

# PROJECT MANUAL

## DEMOLITION AND REBUILD OF BATHHOUSES BURLINGAME STATE PARK AND CAMPGROUND CHARLESTOWN, RHODE ISLAND

Prepared For:  
**RHODE ISLAND DEPARTMENT OF  
ENVIRONMENTAL MANAGEMENT**

SEPTEMBER 2023

**CAPUTO AND WICK LTD.**

1150 Pawtucket Avenue  
Rumford, RI 02916







**SECTION 00 0002 - PROJECT DIRECTORY**

**OWNER:**

State of Rhode Island  
Department of Administration  
One Capitol Hill  
Providence, Rhode Island 02908

**USER AGENCY:**

State of Rhode Island and Providence Plantations  
Department of Environmental Management  
Division of Planning and Development  
235 Promenade Street  
Providence, Rhode Island 02908  
(401) 222-2776

**DESIGN CONSULTANTS:**

Caputo and Wick Ltd.  
1150 Pawtucket Avenue  
Rumford, RI 02916  
(401) 434-8880

George S. Burman  
66 Highland Road  
Bristol, RI 02809  
(617) 901-0304

Sterling Engineering Co., Inc.  
79 Main Street  
Sturbridge, MA 01566  
(508) 347-9101

Wilkinson Associates Inc.  
615 Jefferson Boulevard  
Warwick, RI 02886  
(401) 737-6386







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**APPENDIX A**

Additional OWTS Materials / RIDEM Permit Applications and Approvals







**SECTION 00 0115 – SCHEDULE OF DRAWINGS****GENERAL**

The drawings for this project represent an integral part of the contract documents and should not be considered as a separate entity. They, along with the technical specifications, form a complete process of disseminating specific information required to perform the work of this project.

The following schedule indicates the drawings of this project, ordered for convenience only, and do not obligate the Contractor to perform the work in any specific sequence, nor construed as specific work for a specific trade, subcontractor or supplier.

**DRAWING**

| <u>NUMBER</u>   | <u>TITLE</u>                               |
|-----------------|--|
| 1 of 106        | Cover Sheet                                |
| 2 of 106        | General Overall Existing Condition Map     |
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**END OF SECTION 00 0115**







## **SECTION 00 5000 – CONTRACTING FORMS**

### **PART 1 GENERAL**

- 1.1 Contractor is responsible for obtaining a valid license to use all copyrighted documents specified or included in the Project Manual.

- 1.2 AGREEMENT AND CONDITIONS OF THE CONTRACT

- A. See Section 00 5200 for the Agreement form to be executed.
  - B. See Section 00 7200 for the General Conditions.

- 1.3 FORMS

- A. Use the following forms for the specified purposes unless otherwise indicated elsewhere in the Contract Documents.
  - B. Bond Forms:
    - 1. Performance Bond and Payment Bond Forms: AIA A312
  - C. Release of Lien:
    - 1. Release of Liens Form: AIA G706A
  - D. Insurance certificate, supplementary attachment:
    - 1. ACORD Certificate of Insurance Form: AIA G715

- 1.4 REFERENCE STANDARDS

- A. AIA G706A – Release of Liens: 1994.
  - B. AIA A312 - Performance Bond: 2010 and Payment Bond: 2010.
  - C. AIA G715 – ACORD Certificate of Insurance: 1991.1.



**PART 2 PRODUCTS – NOT USED**

**PART 3 EXECUTION – NOT USED**

END OF SECTION 00 5000



**SECTION 00 5200 –AGREEMENT FORM**

AIA Document A101, Standard Form of Agreement Between Owner and Contractor – 2017 Edition, and as amended, forms the basis of Contract between the Owner and Contractor, is included following this page, as an integral part of the Bid Documents. Provisions not amended or supplemented remain in full force and effect.

END SECTION 00 5200







RIDEM and Contractor to execute and insert AIA Document A101 here.

Sample glimpse



# AIA<sup>®</sup> Document A101<sup>™</sup> – 2017

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

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

**BETWEEN** the Owner:  
(Name, legal status, address, telephone and facsimile numbers, and website)

State of Rhode Island, acting by and through the Department of Administration,  
Division of Purchases, on behalf of the User Agency One Capitol Hill, Second Floor  
Providence, Rhode Island 02908-5855  
401.578.8100 (telephone); 401.574.8387 (facsimile)  
[www.purchasing.ri.gov](http://www.purchasing.ri.gov)

**ADDITIONS AND DELETIONS:**

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

SAMPLE PAGE







## **SECTION 00 7000 – GENERAL CONDITIONS**

AIA Document A201, General Conditions of the Contract for Construction – 2007 Edition, is included, following this page, as an integral part of the Bidding and Contract Documents. Provisions not amended or supplemented remain in full force and effect.

END OF SECTION 00 7000








Insert AIA Document A201 here.

Sample glimpse

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

**General Conditions of the Contract for Construction**

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

**THE OWNER:**  
*(Name, legal status and address)*  
The State of Rhode Island, acting by and through the Department of Administration  
Division of Purchases, on behalf of the User Agency  
One Capitol Hill, Second Floor  
Providence, Rhode Island 02908-5855  
(401) 574-8100 (telephone)  
(401) 574-8387 (facsimile)  
[www.purchasing.ri.gov](http://www.purchasing.ri.gov)

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

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**SECTION 00 8500 – PREVAILING WAGE**

The State of Rhode Island, Department of Labor, Division of Professional Regulation General Decision Modification is an integral part of the Bid Documents for prevailing wage rate requirements.

An available copy is on the following State of Rhode Island website:

[www.ridop.ri.gov](http://www.ridop.ri.gov)

All contractors working on State of Rhode Island prevailing wage projects must adjust hourly rates for their employees every July 1, in accordance with Davis Bacon updated rates, which are indicated on the following website:

[www.sam.gov](http://www.sam.gov)

US Government prevailing wage tables can be found on the following website:

[www.sam.gov/wage-determination/RI20220001/8](http://www.sam.gov/wage-determination/RI20220001/8)

Applicable Rhode Island Labor Laws can be found on the following website:

[www.dlt.ri.gov/pw/](http://www.dlt.ri.gov/pw/)

END OF SECTION 00 8500







**SECTION 01 1000 – SUMMARY OF WORK****PART 1 - GENERAL****1.01 DESCRIPTION OF WORK**

- A. Overview: Contractor to provide all labor, materials, and equipment to remove the existing bathhouses, miscellaneous site improvements and onsite wastewater treatment systems and to construct 6 new bathhouses and onsite wastewater treatment systems with associated site improvements at the Burlingame State Park and Campground, in accordance with the contract drawings and specifications listed in the Project Manual.
- B. General Requirements:
  - 1. Contractor shall perform the Work of the Contract under a stipulated sum Contract with the Owner in accordance with the Conditions of Contract.
  - 2. Vendor is responsible for obtaining and paying for any required Local and State licenses, Permits and inspections.
  - 3. Contractor to include all Bond costs in their Bid.
  - 4. Before starting work, all Contractor workers and Subs are required to obtain and submit a current (within 2 months) BCI of State residing in along with RI BCI and State-approved picture ID.
  - 5. All onsite workers are to be OSHA 10 certified. Copies of this certification along with driver licenses are required on the first day of work.
  - 6. The Contractor is responsible for providing their workers with all personal protection equipment. At a minimum, this includes hard hats, reflective vests, eye protection, harnesses and ear protection.
  - 7. All completed work must be inspected and approved by RIDEM and the Design Agent.
  - 8. There will be mandatory bi-weekly progress meetings onsite with four week look-ahead schedules to be furnished to RIDEM and Design Agent.
  - 9. Contractor and/or its subcontractors are to be licensed as required by RI Department of Labor.



10. All contractors and subcontractors to sign in each employee at the Vendor site office at the start of each shift.
11. Deliveries to be coordinated with RIDEM and to occur at convenient times for RIDEM.
12. The Successful Bidder is to submit the names and resumes of the onsite supervisors for review and acceptance to work on the project by the RIDEM team. RIDEM reserves the right to reject any proposed onsite supervisors.
13. RIDEM is not responsible for security of materials, tools, etc.
14. Contractors are not permitted to display a project sign anywhere on the park grounds.
15. Contractor must come to terms with all vendors and subcontractors prior to submitting their bid.
16. All noisy demolition shall be performed between 7:30am and 3:30pm.

#### 1.02 ALTERNATES

- A. None at time of bid.

#### 1.03 CONTRACTOR'S USE OF SITE AND PREMISES

- A. Owner intends to fully occupy the areas outside of the project limits indicated on the project plans during the period of construction.
- B. Construction Operations: Limit work areas within the facility as agreed with RIDEM. Coordinate with Owner to insure delivery and completion per the schedule identified on the Bid Form. Include all costs of this coordination, including all premium time wages that may be required to meet these requirements, in the Base bid.
- C. Provide access to and from site as required by law and by Owner:
  1. Do not obstruct roadways, sidewalks, or other public ways without permission from the Owner.
- D. Utility Outages and Shutdown:



1. Do not disrupt or shut down site power without 7 days' notice to Owner and authorities having jurisdiction.
  2. Prevent accidental disruption of utility services to other facilities.
- E. Protect all existing surfaces from damages. Any damages to the existing surfaces requiring replacement and or repair will be at this vendor's expense.
- F. At all times and at the completion of the Project, construction areas are to be kept in a clean, safe and acceptable condition on a daily basis.
- G. Vendor is responsible for removing all project debris off site including all costs associated with waste containers and proper disposal of waste. Vendor is responsible to coordinate with RIDEM for the temporary placement of a waste container.
- H. Vendor is to have all equipment necessary to perform the work required to construct and install all improvements including tools, staging, lift truck, etc. No RIDEM equipment or tools will be available.

#### 1.04 ITEMS PROVIDED BY OWNER INSTALLED BY CONTRACTOR

- A. None

#### 1.05 WORK BY OWNER

- A. Items noted NIC (Not in Contract) will be supplied and installed by Owner before Substantial Completion. Some items include:
1. None

#### 1.06 OWNER REQUIRED SUBCONTRACTORS

- A. None

#### 1.07 ITEMS TO BE SALVAGED

- A. None

#### 1.08 ALLOWANCES

- A. Include an allowance of \$20,000 for unknown concealed work.



PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

- A. Submit monthly waivers of lien for all vendors and subs.
- B. Submit certified payrolls to RIDEM.
- C. Submit monthly MBE Reports w/cancelled checks to RIDEM with each invoice for payment.

END OF SECTION 01 1000



**Office of Diversity, Equity and Opportunity (ODEO)**  
**MBE Compliance Office**  
**1 Capitol Hill, 3<sup>rd</sup> Floor**  
**Providence, RI 02908**

**(401) 574-8670**  
<http://odeo.ri.gov/>

Pursuant to RIGL 37-14.1 as well as the regulations promulgated thereto, the MBE Compliance Office requires that you complete the following table. Please note that these figures will be verified with the MBEs identified. If there are outstanding issues, such as retainage or a dispute, please indicate and attach supporting documentation for same. Also note that copies of invoice and cancelled checks for payment to all MBE subcontractors and suppliers are required.

