiber optic riser cable, 6/6 Hybrid (6) strand, multi-mode, 62.5/125um, 3.5/1.0 dB, and (6) strand single-mode, MIC, TBII tight buffer tube construction, FEP.

C. Workstation Telecommunications Outlet (TO):

<u>Description</u>	<u>Part No.</u>
1. Ortronics TracJack USOC 6P6W RJ25C	OR-63700005-13 Ivory Jack
2. Ortronics TracJack T568A/B 180 deg	OR-TJ5E00-44 Dark Yellow Jack
3. Ortronics TracJack T568A/B 180 deg	OR-TJ5E00-36 Dark Blue Jack
4. Ortronics TracJack Face Plate	OR-40300547-13 3-Port Wall Plate
5. Ortronics TracJack Blank Modules (Pk of Ten)	OR-42100002-13 Ivory Blank

D. IC/HC ER/TR Patch Panel Data Termination

<u>Description</u>	<u>Ports</u>	<u>Part No.</u>
1. Ortronics High Density Patch Panel Modular to 110 T568A/B	24	OR-PHD5E6U24
	48	OR-PHD5E6U48
	96	OR-PHD5E6U96

E. Patch Cords:

<u>Description</u>	<u>Length</u>	<u>Part No.</u>
1. Blue, 4-pair	3 ft.	OR-MC5E03-06
	5 ft.	OR-MC5E05-06
	7 ft.	OR-MC5E07-06
	9 ft.	OR-MC5E09-06
	15 ft.	OR-MC5E15-06
	20 ft.	OR-MC5E20-06
	25 ft.	OR-MC5E25-06

F. IC/HC ER/TR 110 Block Voice Termination:

<u>Description</u>	<u>Part No.</u>
1. Ortronics 200-pair 19-in. Rack Mount 110 Field Termination Block/Panel Kit includes two 100-pair 110 blocks without legs, with (40) 110C4 and (8) 110C5 connecting blocks, two jumper troughs, and designation.	OR-302003251

2. 100-pair wall mount 110 Field Termination Block with (20) 110C4 and (4) 110C5 connecting blocks and snap-on label designation field OR-110ABC5E100
  3. 110C5 Connecting Blocks, five-pair, Pk of ten. OR-30200110
- G. Outside Cable Plant and Termination:
1. Copper and fiber optics pair/strand count, composition and termination to be specified by ISU NetCom per specific project. See 2.2
- H. BEF/IC/HC ER/TR Fiber Optic Cabinet and Termination:
1. For Hubbell Next Frame Rack Installations:
    - a. Corning CCH-04U Fiber Distribution Center 72/288 fiber optic enclosure.
    - b. Corning CCH-CP12-19T Single-Mode ST connector 12 strand pre-loaded panel.
- I. For Hubbell RE4X Cabinet Installations:
1. Corning SPH-01P 12-Fiber wall panel with ST connectors
  2. Corning CCH-CP12-19T Single-Mode ST connector 12 strand pre-loaded panel.
- J. Grounding and Bonding:
1. Chatsworth Products 40153-012 12 inch TMGB Pattern ANSI/EIA/TIA Grounding busbar.
- K. Equipment Racks, Cabinets and Ladder Tray:
1. For Standard Equipment and Telecommunications Room Installations:
    - a. Hubbell Next Frame 19-in. x 7-ft. Equipment rack with 6 inch Vertical Organizer - 6 inch wide Z Channel and cover and Horizontal Cable Management. Black finish.
    - b. Chatsworth 10250-712 Universal Cable Runway, Black Finish
- L. For Computer Labs, corridors and/or Zone Installations:
1. Hubbell RE4X REBOX® Commercial Cabinet, 42.2-in. H x 24.2-in. W x 10-in. D, Light Gray, Pre-Configured.
- M. Other-
1. Panduit HLT21-XO Black Velcro 8 inch Tie Wrap, 10 pack.
  2. ERICO, Inc., CADDY CableCat Fasteners ("J" Hooks).
  3. Carlon CF4X1C-5200 corrugated FEP orange inner duct.