**Contractor/Vendor Name:**

**Project Name & Location:**

**Original Prime Contract Amount: \$ \_\_\_\_\_ Current Prime Contract Amount: \$ \_\_\_\_\_ % Complete: \_\_\_\_\_**

| MBE/WBE<br>Subcontractor | Original<br>Contract<br>Amount | Change<br>Orders | Revised<br>Contract<br>Value | % Completed<br>To Date | Amount<br>Paid<br>To Date | Amount Due | Retainage % | Retainage<br>Amount | Explanation |
|--------------------------|--------------------------------|------------------|------------------------------|------------------------|---------------------------|------------|-------------|---------------------|-------------|
|                          |                                |                  |                              |                        |                           |            |             |                     |             |
|                          |                                |                  |                              |                        |                           |            |             |                     |             |
|                          |                                |                  |                              |                        |                           |            |             |                     |             |
|                          |                                |                  |                              |                        |                           |            |             |                     |             |
|                          |                                |                  |                              |                        |                           |            |             |                     |             |

I declare, under penalty of perjury, that the information provided in this verification form and supporting documents is true and correct.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

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

Notary Certificate:

Sworn before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
Notary Signature

\_\_\_\_\_  
Commission Expires







**SECTION 01 1005 – ADMINISTRATIVE PROVISIONS****PART 1 - GENERAL****1.00 GENERAL REFERENCE**

- A. The General Conditions, Supplementary General Conditions and Division 1 of these specifications are hereby included as part of this section.

**1.01 REQUIREMENTS INCLUDED**

- A. Title of Work, and type of Contract.
- B. Contractor Use of Premises.
- C. Applications for Payment
- D. Field Engineering.
- E. Reference Standards.
- F. Cutting and Patching
  - 1. Requirements and limitations for cutting and patching of Work.
- G. Supervision
- H. Miscellaneous Administrative Items

**1.02 WORK COVERED BY CONTRACT DOCUMENTS**

- A. All equipment, materials, installation, workmanship, inspection, and testing shall be in strict accordance with the Rhode Island Uniform Building Code.
- B. The contractor must provide all material, labor, tools, plant supplies, equipment, transportation, superintendence, temporary construction of every nature and all other services and facilities necessary to complete the construction for the Owner, including all incidental work as required or described in the contract documents.

**1.03 CONTRACT METHOD**

- A. Construction of the Work under single Lump Sum contract.
- B. Items noted "NIC" (Not in Contract) and other items as indicated will be furnished and installed by Owner.



#### 1.04 APPLICATIONS FOR PAYMENT

- A. Submit three copies of each application under procedures of Section 01300 on AIA G702 - Application and Certificate for Payment.
- B. Content and Format: That specified for Schedule of Values in Section 01300.
- C. The contractor must submit a payment schedule and Lump Sum breakdown with their Lump Sum Bid. The State will hold 5% of Lump Sum until Final Acceptance.
- D. Contractor shall refer to Section 00700 - General Conditions, for additional requirements.

#### 1.05 CONTRACTOR USE OF PREMISES

- A. Limit use of premises for Work and for construction operations, to allow for work by other Contractors. The contractor shall develop a phasing plan that must be submitted and approved by owner prior to any work on site.
- B. The contractor shall provide for the necessary protection of the work area from the general public and the working staff utilizing the parking lot during construction.
- C. Limit access to site and work areas as directed by the Owner.
- D. The contractor shall not use private property to store equipment or materials without written approval of the property owner.

#### 1.06 JOB SAFETY AND ACCIDENT PREVENTION

- A. All construction work on this project must be performed in compliance with the Occupational Safety and Health Act of 1970 or with local or State occupational safety and health regulations enforced by an agency of the locality or State under a plan approved by the U.S. Department of Labor Occupational Safety and Health Administration (OSHA).
  - 1. All contractors and subcontractors shall comply with requirements of the Occupational Safety and Health Act of 1970 or revisions thereto, which are applicable during the term of this contract and hold the Owner and Architect and/or their agents harmless from any claim or loss that may result from violations of or claims under this act.
- B. See the General Conditions for further requirements.

#### 1.07 FIELD ENGINEERING

- A. Provide field engineering services; establish grades, lines, and levels, by use of



recognized engineering survey practices.

- B. Contractor shall not deviate from established grades and lines, except by written approval of the Architect or obvious error exists in designated grades and lines.
- C. Contractor shall establish bench marks as required to properly perform work of this project.
- D. Contractor shall layout partition lines and other significant reference lines or points which will enable mechanical, electrical and other trades to accurately locate boxes, openings, sleeves, conduits, hangers, inserts and other devices.
- E. Prior to start of any work, the contractor shall confirm and verify the location, adequacy and elevations of all existing conditions that are being disturbed for a complete installation. Contractor shall pay all costs associated with any modifications required by his failure to follow this requirement.
- F. All Construction layout, Survey and as-built drawings will be incidental to this contract.

#### 1.08 REFERENCE STANDARDS

- A. For products specified by association or trade standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes. All RIDOT Standards Specifications and Material testing requirements apply to this contract.
- B. The date of the standard is that in effect as of date of Contract Documents when there are no bids, except when a specific date is specified. If governing codes reference standard date then code reference date shall be in effect.
- C. Obtain copies of standards when required by Contract Documents. Maintain copy at jobsite during progress of the specific work.

#### 1.09 CUTTING AND PATCHING

- A. Submit written request in advance of cutting or alteration which affects:
  - 1. Structural or security integrity of any element of Project.
  - 2. Integrity of weather-exposed or moisture-resistant element.
  - 3. Efficiency, maintenance, or safety of any operational element.
  - 4. Visual qualities of sight exposed elements.
  - 5. Work of Owner or separate Contractor.

#### 1.10 EXISTING UTILITIES AND STRUCTURES

- A. Contractor shall be responsible for injury or damages to any utility piping, drains, sewers, electrical wiring and conduits, buildings and other structures that may be met within the prosecution of the work. Contractor shall be liable for any damages to items



resulting from work of this Contract. To include injury or damages caused by Subcontractors, sub-subcontractors and material manufacturers.

- B. Shore or sling in place and prevent any damage to above mentioned items. Maintain them in constant operation except as may be required to connect or disconnect from them.
- C. All existing utilities are NOT indicated on the drawings. Contractor to use caution during construction.

#### 1.11 SUPERINTENDENCE OF SUBCONTRACTORS

- A. The contractor must supervise subcontractors in accordance with the provisions of General Conditions. A project superintendent shall be on site whenever any work is being performed. Contractor to submit resume of proposed project super for Design Team's approval.

#### 1.12 COORDINATION

- A. Prior to commencement of subcontract work, a designated representative of each subcontractor shall meet with project superintendent, Owner and Engineer at the site to discuss requirements and scope of Work.
- B. The General Contractor and all subcontractors will be required to attend a preconstruction conference at a date and time set by the Owner.

#### 1.13 BEHAVIOR OF PERSONNEL

- A. If in the opinion of the Owner, any employee of the Contractor or his subcontractors is physically or mentally unfit for work or exhibits behavior incompatible with work site environment, said employee may be required to leave property and may be refused re-admittance.

#### 1.14 SUBSTITUTIONS

- A. In all cases where a proprietary designation is used in connection with materials or articles to be furnished under this contract and the phrase "or equal" is not used, the Contractor shall furnish the specified item, unless a written request for a substitute has been submitted by the Contractor and reviewed by the Architect to his satisfaction.

#### 1.15 CODES, RULES AND REGULATIONS

- A. All work is to be in accord with the latest requirements of:
  - 1. Federal, State and Municipal Laws
  - 2. Rhode Island Building and Fire Code
  - 3. National Plumbing Code
  - 4. National Electric Code



5. Any prevailing rules, regulations pertaining to adequate protection and/or guarding of any moving parts or otherwise hazardous locations.
- B. Reference in Specifications or Drawings shall mean and intend the latest edition of such, as published at date of submission of bids.
- C. Reference to technical society organizations or body is made per the following abbreviations:
- |       |   |
|-------|---|
| AIA   | American Institute of Architects              |
| AISE  | American Institute of Electrical Engineers    |
| AISC  | American Institute of Steel Construction      |
| ASA   | American Standards Association                |
| ASME  | American Society of Mechanical Engineers      |
| ASTM  | American Society of Testing and Materials     |
| AWSC  | American Welding Society                      |
| CS    | Commercial Standard of U.S. Dept. of Commerce |
| FS    | Federal Specifications                        |
| NBFU  | National Board of Fire Underwriters           |
| NBS   | National Bureau of Standards                  |
| NEC   | National Electric Code                        |
| UBC   | Uniform Building Code                         |
| UL    | Underwriters' Laboratories, Inc.              |
| AASHO | American Assoc. of State Highway Officials    |
- D. Nothing in the Specification or Drawings is to be construed to allow work not in accord with the above requirements. When requirements shown or specified are less than those in the codes listed above, the Contractor is to furnish and/or install the larger size or higher standard without extra cost to the Owner.

#### 1.16 DRAWINGS AND SPECIFICATIONS

- A. All work drawn on Plans and not specified or all work specified and not drawn are part of Contract Work required to be done and are to be executed as fully as if described in both of these ways. Only work specifically noted in the following manner shall be considered as not being in the contract:
- ".....by Owner".
- ".....NIC (Not In Contract)".
- B. If, after examination of Contract Drawings and Specifications, or after a visit to the premises, any discrepancies, omissions, ambiguities, or conflicts are found in or amount contract documents or there is doubt as to their meaning, Architect is to be notified at the earliest possible date. Where information sought is not clearly indicated or specified,



the Architect will issue addendum to the Contractor clarifying conditions, which addendum will become part of the Contract Documents. Neither the Owner nor the Architect will be responsible for any oral instructions.

- C. If there are two ways and/or instruction in drawings and/or specifications, it shall be assumed that the Contractor has based his base bid price on the most expensive way.
- D. If duplication is shown on drawings and/or specifications of work by more than one trade, Architect shall determine which trade shall do work and rebate shall be due from the other trades to Owner.
- E. Drawings DO NOT include any necessary components for construction safety.
- F. In all work shown on Drawings, figured dimensions are to be followed in all cases, though they may differ from scaled measurements. Before beginning the work, Contractor is to check through and verify all dimensions/elevations and call to the attention of the Architect any apparent or manifest discrepancy.
  - 1. Contractor shall verify all dimensions with existing and actual field conditions, prior to start of any work.
- G. All work and materials shown on drawings shall be interpreted by the Contractor as being new work and materials to be furnished and installed unless are specifically indicated as being existing to remain.

#### 1.17 MANUFACTURER'S DIRECTIONS

- A. It is intended that manufactured articles, materials, and equipment be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with manufacturer's printed directions unless specifically specified to the contrary.
- B. If there is a conflict between the Contract Documents and manufacturer's directions, the Contractor shall notify the Architect in writing. Contractor shall not proceed with work until Architect has reviewed the conflicting data and provide the Contractor with a decision on which specification to follow.

#### 1.18 GENERAL SPECIFICATION NOTE

- A. The paragraph entitled "WORK INCLUDED" in each section of the technical section shall be considered general in nature and NOT all inclusive. The intent of the paragraph is to provide a general guide of what is included in the section.
- B. The paragraph entitled "RELATED WORK" in each section of the technical section shall be considered general in nature and NOT all inclusive. The intent of the paragraph is to provide a general guide of what work is related to work included in this section.