## PART 2 - CABLE PLANT

### 2.1 EQUIPMENT AND TELECOMMUNICATIONS ROOM REQUIREMENTS

- A. Each BEF/IC/ER and HC/TR shall be a stand-alone wiring closet located centrally such that no single UTP horizontal cable run shall exceed 90 meters, when terminated at each end, nor shall horizontal cable runs span floors. There shall be a minimum of one (1) ER/TR per floor in a multi-level building. BEF/IC/ER and HC/TR shall not be co-located in custodial, mechanical or other shared space where damage to critical electronics may occur. Each room shall be sized according to use, and meet the below listed criteria. Coordinate with a representative of ISU NetCom prior to installation of backboard, grounding and bonding system, and electrical service.
- B. Each BEF/IC/ER shall have a minimum of (2) 4 inch inside diameter EMT conduits run to each HR/TR. Each conduit shall have (3) 1 inch corrugated inner-duct installed. (See Conceptual Conduit and Riser drawing at the end of this document)
- C. No right angle bends or LBs allowed. 60 degree sweep maximum allowed.
- D. No Intra or Inter-building telecommunications cable shall be run adjacent and parallel to power cabling. A minimum of 5 inch distance is required from any fluorescent lighting fixture or power line up to 2kVA and 24 inch from any power line over 5kVA. Similarly, cable should be routed and terminated as far as possible from sources of EMF, such as ballasts, generators, fans, motor control units, motors, etc.

- E. The BEF/IC/ER and HC/TR structured cable system shall be constructed using materials as specified in the materials list. Horizontal station cable, riser cables, and fiber optics shall be terminated in the appropriate location on the racking system. Voice cables shall be terminated on the appropriate 110 system. Data cables shall be terminated in the appropriate patch panels. Fiber optics shall be terminated in the appropriate fiber optic termination assembly. Cable termination, order of termination, color-coding, grouping, numbering plan, and labeling shall be performed in accordance with BICSI TDMM Chapter 14 Telecommunications Administration and ISU NetCom conventions. Entrance facilities shall be terminated on the backboard with appropriate building entrance protection as specified by ISU NetCom. Riser shall be extended from the backboard building entrance protection panel to the 110 system on the rack. Coordinate with a representative of ISU NetCom prior to installation of BEF/IC/ER and HC/TR distribution and termination hardware.

## 2.2 ENTRANCE FACILITIES

- A. Outside cable plant facility requirements shall be coordinated with ISU NetCom. A minimum of (2) 4 inch inside diameter schedule 40 PVC conduits shall be run from the BEF/IC/ER to the designated vault or tunnel system. One of the 4 inch conduits shall have installed (4) 1 inch corrugated orange inner-duct. Conduits shall be buried a minimum of 24 inch from the surface on a foundation of 10 inch wet sand fill. A metallic locator ribbon shall be installed 12 inch above and parallel to the conduit. There shall be a minimum horizontal separation of 24 inch from co-located buried electrical service.
- B. Outside plant requirements are determined per project. At a minimum, Telecommunications contractor shall ensure entrance facilities will support a multi-exchange carrier WAN environment with provisions for (1) DS3 circuit and (25) pair copper facilities with future expansion to OC48 and (100) pair copper facilities.
- C. Grounding and Bonding shall conform to NEC Article 250 and TIA/EIA-607 using a minimum conductor size of 6 AWG.
- D. No right angle bends or LBs allowed. 60 degree sweep maximum allowed.

## 2.3 HORIZONTAL WORKSTATION CABLE

- A. Each Workstation Telecommunications Outlet (TO) shall have (3) Category 5E cables. The gray cable and ivory jack shall be designated as analog voice and the blue and yellow cables and jacks shall be designated for data communications.
- B. Each Computer Lab TO shall have (2) Category 5E cables. The blue and yellow cables and jacks shall be designated for data communications.
  - 1. Each Telecommunications Outlet (TO) shall have (3) jacks in each outlet plate as follows:
  - 2. Install (1) Gray Category 5E (CAT 5E) 4-Pair UTP cable terminated at the TO in an Ivory RJ25C USOC jack and at the HC/TR in the rack mounted (or backboard mounted) 110 system as appropriate.
  - 3. Install (1) Blue CAT 5E 4-Pair UTP cable terminated at the TO in a Blue RJ45 CAT 5E jack and at the HC/TR in the rack mounted patch panel system.
  - 4. Install (1) Yellow CAT 5E 4-Pair UTP cable terminated at the TO in a Yellow RJ45 CAT 5E jack and at the HC/TR in the rack mounted patch panel system.
  - 5. Cables shall be distributed in a horizontal star topology from each TO to the HC/TR. Total terminated length of cable from TO to HC/TR shall not exceed 90 meters total length. Each horizontal cable shall be installed in a "home-run" configuration. No "daisy chained" conduit or cables shall be allowed. No horizontal cable run shall span between floors. A minimum 12 inch service loop shall be provided at each TO and 24 inch at each HC/TR.
  - 6. All cables shall be installed using conduit, cable tray, or "J" hooks. Where cables are not installed in conduit or cable tray, the cable shall not be pulled or installed directly across suspended ceiling tiles or fluorescent lights without proper suspension and consideration of possible electrical interference. If "J" hooks are used, avoid placing any pressure or creating stress points on the cable. Maximum spacing between "J" hooks shall not exceed five feet. Suspended ceiling support wires shall not be used to support cables or cable support system(s).
  - 7. At no time shall pulling tension exceed 25 lbs. on horizontal cables. Exceeding the maximum recommended pulling tension during installation of cables will compromise wire integrity. If wire integrity is compromised, the wire may not pass testing and certification standards required for a 1000BaseTX infrastructure. The installing Telecommunications contractor will be responsible for replacement of any cable system that does not pass required certification standards. A representative from ISU NetCom may randomly test cable installations during weekly coordination meetings.
  - 8. Traditional nylon synch style Tie Wraps shall not be used to bundle cables. Only Velcro Tie Wraps are acceptable to bundle cables. Cables shall be dressed in loose, neat bundles.
  - 9. No Intra-building telecommunications cable shall be run adjacent and parallel to power cabling. A minimum of 5 inch distance is required from any fluorescent lighting fixture or power line up to 2kVA and 24 inch from any power line over 5kVA. Similarly, cable should be routed and terminated as far as possible from sources of EMF, such as ballasts, generators, fans, motor control units, motors, etc.