## PART 2 PRODUCTS



Not Applicable

### PART 3 EXECUTION

#### 3.01 EXAMINATION

- A. Inspect existing conditions prior to commencing Work, including elements subject to damage or movement during cutting and patching.
- B. After uncovering existing work, inspect conditions affecting performance of Work.
- C. Beginning of cutting or patching means acceptance of existing conditions.

#### 3.02 PREPARATION

- A. Provide all required temporary supports to ensure structural integrity of the Work. Provide devices and methods to protect other portions of Project from damage.
- B. Provide protection from elements for areas which may be exposed by uncovering work.

#### 3.03 CUTTING AND PATCHING

- A. Execute cutting, fitting, and patching including excavation and fill to complete work.
- B. Fit products together, to integrate with other work.
- C. Remove and replace defective or non-conforming work.
- D. Provide openings in the Work for penetration of mechanical and electrical work.

#### 3.04 PERFORMANCE

- A. Execute work by methods to avoid damage to other Work, and which will provide appropriate surfaces to receive patching and finishing.
- B. Cut rigid materials using saws or core drill. Existing interior window casings and trim scheduled to be removed shall be saw cut at location where removed materials meet existing materials scheduled to remain. Pneumatic tools not allowed without prior approval of the Architect.
- C. Restore work with new Products in accordance with requirements of Contract Documents.
- D. Fit work tight to adjacent surfaces and refinish all work back to its original condition. Refinish all surfaces to match adjacent finish. For continuous surfaces, refinish to



nearest intersection or natural break. For an assembly, refinish entire unit.

- E. At penetrations of fire rated walls, partitions, ceiling, and all floor construction, completely seal voids with fire rated materials to full thickness of the penetrated element.

END OF SECTION 01 1005



**SECTION 01 1006 – CONSTRUCTION PHASING AND SCHEDULING****PART 1 - GENERAL****1.00 GENERAL REFERENCE**

- A. The General Conditions, Supplementary General Conditions and Division 1 of these specifications are hereby included as part of this section.

**1.01 REQUIREMENTS INCLUDED**

- A. Coordination.
- B. Work Hours.
- C. Work Sequence and Scheduling.

**1.02 RELATED REQUIREMENTS**

- A. Section 01005 - Administrative Provisions: Cutting and patching.
- B. Section 01300 - Submittals: Construction schedules.
- C. Section 01500 - Construction Facilities and Temporary Controls: Temporary enclosures, protection of completed work, and cleaning.

**1.03 COORDINATION**

- A. Coordinate work of the various sections of specifications and all drawings, to assure efficient and orderly sequence of installation of construction elements, and with provisions for accommodating items installed later.
- B. Verify characteristics of elements of interrelated operating equipment are compatible; coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- C. Coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on drawings. Follow routing shown for pipes, ducts, and conduits, as closely as practicable; make runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. In finished areas, conceal pipes, ducts, and wiring in the construction. Coordinate locations of fixtures and outlets with finish elements.



- E. Execute cutting and patching to integrate elements of Work, uncover ill-timed, defective, and non-conforming work, provide openings for penetrations of existing surfaces, and provide samples for testing. Seal all penetrations through floors, walls, and ceilings.

#### 1.04 WORKING HOURS

- A. In no case shall Contractor or any Subcontractor perform any work on project, except during regular working hours without in each instance, notifying the Owner's Representative in order that they may be present to assist during work. This shall not be interpreted as a measure to prevent the Contractor from working "overtime" under any circumstances, but merely to insure that the Owner's Representative may have the opportunity to be on hand to assist the Contractor, as may be required, to interpret Contract Documents, Plans or Specifications and to insure that construction operations will not interfere with Owner's Operations.
  - 1. Normal working hours for the purpose of this construction project shall be 7:00am to 3:00pm daily. Work performed outside of these hours must be approved by the Engineer and Owner prior to performing work. The Owner's operations will take precedence over the Contractor's operations. Any noisy work shall be completed between 7:00am to 3:00pm.
- B. If found necessary to reach a proper stopping place in any portion of the work, or to complete work within the Contract time limit, the Contractor shall work his forces and forces of his Subcontractors overtime without addition to the Contract Price. The Contractor shall insure that installation of Work under any subcontract does not interfere with nor delay progress of the building work, nor with progress of any independent contracts running concurrently.

#### 1.05 GENERAL WORK SEQUENCE and SCHEDULING REQUIREMENTS

- A. Contractor shall schedule and construct work to accommodate Owner's continuous use of the facility during the construction period.
- B. The park may be occupied during all of the construction process. The construction schedule shall be developed around the understanding that some of the existing bathhouses may need to remain open while demolition and construction is occurring at alternate bathhouses.
  - 1. Construction schedule shall be approved by the Owner.

END OF SECTION 01 1006



**SECTION 01 1200 – PROJECT MEETINGS****PART 1 - GENERAL****1.00 GENERAL REFERENCE**

- A. The General Conditions, Supplementary General Conditions and Division 1 of these specifications are hereby included as part of this section.

**1.02 REQUIREMENTS INCLUDED**

- A. Contractor participation in preconstruction conferences and progress meetings.
- B. Contractor administration of pre-installation conferences.

**1.03 RELATED REQUIREMENTS**

- A. Section 01006 - Construction Phasing: Coordination of Work, Scheduling and Phasing.

**1.04 PRECONSTRUCTION CONFERENCES**

- A. Owner shall administer preconstruction conference for execution of Owner - Contractor Agreement and exchange of preliminary submittals.
- B. Engineer shall administer site mobilization conference at Project site for clarification of Owner and Contractor responsibilities in use of site and for review of administrative procedures.

**1.05 PROGRESS MEETINGS**

- A. Contractor will schedule and administer project meetings throughout progress of the Work at weekly intervals.
- B. Contractor shall make physical arrangements for meetings. Contractor shall be responsible for recording meeting minutes and distribution to all concerned parties. Minutes shall be typed and distributed within two working days of the meeting.
- C. Attendance: Contractor, job superintendent, major subcontractors and suppliers; Owner's Representative, Engineer and others as appropriate to agenda topics for each meeting.

**1.06 PRE-INSTALLATION CONFERENCES**



- A. When required in individual specification Section, Contractor shall convene a pre-installation conference prior to commencing work of the Section.
- B. Require attendance of entities directly affecting, or affected by, work of the Section.
- C. Review conditions of installation, preparation and installation procedures, and coordination with related work.

END OF SECTION 01 1200



**SECTION 01 1300 - SUBMITTALS****PART 1 - GENERAL****1.00 GENERAL REFERENCE**

- A. The General Conditions, Supplementary General Conditions and Division 1 of these specifications are hereby included as part of this section.

**1.01 SECTION INCLUDES**

- A. Submittal procedures.
- B. Construction schedules.
- C. Proposed Products list.
- D. Shop drawings.
- E. Product data.
- F. Manufacturers' instructions.
- G. Manufacturers' certificates.
- H. Schedule of Values.
- I. Progress Reports
- J. Construction Cost Estimate

**1.02 GENERAL SUBMITTAL PROCEDURES**

- A. Schedule of Submittals
  - 1. Within 30 days after receiving a notice to proceed the contractor must submit to the Engineer, in duplicate, a schedule listing all items that must be furnished for review and approval by the Owner.
- B. Transmit each submittal with AIA Form G810 or Design Agent accepted form.
- C. Sequentially number the transmittal forms. Resubmittals to have original number



with an alphabetic suffix.

D. Contractor Review:

1. Review submittals prior to transmittal; determine and verify field measurements, field construction criteria, manufacturer's catalog numbers, and conformance of submittal with requirements of Contract Documents.
2. Coordinate submittals with requirements of Work and of Contract Documents.
3. Apply Contractor's stamp, signed or initialed certifying that review, verification of Products required, field dimensions, adjacent construction Work, and coordination of information, is in accordance with the requirements of the Work and Contract Documents.

E. Schedule submittals to expedite the Project.

1. Transmit submittals in accordance with approved Progress Schedule and in such sequence to avoid delay in the Work or work of other contracts. Failure to do so will not justify an extension in contract time.
2. Coordinate submittals into logical groupings to facilitate interrelation of the several items.

F. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.

G. Provide space for Contractor and Engineer review stamps.

H. Revise and resubmit submittals as required, identify all changes made since previous submittal. Failure to do so will be reason to reject submittal.

I. Distribute copies of reviewed submittals to concerned parties.

### 1.03 CONSTRUCTION SCHEDULES

A. The contractor is responsible for the scheduling of construction and must prepare a scheduling and charting system described below. This schedule is to ensure adequate planning and execution of the work by the contractor and to assist the Owner in appraising the reasonableness of the schedule and evaluating work progress.

B. General Requirements of Schedule

1. Submit initial schedule in duplicate within 10 days after date of Owner-Contractor Agreement for Design Agent review.



2. Revise, update and resubmit 3 copies with monthly requisition.

C. Format

1. Horizontal bar chart with separate line for each section of Work, identifying first work day of each week.
2. Indicate submittal dates required for shop drawings, product data, samples, and product delivery dates, including those furnished by Owner and under Allowances.
3. Provide legend for symbols and abbreviations used.
4. Major milestones must be indicated on the schedule, such as the Notice to Proceed date, 50 percent completion, substantial completion for liquidated damages purposes, and project completion. In addition, the schedule must indicate when utility connections are to be made, permits to be obtained, and all other internal or external activities that affect the work flow (including all activities of the Owner that affect progress and contract-required dates to be completed).

D. Coordinate contents with Schedule of Values.

E. Participate in joint review and evaluation of schedule.

F. After review, revise as necessary as result of review, and resubmit 6 copies within 10 days.

G. See General Conditions for additional requirements.

1.04 PROPOSED PRODUCTS LIST

- A. Within 10 days after date of Owner-Contractor Agreement, submit complete list of major products proposed for use, with name of manufacturer, trade name, and model number or each product.

1.05 SHOP DRAWINGS

- A. Submittal of shop drawings and related data must conform to the requirements of the general contract clauses and as specified in this section. The contractor must make any corrections required by the Architect. If the contractor considered any correction indicated on the drawings to constitute a change to the contract drawings or specifications, notice must be given to the Engineer. The approval of the drawings must not be construed as a complete check but indicates only that the general method



of construction and detailing is satisfactory. Approval of the shop drawings does not relieve the contractor of the responsibility for any error that may exist because the contractor is responsible for the dimensions and design of adequate connections and details and satisfactory construction of all work.

- B. Present in a clear and thorough manner. Title each drawing with Project name and number; identify each element of drawings by reference to sheet number and detail, schedule, or room number of Contract Documents.
- C. Identify field dimensions; show relation to adjacent or critical features or Work or products.
- D. Minimum Sheet Size: Multiples of 8-1/2 x 11 inches.
- E. Number and type of copies as follows:
  - 1. Submit reproducible transparency.
  - 2. Submit the number of opaque reproductions which Contractor requires, plus three copies which will be retained by Architect.
  - 3. After review, reproduce and distribute in accordance with Article on Procedures above and for Record Documents described in Section 01700 - Contract Close-Out.

#### 1.06 PRODUCT DATA

- A. Submit the number of copies which the Contractor requires, plus three copies which will be retained by the Engineer.
- B. Mark each copy of standard printed data to identify pertinent products, referenced to Specification Section and Article number. Show reference standards, performance characteristics, and capacities, wiring and piping diagrams and controls; component parts; finishes; dimensions; and required clearances.
- C. Modify manufacturer's standard schematic drawings and diagrams to supplement standard information and to provide information specifically applicable to the Work. Delete information not applicable.
- D. Supplement manufacturers' standard data to provide information unique to this Project.

#### 1.07 MANUFACTURER'S INSTRUCTIONS

- A. When specified in individual specification Sections, submit manufacturers' printed



instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, in quantities specified for Product Data.

- B. Identify conflicts between manufacturers' instructions and Contract Documents. Perform no work until conflict has been satisfactorily resolved.

#### 1.08 MANUFACTURER'S CERTIFICATES

- A. When specified in individual specification Sections, submit manufacturers' certificate for review, in quantities specified for Product Data. The contractor must review all certificates before submissions are made to ensure compliance with the contract specification requirements and to ensure that the affidavit is properly executed prior to submission to the contracting officer. Certification must not be construed as relieving the contractor from furnishing satisfactory material if, after tests are performed on selected samples, the material is found not to meet the specific requirements.
- B. Indicate material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

#### 1.09 SCHEDULE OF VALUES

- A. Requirements included:
  - 1. Contractor shall submit a schedule of values allocated to the various portions of the work, within twenty days after the award of contract.
- B. Form and Content of Schedule of Values
  - 1. Per General Conditions.
  - 2. Schedule shall list the installed value of the component parts, by phase, of the work in sufficient detail to serve as a basis for computing values for progress payments during construction
  - 3. For each major line item list sub-values of major products or operations under the item.
    - a. List all items that have a value of \$5,000 or more break out labor and material cost.
    - b. For items on which progress payments will be requested for stored materials, break down the value into:



1. The cost of the materials, delivered and unloaded.
2. The total installed value.
4. The sum of all values listed in the schedule shall equal the total contract sum.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

- A. Failure of Contractor to follow submittal requirements specified herein will serve as reason to reject the submittal, material, product or work in place.
- B. Performing any work, ordering or furnishing materials/products prior to review will serve as justification to reject and refusal to make payment of same.

END OF SECTION 01 1300



**SECTION 01 1400 – QUALITY CONTROL****PART 1 - GENERAL****1.00 GENERAL REFERENCE**

- A. The General Conditions, Supplementary General Conditions and Division 1 of these specifications are hereby included as part of this section.
- B. The contractor is responsible for the overall quality of all its own work and the work performed by the subcontractors working under this contract. The quality of any part of the work installed must not be less than that required by the contract documents. If the Engineer or Owner determines that the quality of work does not conform to the applicable specifications and drawings, the contractor will be advised in writing of the areas of nonconformance and within 7 days the contractor must correct the deficiencies and advise the Engineer and Owner in writing of the corrective action taken.

**1.01 SECTION INCLUDES**

- A. Quality assurance and control of installation.
- B. References.
- C. Field samples.
- D. Inspection and testing laboratory services.

**1.02 RELATED SECTIONS**

- A. Section 01300 - Submittals: Submission of Manufacturers' Instructions and Certificates.
- B. Section 01600 - Material and Equipment: Requirements for material and product quality.

**1.03 CONTRACTOR QUALITY ASSURANCE/CONTROL OF INSTALLATION**

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply fully with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Engineer before proceeding.
- D. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform work by persons qualified to produce workmanship of specified quality.
- F. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

**1.04 REFERENCES**

- A. Conform to reference standard by date of issue current on date of Contract



- Documents.
- B. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.
  - C. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

#### 1.05 INSPECTION AND TESTING LABORATORY SERVICES

- A. All inspection and testing services to be provided by Contractor and included in Base Bid costs.
- B. Limits of Testing Laboratory Authority
  - 1. Laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
  - 2. Laboratory may not approve or accept any portion of the Work.
  - 3. Laboratory may not assume any duties of Contractor.
  - 4. Laboratory has no authority to stop the Work.
- C. Contractor Responsibilities
  - 1. Deliver to laboratory at designated location, adequate samples of materials proposed to be used which require testing, along with proposed mix designs.
  - 2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturer's facilities.
  - 3. Provide incidental labor and facilities to provide access to Work to be tested, to obtain and handle samples at the site or at source of Products to be tested, to facilitate tests and inspections, storage and curing of test samples.

END OF SECTION 01 1400



**SECTION 01 1500 – CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS****PART 1 - GENERAL****1.00 GENERAL REFERENCE**

- A. The General Conditions, Supplementary General Conditions and Division 1 of these specifications are hereby included as part of this section.
- B. The contractor must provide all temporary facilities and services required to complete the work and to comply with OSHA and other applicable regulations.

**1.01 SCOPE OF WORK THIS SECTION**

- A. Temporary Utilities: Electricity, lighting, heat, ventilation, telephone service, water, fire protection and sanitary facilities.
- B. Temporary Controls: Barriers, enclosures and fencing, protection of the Work, water control and snow and ice control, dust control and hazards control. Maintenance of required means of egress from existing structure.
- C. Vendor is not allowed to put up a construction or project sign.

**1.02 RELATED SECTIONS**

- A. Section 01005 - Administrative Provisions.
- B. Section 01006 - Construction Phasing and Scheduling: Phasing and sequencing construction.
- C. Section 01700 - Contract Close-Out: Final cleaning.

**1.03 TEMPORARY ELECTRICITY**

- A. Connect to existing power service. Power consumption shall not disrupt Owner's need for continuous service.
- B. Provide temporary electric feeder from existing electrical service at location as directed.
- C. Owner will pay cost of energy used.
- D. Provide power outlets for construction operations, with branch wiring and distribution boxes located as required.



- E. Provide feeder switch at source distribution equipment.
- F. Permanent convenience receptacles may be utilized during construction work in the building.
- G. Provide all labor, materials and equipment required for installation of temporary electric lighting and power.
- H. Temporary power for hoisting, welding or compressor equipment shall be provided and paid for by the Contractor.
- I. Each subcontractor shall furnish all extension cords, sockets, lamps, motors, and accessories required for the execution of his work.
- J. Lighting fixtures, lamps, feeders, and branch circuit wiring as indicated on contract plans shall not be used for temporary lighting.
  - 1. Safety: The contractor must provide and maintain lights and signs to prevent damage or injury and must illuminate all hazardous areas. Safety lights must be kept burning from dusk to dawn, coordinate with RIDEM.
- K. At the end of the day's work, close all lights and power other than the minimum required for exterior security lights.
- L. During construction the Contractor shall maintain the existing electrical system in operating condition in all areas. Contractor shall furnish and pay for all labor and materials required to maintain this system in a full operating condition.

#### 1.04 TEMPORARY SANITARY FACILITIES

- A. Vendor to provide port-a-johns.

#### 1.05 BARRIERS AND BARRICADES

- A. Provide and maintain barriers to prevent unauthorized entry to construction areas, to allow for the continued uninterrupted use of existing buildings and sites, to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by governing authorities for public access and use of existing buildings.
- C. Provide barriers to protect non-owned vehicular traffic, stored materials, site and



structures from damage.

- D. Provide guardrails, barricades, handrails, and covers for floor, roof, and wall openings.
- E. Comply with OSHA with regard to standards and requirements for guardrails, openings and stairways.

#### 1.06 PROTECTION OF INSTALLED WORK

- A. Protect installed Work and provide special protection where specified in individual specification Sections.
- B. Provide temporary and removable protection for installed Products. Control activity in immediate work area to minimize damage.
- C. Prohibit traffic from onsite wastewater treatment systems and landscaped areas.

#### 1.07 SECURITY

- A. Provide security and facilities to protect Work from unauthorized entry, vandalism, or theft.
- B. Contractor shall keep all unauthorized visitors off construction site by such legal/approved means as they selects.

#### 1.08 STORAGE AREAS

- A. Construction material storage, offices, shops, etc. shall be located as directed and assigned by the Owner. Contractor shall relocate any material storage areas, temporary trailers, etc., as required during work execution.

#### 1.09 PROGRESS CLEANING AND JANITORIAL SERVICES

- A. The contractor must furnish janitorial services for the project site and must perform any required maintenance of facilities and grounds deemed necessary by the Owner's Representative during the entire term of the contract. Services must be performed at such a time and in such a manner as to least interfere with the operations. Services must be performed to the satisfaction of the Owner's Representative. The contractor must provide daily trash collection and cleanup of the buildings and adjacent outside areas, and disposal of all discarded debris, aggregate samples and concrete test samples in a manner approved by the Owner's Representative. No separate payment may be made for these contractor- furnished services; all costs are incidental to the contract.
- B. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.



- C. Maintain premises and properties free from accumulation of waste, debris and rubbish caused by operations.
- D. Collect and deposit debris in such collation facilities.
- E. Remove all debris from the job site on a regular basis. Do not allow trash and debris to accumulate or remain on the site for longer than 7 days.

#### 1.10 TEMPORARY FIRE PROTECTION

- A. The Contractor shall provide and maintain in good operating condition suitable and adequate fire protection equipment and services and shall comply with all reasonable recommendations regarding fire protection made by the Owner's Representatives or by the local fire chief or fire marshal.

#### 1.11 HOISTING FACILITIES

- A. Provide hoisting facilities as required for the vertical movement of all materials.
- B. Comply with OSHA for all hoists, conveyers, and elevators and maintain the facilities in compliance with the law.

#### 1.12 TEMPORARY CONTROLS

##### A. Dust Control

- 1. The contractor must keep all work areas within or outside the project boundaries free from the dust that would cause the standards of air pollution to be exceeded or that would cause a hazard or nuisance to others. Dust must be controlled as the work proceeds and whenever a dust nuisance or hazard occurs. No separate or direct payment is made for dust control, and its cost is considered incidental to and included in the contract price.

##### B. Hazards Control

- 1. Store volatile wastes in covered metal containers and remove from premises daily.
- 2. Prevent accumulation of wastes which create hazardous conditions.
- 3. Provide adequate ventilation during use of volatile or noxious substances.

##### C. Cleaning and Disposal

- 1. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.



2. Do not burn or bury rubbish and waste materials on project site.
3. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drain.
4. Do not dispose of wastes into streams or waterways.
5. Maintain cleaning until project, or portion thereof, is occupied by Owner.

D. Parking

1. All contractor employees and subs shall park in an area designated by the Owner.

PART 2 PRODUCTS - NOT USED

END OF SECTION 01 1500







**SECTION 01 2200 – UNIT PRICES****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. List of unit prices, for use in preparing Bids.
- B. Measurement and payment criteria applicable to Work performed under a unit price payment method.

**1.02 RELATED REQUIREMENTS**

Section 01 2000 - Price and Payment Procedures: Additional payment and modification procedures.

**1.03 COSTS INCLUDED**

- A. Unit Prices included on the Bid Form shall include full compensation for all required labor, products, tools, equipment, plant, transportation, services and incidentals; erection, application or installation of an item of the Work; overhead and profit.

**1.04 UNIT QUANTITIES SPECIFIED**

- A. Quantities indicated in the Bid Form are for bidding and contract purposes only. Quantities and measurements of actual Work will determine the payment amount.