10. Horizontal UTP station cable shall be terminated at the HC/TR in a manner such that each workstation location will be numbered and terminated in sequential order. Voice (Gray) cable shall be terminated at the 19-in. x 7-ft. stand-alone rack in rack mounted (or backboard mounted) 110 blocks as specified in materials list. Each 100 pair 110 block will support (24) 4-pair cables. Designator strips shall be blue in color. Data (Blue & Yellow) cables shall be terminated in Ortronics High Density T568A/B wired Patch Panels as specified in materials list and shall be located in 19-in. x 7 ft. stand-alone rack as specified in materials list. Horizontal and vertical fiber optic cable shall be terminated at BEF/IC/ER and HC/TR in Corning fiber optic distribution centers as specified in materials list. Coordinate with a representative of ISU NetCom prior to installation of BEF/IC/ER and HC/TR distribution and termination hardware.
11. Each TO location shall use Ortronics TracJack hardware as specified in materials list. The gray CAT 5E cable shall be terminated USOC in an Ivory RJ25C jack. The Blue and Yellow CAT 5E cable(s) shall be terminated TIA/EIA T568A in (1) Blue and (1) Yellow CAT 5E RJ45 jacks. Striping of cable jacket, untwisting of conductor pairs and termination shall be done using TIA/EIA conventions. 12 inch of excess, jacketed, cable shall be coiled in the outlet box to accommodate future re-termination. Maintain UTP cable pair twists up to the point of termination (maximum of up to 1/4-in. jacket removal allowed) at both the station/outlet end as well as patch panel/ block end for each horizontal cable. Take caution as to refrain from physically changing or damaging the shape or geometry of the cable during installation, i.e., do not cinch cable ties too tightly; avoid kinks and sharp bends in cable. Do not place bundles in such a way that the weight of large bundles is damaging the cables on the bottom of the bundle. Each TO wall plate shall be numbered sequentially, consistent with the HC/TR number layout using an acceptable labeling system. Coordinate with a representative of ISU NetCom prior to installation of TO termination hardware.
12. Telecommunications contractor shall test and certify, in writing, building wiring meets or exceeds all applicable TIA/EIA 568, 569, 606, 607, etc. conventions and standards. Telecommunications contractor shall test and certify, in writing, building wiring shall support 1000Base TX/FX (gigabit) Ethernet technologies. Ortronics/Superior Essex will extend a nCompass Limited Lifetime Warranty to ISU NetCom once the Telecommunications contractor fulfills all requirements under Ortronics CIP Program.

#### 2.4 VERTICAL RISER CABLE

- A. Install a minimum of (2) 4 inch conduit paths between the BEF/IC/ER and each HC/TR.
- B. No right angle bends or LBs allowed. 60 degree sweep maximum allowed. Any conduit exceeding 100-ft. shall have a pull box every 100-ft..
- C. For each (12) telephone workstation locations there shall be a (25) pair copper riser from the HC/TR to the BEF/IC/ER. Copper riser cable shall be of a 25 Pair Category 5E FEP rated construction as specified in materials list. All riser cable shall be terminated using 110 wiring distribution systems as specified in materials list. Riser cable shall be terminated on a separate 100 pair block from horizontal station cable. Designator strips shall be gray in color. Coordinate with a representative of ISU NetCom prior to installation and termination of riser cable and termination hardware.
- D. Each HC/TR shall have a (6/6) strand Hybrid multi-mode/single-mode fiber optic cable run back to the BEF/IC/ER. Fiber Optic riser cable shall be Corning , Hybrid (6) stand, multi-mode, FDDI performance, 62.5/125um, 3.5/1.0 dB, (6) strand single-mode, MIC, TBII tight buffer tube construction. Fiber optic cable shall be terminated in a Corning FDC cabinet at the BEF/IC/ER and each HC/TR. See materials list. Coordinate with a representative of ISU NetCom prior to installation of fiber optic riser cable.

#### 2.5 PATHWAY SUPPORT SYSTEM

- A. All horizontal cable shall be installed using a home-run configuration. Conduit, cable tray or "J" hooks are acceptable in any combination to support the cable system.
  1. **NOTE:** In open ceiling environments, where cable is intentionally or unintentionally exposed to view, the cable shall not be painted.
    - a. Cable should be protected from exposure to paint.
    - b. Paint products may deteriorate the cable sheath and compromise the integrity of cable conductors.
- B. Ladder tray in BDF, IDF, TR rooms shall be securely fasted to the wall and network racks in accordance with TIA/EIA-569-A
- C. Conduits shall be dedicated, using no smaller than a 3/4 inch inside diameter per workstation outlet. There shall be no daisy-chain conduit runs. Each workstation location shall require one 3/4 inch conduit, which is a home run back to the appropriate HC/TR or appropriate tray/support system. Provide pull boxes in telecommunications conduit runs spaced not greater than 100 feet apart with no more than two right angle bends. If more than two bends are in any 100 foot section, increase the conduit by one trade size. See TIA/EIA-569-A Section 4.4. Place a "TELECOMMUNICATIONS" label on all pull and junction

boxes. If a cable tray system is installed, the conduit shall be a home run from the workstation outlet jack to the tray. Conduit runs shall not exceed 40% fill capacity and bend design as specified in TIA/EIA-569-A documents. Conduits should be sized appropriately.