**1.05 MEASUREMENT OF QUANTITIES**

- A. Take all measurements and compute quantities. Measurements and quantities will be verified by Owner.
- B. Assist by providing necessary equipment, workers, and survey personnel as required.

**1.06 PAYMENT**

- A. Payment for Work governed by unit prices will be made on the basis of the actual measurements and quantities of Work that is incorporated in or made necessary by the Work and accepted by the Architect, multiplied by the unit price.
- B. Payment will not be made for any of the following:
  - 1. Products wasted or disposed of in a manner that is not acceptable.
  - 2. Products determined as unacceptable before or after placement.

**1.07 SCHEDULE OF UNIT PRICES**

- A. Item: Bedrock and Boulder Removal.
  - 1. The Contractor and Subcontractors shall note that the unit costs presented below are for materials that be encountered during the project work not part of the original Base Bid Price that affects the work issued by changes in scope of work,



or otherwise clearly not part of the original scope of work. These materials include bedrock, boulder removal/disposal, and the removal of debris such as a tree stump.

Quantity classification delineated below shall be determined based on the scope of work being performed and may be considered cumulative for work that is being performed in localized areas of the project, and/or project wide depending on the circumstances and/or phase of work underway. The Contractor and Owner shall review the status of work underway and mutually agree on the unit costs to be carried as the project progresses and shall adjust the unit cost accordingly based on the overall work effort undertaken and determination that multiple mobilizations and/or unique and/or separate set up efforts were required to perform the work.

| Unit Price Number | Description of Service   |
|-------------------|--|
| 1                 | <b>Ledge/Rock Removal and Disposal with Hammer</b>                                       |
| 2                 | 0-1500 CY per Cubic Yard<br>1500 cy and Above per Cubic Yard                             |
| 3                 | <b>Boulder Removal</b><br>Excavate, Load and Haul Boulders Less than 1 CY per Cubic Yard |
| 4                 | Excavate, Load and Haul Boulders Greater than 1 CY and Less than 3 CY per Cubic Yard     |

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION



**SECTION 03 3000 - CAST-IN-PLACE CONCRETE****PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:
  - 1. Footings.
  - 2. Foundation walls.
  - 3. Slabs-on-grade.
  - 4. Concrete toppings.

**1.3 DEFINITIONS**

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

**1.4 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
  - 1. Indicate amounts of mixing water to be withheld for later addition at Project site.
- C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
- D. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
- E. Samples: For waterstops and vapor retarder.



## 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer, manufacturer, and testing agency.
- B. Welding certificates.
- C. Material Certificates: For each of the following, signed by manufacturers:
  - 1. Cementitious materials.
  - 2. Admixtures.
  - 3. Form materials and form-release agents.
  - 4. Steel reinforcement and accessories.
  - 5. Fiber reinforcement.
  - 6. Waterstops.
  - 7. Curing compounds.
  - 8. Floor and slab treatments.
  - 9. Bonding agents.
  - 10. Adhesives.
  - 11. Vapor retarders.
  - 12. Semirigid joint filler.
  - 13. Joint-filler strips.
  - 14. Repair materials.
- D. Material Test Reports: From a qualified testing agency indicating compliance with requirements.
- E. Floor surface flatness and levelness measurements indicating compliance with specified tolerances.
- F. Field quality-control reports.
- G. Minutes of preinstallation conference.

## 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
- B. 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.
  - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- C. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.



1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
  2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.
- D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
- E. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D 1.4M, "Structural Welding Code - Reinforcing Steel."
- F. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
1. ACI 301, "Specifications for Structural Concrete."
  2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
- G. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.
- H. Preinstallation Conference: Conduct conference at Project site.
1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
    - a. Contractor's superintendent.
    - b. Independent testing agency responsible for concrete design mixtures.
    - c. Ready-mix concrete manufacturer.
    - d. Concrete subcontractor.
    - e. Special concrete finish subcontractor.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

## PART 2 - PRODUCTS

### 2.1 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
1. Plywood, metal, or other approved panel materials.



2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
  - a. High-density overlay, Class 1 or better.
  - b. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.
  - c. Structural 1, B-B or better; mill oiled and edge sealed.
  - d. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch (19 by 19 mm), minimum.
- D. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
- E. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
  1. Furnish units that will leave no corrodible metal closer than 1 inch (25 mm) to the plane of exposed concrete surface.
  2. Furnish ties that, when removed, will leave holes no larger than 1 inch (25 mm) in diameter in concrete surface.

## 2.2 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- B. Epoxy-Coated Reinforcing Bars: Deformed bars, ASTM A 775/A 775M, epoxy coated, with less than 2 percent damaged coating in each 12-inch (300-mm) bar length.
- C. Plain-Steel Wire: ASTM A 82/A 82M.
- D. Deformed-Steel Wire: ASTM A 496/A 496M.
- E. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, plain, steel wire into flat sheets.
- F. Deformed-Steel Welded Wire Reinforcement: ASTM A 497/A 497M, flat sheet.

## 2.3 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), plain-steel bars, cut true to length with ends square and free of burrs.



- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.
  2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.
  3. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.

## 2.4 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
1. Portland Cement: ASTM C 150, Type I, Type II.
    - a. Fly Ash: ASTM C 618, Class F or C.
- B. Normal-Weight Aggregates: ASTM C 33, coarse aggregate or better, graded. Provide aggregates from a single source.
- C. Water: ASTM C 94/C 94M and potable.

## 2.5 ADMIXTURES

- A. Air-Entraining Admixture: ASTM C 260.
- B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will 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.

## 2.6 VAPOR RETARDERS

- A. Sheet Vapor Retarder: ASTM E 1745, Class B. Include manufacturer's recommended adhesive or pressure-sensitive tape.



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. Fortifiber Building Systems Group; Moistop Ultra 6.
  - b. Raven Industries Inc.; Griffolyn.
  - c. Stego Industries, LLC; Stego Wrap, 10 mil Class A.
- B. Sheet Vapor Retarder: Polyethylene sheet, ASTM D 4397, not less than 10 mils (0.25 mm) thick.
- C. Bituminous Vapor Retarder: 110-mil- (2.8-mm-) thick, semiflexible, 7-ply sheet membrane consisting of reinforced core and carrier sheet with fortified asphalt layers, protective weathercoating, and removable plastic release liner. Furnish manufacturer's accessories including bonding asphalt, pointing mastics, and self-adhering joint tape.
  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. Meadows, W. R., Inc.; Premoulded Membrane Vapor Seal.
  2. Water-Vapor Permeance: 0.00 grains/h x sq. ft. x inches Hg (0.00 ng/Pa x s x sq. m); ASTM E 154.
  3. Tensile Strength: 140 lbf/inch (24.5 kN/m); ASTM E 154.
  4. Puncture Resistance: 90 lbf (400N); ASTM E 154.
- D. Granular Fill: Clean mixture of crushed stone or crushed or uncrushed gravel; ASTM D 448, Size 57, with 100 percent passing a 1-1/2-inch (37.5-mm) sieve and 0 to 5 percent passing a No. 8 (2.36-mm) sieve.
- E. Fine-Graded Granular Material: Clean mixture of crushed stone, crushed gravel, and manufactured or natural sand; ASTM D 448, Size 10, with 100 percent passing a 3/8-inch (9.5-mm) sieve, 10 to 30 percent passing a No. 100 (0.15-mm) sieve, and at least 5 percent passing No. 200 (0.075-mm) sieve; complying with deleterious substance limits of ASTM C 33 for fine aggregates.

## 2.7 FLOOR AND SLAB TREATMENTS

- A. Slip-Resistive Emery Aggregate Finish: Factory-graded, packaged, rustproof, nonglazing, abrasive, crushed emery aggregate containing not less than 50 percent aluminum oxide and not less than 20 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials.
  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. Anti-Hydro International, Inc.; Emery.
    - b. Dayton Superior Corporation; Emery Tuff Non-Slip.
    - c. Lambert Corporation; EMAG-20.
    - d. L&M Construction Chemicals, Inc.; Grip It.
    - e. Metalcrete Industries; Metco Anti-Skid Aggregate.



## 2.8 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
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. Axim Italcementi Group, Inc.; CATExOL CimFilm.
  - b. BASF Construction Chemicals - Building Systems; Confilm.
  - c. ChemMasters; SprayFilm.
  - d. Conspec by Dayton Superior; Aquafilm.
  - e. Dayton Superior Corporation; Sure Film (J-74).
  - f. Edoco by Dayton Superior; BurkeFilm.
  - g. Euclid Chemical Company (The), an RPM company; Eucobar.
  - h. Kaufman Products, Inc.; Vapor-Aid.
  - i. Lambert Corporation; LAMBCO Skin.
  - j. L&M Construction Chemicals, Inc.; E-CON.
  - k. Meadows, W. R., Inc.; EVAPRE.
  - l. Metalcrete Industries; Waterhold.
  - m. Nox-Crete Products Group; MONOFILM.
  - n. Sika Corporation; SikaFilm.
  - o. SpecChem, LLC; Spec Film.
  - p. Symons by Dayton Superior; Finishing Aid.
  - q. TK Products, Division of Sierra Corporation; TK-2120 TRI-FILM.
  - r. Unitex; PRO-FILM.
  - s. Vexcon Chemicals, Inc.; Certi-Vex Envio Set.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.
- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.
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. Anti-Hydro International, Inc.; AH Curing Compound #2 DR WB.
  - b. BASF Construction Chemicals - Building Systems; Kure 200.
  - c. ChemMasters; Safe-Cure Clear.
  - d. Conspec by Dayton Superior; W.B. Resin Cure.
  - e. Dayton Superior Corporation; Day-Chem Rez Cure (J-11-W).
  - f. Edoco by Dayton Superior; Res X Cure WB.
  - g. Euclid Chemical Company (The), an RPM company; Kurez W VOX; TAMMSCURE WB 30C.
  - h. Kaufman Products, Inc.; Thinfilm 420.



- i. Lambert Corporation; AQUA KURE - CLEAR.
- j. L&M Construction Chemicals, Inc.; L&M Cure R.
- k. Meadows, W. R., Inc.; 1100-CLEAR.
- l. Nox-Crete Products Group; Resin Cure E.
- m. Right Pointe; Clear Water Resin.
- n. SpecChem, LLC; Spec Rez Clear.
- o. Symons by Dayton Superior; Resi-Chem Clear.
- p. TK Products, Division of Sierra Corporation; TK-2519 DC WB.
- q. Vexcon Chemicals, Inc.; Certi-Vex Enviocure 100.

## 2.9 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.
- B. Bonding Agent: ASTM C 1059/C 1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- C. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:
- D. Reglets: Fabricate reglets of not less than 0.022-inch- (0.55-mm-) thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.
- E. Dovetail Anchor Slots: Hot-dip galvanized-steel sheet, not less than 0.034 inch (0.85 mm) thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

## 2.10 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3.2 mm) and that can be feathered at edges to match adjacent floor elevations.

## 2.11 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
  - 1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than Portland cement in concrete as follows:
  - 1. Fly Ash: 25 percent.



- C. Admixtures: Use admixtures according to manufacturer's written instructions.
1. Use water-reducing, high-range water-reducing, or plasticizing admixture in concrete, as required, for placement and workability.
  2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
  3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
  4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

## 2.12 PROPORTIONING AND DESIGN OF MIXES

- A. The design of the exact proportions for the mix, including amounts of admixtures and water to meet all specification requirements shall be the responsibility of the concrete supplier.
- B. Submit written reports to Architect of each proposed mix for each class of concrete at least 30 days prior to start of work. Do not begin concrete production until proposed mix designs have been reviewed by Architect.
- C. Design mixes to provide normal weight concrete with the following properties, as indicated on drawings and schedules:
1. 4000-psi, 28-day compressive strength, maximum size of aggregate as specified below, minimum cement content 611 pounds per cubic yard.
    - a. Foundations and Walls: 1-1/2" maximum aggregate size.
    - b. Slabs: 3/4" maximum aggregate size.
  2. 3500-psi, 28-day compressive strength, 3/4" maximum size of aggregate, 540 pounds per cubic yard minimum cement content.
  3. 3000-psi, 28-day compressive strength, 1-1/2" maximum size of aggregate, 470 pounds per cubic yard minimum cement content.
- D. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, as accepted by Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Architect before using in work.

## 2.13 ADMIXTURES

- A. Use mid-range or high-range water-reducing admixture (Superplasticizer) in concrete as required for placement and workability.
1. Use mid-range water-reducing admixture in pumped concrete, concrete for slabs, and concrete with water/cement ration of 0.50 or less.
  2. Use high-range water-reducing admixture in concrete required to be watertight and concrete with water/cement ratio of 0.40 or less.



- B. Use nonchloride accelerating admixture in concrete slabs placed at ambient temperatures below 50°F (10°C).
- C. Use air-entraining admixture in exterior exposed concrete unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content of 4.5 to 6.5 percent. Interior slabs shall have a maximum air content of 3 percent.
- D. Use corrosion inhibitor admixture in the elevated slab concrete. Add admixture at the manufacturer's recommended rate of 3 gal./yd.
- E. Use admixtures for water reduction and set control in strict compliance with manufacturer's directions.
- F. Water-Cement Ratio: Provide concrete for following conditions with maximum water-cement (W/C) ratios as follows:
  - 1. Reinforced concrete subjected to brackish water, salt spray, deicers, or to be watertight, W/C 0.40.
  - 2. Subjected to freezing and thawing, W/C 0.45.
  - 3. All other concrete, W/C 0.50.
- G. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:
  - 1. Ramps, slabs, and sloping surfaces: Not more than 3 inches.
  - 2. Reinforced foundation systems: Not less than 1 inch and not more than 3 inches.
  - 3. Concrete containing plant-added mid-range water reducing admixture: 4-inch to 6-inch slump at time of arrival at the site.
  - 4. Concrete containing high-range, water-reducing admixture (Superplasticizer): Not more than 8 inches after addition of high-range, water-reducing to site-verified 2-inch to 3-inch slump concrete. Concrete containing plant added high-range, water-reducing admixture shall arrive at the site with a 5-inch to 8-inch slump.
  - 5. Other concrete: Not more than 4 inches.

## 2.14 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

## 2.15 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116M and furnish batch ticket information.



## PART 3 - EXECUTION

### 3.1 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Construct forms tight enough to prevent loss of concrete mortar.
- D. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
  - 1. Install keyways, reglets, recesses, and the like, for easy removal.
  - 2. Do not use rust-stained steel form-facing material.
- E. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- F. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- G. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- H. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- I. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- J. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

### 3.2 EMBEDDED ITEMS

- 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.



1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
3. Install dovetail anchor slots in concrete structures as indicated.

### 3.3 REMOVING AND REUSING FORMS

- A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 48 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations and curing and protection operations need to be maintained.
  1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
  2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

### 3.4 VAPOR RETARDERS

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.
  1. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.
- B. Bituminous Vapor Retarders: Place, protect, and repair bituminous vapor retarder according to manufacturer's written instructions.
- C. Granular Course: Cover vapor retarder with granular fill, fine-graded granular material, moisten, and compact with mechanical equipment to elevation tolerances of plus 0 inch (0 mm) or minus 3/4 inch (19 mm).
  1. Place and compact a 1/2-inch- (13-mm-) thick layer of fine-graded granular material over granular fill.



### 3.5 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
  - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
  - 1. Weld reinforcing bars according to AWS D1.4/D 1.4M, where indicated.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

### 3.6 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
  - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
  - 2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.
  - 3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
  - 4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
  - 5. Space vertical joints in walls. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
  - 6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
  - 7. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. 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 of concrete thickness as follows:



1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch (3.2 mm). Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
  2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3.2-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
- D. 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.
  2. Terminate full-width joint-filler strips not less than 1/2 inch (13 mm) or more than 1 inch (25 mm) below finished concrete surface where joint sealants, specified in Division 07 Section "Joint Sealants," are indicated.
  3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
- E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

### 3.7 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.
- C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
  2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
  3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration



to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

- E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
  - 1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
  - 2. Maintain reinforcement in position on chairs during concrete placement.
  - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
  - 4. Slope surfaces uniformly to drains where required.
  - 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- F. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
  - 1. When average high and low temperature is expected to fall below 40 deg F (4.4 deg C) for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
  - 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
  - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- G. Hot-Weather Placement: Comply with ACI 301 and as follows:
  - 1. Maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
  - 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

### 3.8 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 that exceed specified limits on formed-surface irregularities.
- 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 defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
- C. 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.

### 3.9 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch (6 mm) in one direction.
- C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraighening until surface is left with a uniform, smooth, granular texture.
- D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
  - 1. Finish surfaces to the following tolerances, according to ASTM E 1155 (ASTM E 1155M), for a randomly trafficked floor surface:
    - a. Specified overall values of flatness, F(F) 25; and of levelness, F(L) 20; with minimum local values of flatness, F(F) 17; and of levelness, F(L) 15.
    - b. Specified overall values of flatness, F(F) 35; and of levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 17; for slabs-on-grade.
    - c. Specified overall values of flatness, F(F) 30; and of levelness, F(L) 20; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 15; for suspended slabs.
    - d. Specified overall values of flatness, F(F) 45; and of levelness, F(L) 35; with minimum local values of flatness, F(F) 30; and of levelness, F(L) 24.
  - 2. Finish and measure surface so gap at any point between concrete surface and an unveled, freestanding, 10-ft.- (3.05-m-) long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/8 inch (3.2 mm).
- E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set method. While concrete is still plastic, slightly scarify surface with a fine broom.
  - 1. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.
- F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.



1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.
- G. Slip-Resistive Finish: Before final floating, apply slip-resistive finish where indicated and to concrete stair treads, platforms, and ramps.
- H. Dry-Shake Floor Hardener Finish: After initial floating, apply dry-shake floor hardener to surfaces according to manufacturer's written instructions.

### 3.10 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.
- D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel finish concrete surfaces.

### 3.11 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 ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m 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. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. Cure concrete according to ACI 308.1, 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 (300-mm) 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 (300 mm), 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.
  - a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
  - b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
  - c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project.
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.
  - a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer.
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.

### 3.12 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches (50 mm) deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.



### 3.13 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part Portland cement to two and one-half parts fine aggregate passing a No. 16 (1.18-mm) sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
  - 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch (13 mm) in any dimension to solid concrete. Limit cut depth to 3/4 inch (19 mm). Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
  - 2. Repair defects on surfaces exposed to view by blending white Portland cement and standard Portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
  - 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
  - 1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
  - 2. After concrete has cured at least 14 days, correct high areas by grinding.
  - 3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
  - 4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
  - 5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch (6 mm) to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
  - 6. Repair defective areas, except random cracks and single holes 1 inch (25 mm) or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch (19-mm)



clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

7. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
  - F. Repair materials and installation not specified above may be used, subject to Architect's approval.

### 3.14 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Inspections:
  1. Steel reinforcement placement.
  2. Verification of use of required design mixture.
  3. Concrete placement, including conveying and depositing.
  4. Curing procedures and maintenance of curing temperature.
- C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
  1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.
    - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
  2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
  3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
  4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.



5. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
6. Compression Test Specimens: ASTM C 31/C 31M.
  - a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
  - b. Cast and field cure two sets of two standard cylinder specimens for each composite sample.
7. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
  - a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
  - b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
8. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
9. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).
10. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
11. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
12. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
13. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
14. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

END OF SECTION 03 3000







**SECTION 04 2200 - CONCRETE UNIT MASONRY****PART 1 - GENERAL****1.1 SUMMARY****A. Section Includes:**

1. Concrete Masonry Units (CMU's).
2. Steel reinforcing bars.

**1.2 PRECONSTRUCTION TESTING****A. Preconstruction Testing Service:** Owner will engage a qualified independent testing agency to perform preconstruction testing indicated below. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.

1. Concrete Masonry Unit Test: For each type of unit required, according to ASTM C 140 for compressive strength.
2. Mortar Test (Property Specification): For each mix required, according to ASTM C 780 for compressive strength.
3. Grout Test (Compressive Strength): For each mix required, according to ASTM C 1019.

**1.3 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.**1.4 INFORMATIONAL SUBMITTALS****A. Material Certificates:** For each type and size of product indicated. For masonry units include data on material properties and material test reports substantiating compliance with requirements.**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.



## 1.5 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 Division 01 Section "Quality Requirements" for mockups.

## 1.6 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.

### 2.2 CONCRETE MASONRY UNITS

- A. Regional Materials: CMUs shall be manufactured within 500 miles (800 km) of Project site from aggregates and cement that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles (800 km) of Project site.
- B. Shapes: Provide shapes indicated and for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
- C. Integral Water Repellent: Provide units made with liquid polymeric, integral water repellent admixture that does not reduce flexural bond strength.
  - 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.
- D. CMUs: ASTM C 90.



1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2800 psi (19.3 MPa).
2. Density Classification: Normal weight.

## 2.3 MASONRY LINTELS

- A. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs with reinforcing bars placed as indicated and filled with coarse grout.

## 2.4 MORTAR AND GROUT MATERIALS

- A. Regional Materials: Aggregate for mortar and grout shall be extracted, harvested, or recovered, as well as manufactured, within 500 miles (800 km) of Project site.
- B. 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.
- C. Hydrated Lime: ASTM C 207, Type S.
- D. Portland Cement-Lime Mix: Packaged blend of Portland cement and hydrated lime containing no other ingredients.
- E. Masonry Cement: ASTM C 91.
  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. Capital Materials Corporation; Flamingo Color Masonry Cement.
    - b. Cemex S.A.B. de C.V.
    - c. Essroc, Italcementi Group.
    - d. Holcim (US) Inc.
    - e. Lafarge North America Inc.
    - f. Lehigh Cement Company.
    - g. National Cement Company, Inc.; Coosa Masonry Cement.
- F. Mortar Cement: ASTM C 1329.
  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. Lafarge North America Inc.
- G. Aggregate for Grout: ASTM C 404.
- H. 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.
- I. 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.
- J. Water: Potable.

## 2.5 REINFORCEMENT

- A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60 (Grade 420).
- B. Masonry Joint Reinforcement, General: ASTM A 951/A 951M.
  1. Interior Walls: Hot-dip galvanized, carbon steel.
  2. Exterior Walls: Hot-dip galvanized, carbon stainless steel.
  3. Wire Size for Side Rods: 0.187-inch (4.76-mm) diameter.
  4. Wire Size for Cross Rods: 0.187-inch (4.76-mm) diameter.
  5. Wire Size for Veneer Ties: 0.187-inch (4.76-mm) diameter.