1. Workstation conduits *shall be dedicated* 1:1 ratio of conduit to workstation outlet.
2. Workstation conduits *shall not be daisy chained* or shared between workstation outlets.
3. Conduit runs shall have no more than (2) right angle bends.
4. Conduit fill *shall not* exceed 40%.

D. Traditional nylon synch style Tie Wraps shall not be used to bundle cables. Velcro style Tie Wraps are the only acceptable method to secure cable bundles. See materials list. At no time shall pulling tension exceed 25 lbs. on horizontal cables. Exceeding the maximum recommended pulling tension on Category 5E cables will compromise cable integrity. If wire integrity is compromised, the wire may not pass testing and certification standards required for a 1000BaseTX infrastructure. The installing Telecommunications contractor will be responsible for replacement of any cable system that does not meet required standards.

E. No intra/inter-building telecommunications cable shall be run adjacent and parallel to power cabling. A minimum of 5 inch distance is required from any fluorescent lighting fixture or power line up to 2kVA and 24 inch from any power line over 5kVA. Similarly, cable should be routed and terminated as far as possible from sources of EMF, such as generators, motors etc.

## 2.6 GROUNDING AND BONDING

A. Telecommunications bonding and grounding are additional bonding and grounding installed specifically for telecommunications systems. From a safety code standpoint, the NEC and NFPA 780 already cover such bonding and grounding, however, these codes are established primarily for safety. There are many situations where these codes can be interpreted or implemented in different ways. Some of these ways may not be as suitable as others for equipment protection, reliability, and performance.

1. Establishing a suitable telecommunications ground is critical in protecting and equalizing telecommunications equipment. A proper grounding and bonding infrastructure is essential for the reliable operation of today's sensitive telecommunications equipment and systems. Telecommunications cabling and electrical power cabling must be effectively equalized.
2. The grounding and bonding infrastructure is to originate at the service entrance (electrical power) ground and extend throughout the building to each telecommunications room.
3. Building steel, neither water pipes, nor electrical service sub-panels are acceptable grounding points.
4. Grounding and Bonding shall conform to NEC Article 250 *and* TIA/EIA-607-A using a minimum conductor size of 6 AWG.
  - a. Install a contiguous Intra-building grounding and bonding system in compliance with NEC Article 250 and TIA/EIA-607-A.
  - b. Use a minimum conductor size of 6 AWG
  - c. Install a grounding busbar on each plywood backboard in each telecommunications room as directed.
  - d. The grounding and bonding system shall originate at the service entrance (electrical power) ground and be a contiguous intra-building bus as shown in the example drawings.
  - e. Bond all telecommunications equipment racks, backboards, conduits, and cable trays as specified in TIA/EIA-607 as shown in example drawings.

B. Glossary:

1. BDF Building Distribution Frame
2. BEF Building Entrance Frame
3. BET Building Entrance Termination
4. BICSI Building Industry Consulting Service International
5. ER Equipment Room
6. HC Horizontal Cross Connect
7. IC Intermediate Cross Connect
8. IDF Intermediate Distribution Frame
9. MC Main Cross Connect
10. MDF Main Distribution Frame
11. RCDD Registered Communications Distribution Designer
12. TO Telecommunications Outlet
13. TR Telecommunications Room
14. UTP Unshielded Twisted Pair
15. FO Fiber Optics



**PART 3 - EXECUTION**

3.1 INSTALLATION

- A. Install building structured wiring systems in accordance with manufacturer's written instructions and with recognized industry practices.

3.2 TESTING

- A. Testing is required in accordance with these specifications to determine that installation conforms to industry standards.
- B. Testing reports shall be furnished to the owner.

END OF SECTION