## 2.6 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.
- B. Adjustable Anchors for Connecting to Concrete: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
  1. Connector Section: Dovetail tabs for inserting into dovetail slots in concrete and attached to tie section; formed from 0.05-inch- (2.66-mm-) thick, steel sheet, galvanized after fabrication.



2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch (25 mm) of masonry face, made from 0.25-inch- (6.35-mm-) diameter, hot-dip galvanized steel wire.
  3. Corrugated Metal Ties: Metal strips not less than 7/8 inch (22 mm) wide with corrugations having a wavelength of 0.3 to 0.5 inch (7.6 to 12.7 mm) and an amplitude of 0.06 to 0.10 inch (1.5 to 2.5 mm) made from 0.075-inch- (1.90-mm-) thick, steel sheet, galvanized after fabrication with dovetail tabs for inserting into dovetail slots in concrete and sized to extend to within 1 inch (25 mm) of masonry face.
- C. Partition Top Anchors: 0.105-inch- (2.66-mm-) thick metal plate with 3/8-inch- (9.5-mm-) diameter metal rod 6 inches (152 mm) long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication.
- D. Rigid Anchors: Fabricate from steel bars 1-1/2 inches (38 mm) wide by 1/4 inch (6.35 mm) thick by 24 inches (610 mm) long, with ends turned up 2 inches (51 mm) or with cross pins unless otherwise indicated.
1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A 153/A 153M.
- E. Anchor Bolts: Headed or L-shaped steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153/A 153M, Class C; of dimensions indicated.

## 2.7 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; formulated from neoprene urethane or PVC.
- B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 or PVC, complying with ASTM D 2287, Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
- C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

## 2.8 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, masonry cement, or mortar cement mortar unless otherwise indicated.
  3. For exterior masonry, use Portland cement-lime, masonry cement or mortar cement mortar.



4. For reinforced masonry, use Portland cement-lime, masonry cement, or mortar cement mortar.
  5. 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.
1. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.
  2. For interior non-load-bearing partitions, Type O may be used instead of Type N.
- D. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.
- E. 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 (14 MPa).
  3. Provide grout with a slump of 8 to 11 inches (203 to 279 mm) 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 (12 mm) or minus 1/4 inch (6 mm).
2. For location of elements in plan do not vary from that indicated by more than plus or minus 1/2 inch (12 mm).
3. For location of elements in elevation do not vary from that indicated by more than plus or minus 1/4 inch (6 mm) in a story height or 1/2 inch (12 mm) 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 (6 mm in 3 m), or 1/2 inch (12 mm) 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 (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.



3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2 inch (12 mm) 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 (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.
5. For lines and surfaces do not vary from straight by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2 inch (12 mm) maximum.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm), with a maximum thickness limited to 1/2 inch (12 mm).
2. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch (9 mm) or minus 1/4 inch (6 mm).
3. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm).

### 3.2 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- C. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less than nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.
- D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- E. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- F. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.
- G. Fill cores in hollow CMUs with grout 24 inches (600 mm) under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

### 3.3 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.

### 3.4 MASONRY JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch (16 mm) on exterior side of walls, 1/2 inch (13 mm) elsewhere. Lap reinforcement a minimum of 6 inches (150 mm).
1. Space reinforcement not more than 16 inches (406 mm) o.c.
  2. Provide reinforcement not more than 8 inches (203 mm) above and below wall openings and extending 12 inches (305 mm) beyond openings in addition to continuous reinforcement.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.

### 3.5 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

- A. Anchor masonry to structural steel and concrete where masonry abuts or faces structural steel or concrete to comply with the following:
1. Provide an open space not less than 1 inch (25 mm) wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
  2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
  3. Space anchors as indicated, but not more than 24 inches (610 mm) o.c. vertically and 36 inches (915 mm) o.c. horizontally.

### 3.6 FLASHING

- A. General: Install embedded flashing in masonry at lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.



B. Install flashing as follows unless otherwise indicated:

1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
2. At lintels, extend flashing a minimum of 6 inches (150 mm) into masonry at each end. At heads and sills, extend flashing 6 inches (150 mm) at ends and turn up not less than 2 inches (50 mm) to form end dams.
3. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch (13 mm) back from outside face of wall and adhere flexible flashing to top of metal drip edge.
4. Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch (13 mm) back from outside face of wall and adhere flexible flashing to top of metal flashing termination.

C. Install single-wythe CMU flashing system in bed joints of CMU walls where indicated to comply with manufacturer's written instructions. Install CMU cell pans with upturned edges located below face shells and webs of CMUs above and with weep spouts aligned with face of wall. Install CMU web covers so that they cover upturned edges of CMU cell pans at CMU webs and extend from face shell to face shell.

### 3.7 REINFORCED UNIT MASONRY INSTALLATION

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.

1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.

B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
2. Limit height of vertical grout pours to not more than 60 inches (1520 mm).

### 3.8 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to



perform tests and inspections. Retesting of materials that fail to meet specified requirements shall be done at Contractor's expense.

- B. Testing Prior to Construction: One set of tests.
- C. Testing Frequency: One set of tests for each 5000 sq. ft. (464 sq. m) of wall area or portion thereof.
- D. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.
- E. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.
- F. Mortar Test (Property Specification): For each mix provided, according to ASTM C 780.
- G. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.

### 3.9 PARGING

- A. Parge exterior faces of below-grade masonry walls, where indicated, in 2 uniform coats to a total thickness of 3/4 inch (19 mm).
- B. Use a steel-trowel finish to produce a smooth, flat, dense surface. Form a wash at top of parging and a cove at bottom.
- C. Damp-cure parging for at least 24 hours and protect parging until cured.

### 3.10 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.

### 3.11 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 (450 mm) 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 042200







**SECTION 04 2200 - CONCRETE UNIT MASONRY****PART 1 - GENERAL****1.1 SUMMARY****A. Section Includes:**

1. Concrete masonry units.
2. Decorative concrete masonry units.
3. Pre-faced concrete masonry units.
4. Steel reinforcing bars.

**1.2 DEFINITIONS**

- A. CMU(s): Concrete masonry unit(s).
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

**1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Shop Drawings: For reinforcing steel. Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315.
- C. Samples: For each type and color of the following:
  1. Exposed CMUs.
  2. Epoxy coated CMUs.
  3. Mortar.

**1.4 INFORMATIONAL SUBMITTALS**

- A. Material Certificates: For each type and size of product. For masonry units, include material test reports substantiating compliance with requirements.
- 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 in accordance with ASTM C109/C109M for compressive strength, ASTM C1506 for water retention, and ASTM C91/C91M for air content.
  2. Include test reports, in accordance with ASTM C1019, for grout mixes required to comply with compressive strength requirement.



## 1.5 QUALITY ASSURANCE

- A. Sample Panels: Build sample panels to verify selections made under Sample submittals and to demonstrate aesthetic effects. Comply with requirements in Section 014000 "Quality Requirements" for mockups.
  - 1. Build sample panels for typical exterior and interior walls in sizes approximately 48 inches x 60 inches long by 36 inches high by full thickness.

## 1.6 FIELD 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 TMS 602/ACI 530.1/ASCE 6.
- B. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

## PART 2 - PRODUCTS

### 2.1 UNIT MASONRY, GENERAL

- A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6, except as modified by requirements in the Contract Documents.
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work.
- C. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.

### 2.2 CONCRETE MASONRY UNITS

- A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
  - 1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
- B. Integral Water Repellent: Provide units made with integral water repellent at all exposed shower stall walls.
- C. CMUs: ASTM C90.
  - 1. Density Classification: Normal weight unless otherwise indicated.
- D. Concrete Building Brick: ASTM C55.



1. Density Classification: Normal weight

- a. Stack Bond Pattern (also known as soldier course pattern), natural face finish.. The use of stack bond layup facilitates insertion of plumbing and conduit within the wall.

- E. Concrete Lintels: ASTM C1623, matching CMUs in color, texture, and density classification; and with reinforcing bars indicated. Provide lintels with net-area compressive strength not less than that of CMUs.

2.3 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C150/C150M, 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 C207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- D. Masonry Cement: ASTM C91/C91M.
- E. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C979/C979M. Use only pigments with a record of satisfactory performance in masonry mortar.
- F. Aggregate for Mortar: ASTM C144.
1. White-Mortar Aggregates: Natural white sand or crushed white stone.
2. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- G. Aggregate for Grout: ASTM C404.
- H. Cold-Weather Admixture: Non-chloride, noncorrosive, accelerating admixture complying with ASTM C494/C494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
- I. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs containing integral water repellent from same manufacturer.
- J. Water: Potable.

2.4 REINFORCEMENT

- A. Galvanized Steel Reinforcing Bars: ASTM A615/A615M or ASTM A996/A996M,



- B. Reinforcing Bar Positioners: Galvanized Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from **0.148-inch** steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.
- C. Masonry-Joint Reinforcement, General: ASTM A951/A951M.
  - 1. Interior Walls: Hot-dip galvanized, carbon steel.
  - 2. Exterior Walls: Hot-dip galvanized carbon steel.
  - 3. Wire Size for Side Rods: **0.148-inch** diameter.
  - 4. Wire Size for Cross Rods: **0.148-inch** diameter.
  - 5. Spacing of Cross Rods: Not more than **16 inches** o.c.
  - 6. Provide in lengths of not less than **10 feet** with prefabricated corner and tee units.

## 2.5 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 A82/A82M, with ASTM A153/A153M, Class B-2 coating.
  - 2. Steel Sheet, Galvanized after Fabrication: ASTM A1008/A1008M, Commercial Steel, with ASTM A153/A153M, Class B coating.
  - 3. Galvanized Steel Plates, Shapes, and Bars: ASTM A36/A36M.
- B. Adjustable Anchors for Connecting to Structural Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
  - 1. Tie Section: Triangular-shaped wire tie made from **0.187-inch** diameter, hot-dip galvanized-steel wire.
- C. Adjustable Anchors for Connecting to Concrete: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
  - 1. Connector Section: Dovetail tabs for inserting into dovetail slots in concrete and attached to tie section; formed from **0.060-inch** thick steel sheet, galvanized after fabrication.
  - 2. Tie Section: Triangular-shaped wire tie made from **0.187-inch** diameter, hot-dip galvanized-steel wire.
  - 3. Corrugated-Metal Ties: Metal strips not less than **7/8 inch** wide with corrugations having a wavelength of **0.3 to 0.5 inch** and an amplitude of **0.06 to 0.10 inch** made from **0.060-inch** thick steel sheet, galvanized after fabrication with dovetail tabs for inserting into dovetail slots in concrete.
- D. Partition Top Anchors: **0.105-inch** thick metal plate with a **3/8-inch** diameter metal rod **6 inches** long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication.
- E. Rigid Anchors: Fabricate from steel bars **1-1/2 inches** wide by **1/4 inch** thick by **24 inches** long, with ends turned up **2 inches** or with cross pins unless otherwise indicated.



1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A153/A153M

## 2.6 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:
  1. Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304, 0.016 inch (0.40 mm) thick.
  2. Fabricate continuous flashings in sections 96 inches long minimum, but not exceeding 12 feet. Provide splice plates at joints of formed, smooth metal flashing.
  3. Fabricate metal drip edges from stainless steel. Extend at least 3 inches into wall and 1/2 inch out from wall, with outer edge bent down 30 degrees and hemmed.
  4. Fabricate metal sealant stops from stainless steel. Extend at least 3 inches into wall and out to exterior face of wall. At exterior face of wall, bend metal back on itself for 3/4 inch and down into joint 1/4 inch to form a stop for retaining sealant backer rod.
  5. Fabricate metal expansion-joint strips from stainless steel to shapes indicated.
- B. Flexible Flashing: Use **one of** the following unless otherwise indicated:
  1. Butyl Rubber Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.030 inch
  2. Elastomeric Thermoplastic Flashing: Composite flashing product consisting of a polyester-reinforced ethylene interpolymer alloy.
  3. EPDM Flashing: Sheet flashing product made from ethylene-propylene-diene terpolymer, complying with ASTM D4637/D4637M, 0.040 inch thick.
- C. Single-Wythe CMU Flashing System: System of CMU cell flashing pans and interlocking CMU web covers made from UV-resistant, high-density polyethylene. Cell flashing pans have integral weep spouts designed to be built into mortar bed joints and that extend into the cell to prevent clogging with mortar.
- D. Solder and Sealants for Sheet Metal Flashings: As specified in Section 076200 "Sheet Metal Flashing and Trim."
- E. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

## 2.7 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene or PVC.



- B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D2000, Designation M2AA-805 or PVC, complying with ASTM D2287, Type PVC-65406] and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
- C. Bond-Breaker Strips: Asphalt-saturated felt complying with ASTM D226/D226M, Type I (No. 15 asphalt felt).

## 2.8 MASONRY-CELL FILL

- A. Loose-Fill Insulation: Perlite complying with ASTM C549, Type II (surface treated for water repellency and limited moisture absorption) or Type IV (surface treated for water repellency and to limit dust generation).
- B. Lightweight-Aggregate Fill: ASTM C331/C331M.

## 2.9 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 **masonry cement** mortar unless otherwise indicated.
  - 3. For exterior masonry, use **masonry cement** mortar.
  - 4. For reinforced masonry, use **masonry cement** mortar.
  - 5. 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. Mortar for Unit Masonry: Comply with ASTM C270, Specification. Provide the following types of mortar for applications stated unless another type is indicated.
  - 1. For masonry below grade or in contact with earth, use **Type S**.
  - 2. For reinforced masonry, use **Type S**.
  - 3. For mortar parge coats, use **Type S**.
  - 4. For all exterior, above-grade, load-bearing and nonload-bearing walls for interior load-bearing walls; for interior nonload-bearing partitions; and for other applications where another type is not indicated, use **Type S**.
- C. Grout for Unit Masonry: Comply with ASTM C476.
  - 1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.
  - 2. Proportion grout in accordance with ASTM C476,
  - 3. Provide grout with a slump of **8 to 11 inches** as measured in accordance with ASTM C143/C143M.



## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

### 3.2 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 (12 mm)** or minus **1/4 inch (6 mm)**.
2. For location of elements in plan, do not vary from that indicated by more than plus or minus **1/2 inch (12 mm)**.
3. For location of elements in elevation, do not vary from that indicated by more than plus or minus **1/4 inch (6 mm)** in a story height or **1/2 inch (12 mm)** 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 (6 mm in 3 m)**, or **1/2-inch (12-mm)** 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 (3 mm in 3 m)**, **1/4 inch in 20 feet (6 mm in 6 m)**, or **1/2-inch (12-mm)** maximum.
3. For vertical lines and surfaces, do not vary from plumb by more than **1/4 inch in 10 feet (6 mm in 3 m)**, **3/8 inch in 20 feet (9 mm in 6 m)**, or **1/2-inch (12-mm)** 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 (3 mm in 3 m)**, **1/4 inch in 20 feet (6 mm in 6 m)**, or **1/2-inch (12-mm)** maximum.
5. For lines and surfaces, do not vary from straight by more than **1/4 inch in 10 feet (6 mm in 3 m)**, **3/8 inch in 20 feet (9 mm in 6 m)**, or **1/2-inch (12-mm)** maximum.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus **1/8 inch (3 mm)**, with a maximum thickness limited to **1/2 inch (12 mm)**.
2. For head and collar joints, do not vary from thickness indicated by more than plus **3/8 inch (9 mm)** or minus **1/4 inch (6 mm)**.
3. For exposed head joints, do not vary from thickness indicated by more than plus or minus **1/8 inch (3 mm)**.

### 3.3 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface STACK bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and



offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in STACK bond; do not use units with less-than-nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.
- C. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- D. Fill space between structural frames and masonry solidly with mortar unless otherwise indicated.
- E. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.
- F. Fill cores in hollow CMUs with grout 24 inches (600 mm) under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

### 3.4 MORTAR BEDDING AND JOINTING

- A. Lay hollow CMUs as follows:
  - 1. Bed face shells in mortar and make head joints of depth equal to bed joints.
  - 2. Bed webs in mortar in all courses of piers, columns, and pilasters.
  - 3. Bed webs in mortar in grouted masonry, including starting course on footings.
  - 4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
- B. Lay solid CMUs 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 epoxy coating, plaster or other direct-applied finishes unless otherwise indicated.

### 3.5 MASONRY-CELL FILL

- A. Pour into cavities to fill void spaces except for concrete filled block courses. Maintain inspection ports to show presence of fill at extremities of each pour area. Close the ports after filling has been confirmed. Limit the fall of fill to one story high, but not more than 20 feet (6 m).



### 3.6 MASONRY-JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of **5/8 inch (16 mm)** on exterior side of walls, **1/2 inch (13 mm)** elsewhere. Lap reinforcement a minimum of **6 inches (150 mm)**.
  - 1. Space reinforcement not more than **16 inches (406 mm)** o.c.
  - 2. Space reinforcement not more than **8 inches (203 mm)** o.c. in foundation walls and parapet walls.
  - 3. Provide reinforcement not more than **8 inches (203 mm)** above and below wall openings and extending **12 inches (305 mm)** beyond openings[ **in addition to continuous reinforcement**].
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units or rigid galvanized steel anchors.
- D. Provide continuity at corners by using prefabricated L-shaped units.

### 3.7 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

- A. Anchor masonry to structural steel and concrete, where masonry abuts or faces structural steel or concrete, to comply with the following:
  - 1. Provide an open space not less than [**1/2 inch (13 mm)**] wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
  - 2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
  - 3. Space anchors as indicated, but not more than **24 inches (610 mm)** o.c. vertically and **36 inches (915 mm)** o.c. horizontally.

### 3.8 FLASHING

- A. General: Install embedded flashing at ledges and other obstructions to allow downward flow of water in wall where indicated.
- B. Install flashing as follows unless otherwise indicated:
  - 1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
  - 2. At lintels, extend flashing a minimum of **6 inches (150 mm)** into masonry at each end. At heads and sills, extend flashing **6 inches (150 mm)** at ends and turn up not less than **2 inches (50 mm)** to form end dams.



3. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing **1/2 inch (13 mm)** back from outside face of wall, and adhere flexible flashing to top of metal drip edge.
- C. Install single-wythe CMU flashing system in bed joints of CMU walls where indicated to comply with manufacturer's written instructions. Install CMU cell pans with upturned edges located below face shells and webs of CMUs above and with weep spouts aligned with face of wall. Install CMU web covers so that they cover upturned edges of CMU cell pans at CMU webs and extend from face shell to face shell.

### 3.9 REINFORCED UNIT MASONRY

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
  1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
  2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and that of other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
  1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
  2. Limit height of vertical grout pours to not more than **[60 inches (1520 mm)] [12.67 ft. (3.86 m)]** <Insert height>.

### 3.10 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements is done at Contractor's expense.
- B. Inspections: Special inspections in accordance with TMS 402/ACI 530/ASCE 5.
  1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
  2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
  3. Place grout only after inspectors have verified proportions of site-prepared grout.
- C. Testing Prior to Construction: One set of tests.



- D. Testing Frequency: One set of tests for each 5000 sq. ft. (464 sq. m) of wall area or portion thereof.
- E. Concrete Masonry Unit Test: For each type of unit provided, in accordance with ASTM C140 for compressive strength.
- F. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, in accordance with ASTM C780.
- G. Grout Test (Compressive Strength): For each mix provided, in accordance with ASTM C1019..

### 3.11 PARGING

- A. Parge exterior faces of below-grade masonry walls, where indicated, in two uniform coats to a total thickness of 3/4 inch (19 mm). Dampen wall before applying first coat, and scarify first coat to ensure full bond to subsequent coat.
- B. Use a steel-trowel finish to produce a smooth, flat, dense surface with a maximum surface variation of 1/8 inch per foot (3 mm per 300 mm). Form a wash at top of parging and a cove at bottom.
- C. Damp-cure parging for at least 24 hours and protect parging until cured.

### 3.12 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 applicable cleaning methods indicated in NCMA TEK 8-4A.

### 3.13 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.
- B. Masonry Waste Recycling: Return broken CMUs not used as fill to manufacturer for recycling.
- C. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 042200







**SECTION 04 4313.13 - ANCHORED STONE VENEER****PART 1 - GENERAL****1.1 SUMMARY****A. Section Includes:**

1. Stone masonry veneer anchored to unit masonry backup.
2. Clear Epoxy Sealing of exterior stone veneer within the outdoor shower stalls

**B. Products Installed but Not Furnished under This Section Include:**

1. Precast concrete lintels in unit masonry.
2. shelf angles for supporting unit masonry.

**C. Related Requirements:**

1. Section 042000 "Unit Masonry" for weather barrier, concealed flashing, horizontal joint reinforcement and veneer anchors.

**1.2 ACTION SUBMITTALS****A. Product Data:** For each variety of stone, stone accessory, and manufactured product.

1. For stone type indicated.
2. For color of mortar required.

**1.3 FIELD CONDITIONS****A. Protection of Stone Masonry:** During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work.**B. Cold-Weather Requirements:** Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and above and will remain so until masonry has dried.

**C. Hot-Weather Requirements:** Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.



## PART 2 - PRODUCTS

### 2.1 NATURAL LEDGESTONE – also referred to as natural ledgerstone

Material Standard: Comply with ASTM C616, C629 C1526 , C568, C568M AND C 1527

1. Classification: density minimum **166 lb/cu. ft. (2400 kg/cu. m)** minimum; 1.17% water absorption, 2.66 specific gravity

**B.** Varieties and Sources: Subject to compliance with requirements,

**Only** natural locally sourced limestone, dolomites, mica schist , goshen stone, or mixed quartzite material , 4 sq.ft. sample acceptable to project manager and architect.

**Natural** Sandstone or artificially produced or fabricated stone products are not acceptable.

As supplied by a RI-DEM approved Rhode Island or Massachusetts quarry

### 2.2 MORTAR MATERIALS

**A.** Portland Cement: ASTM C150/C150M, Type I or Type II, except Type III may be used for cold-weather construction; natural color or white cement may be used as required to produce mortar color indicated.

1. Low-Alkali Cement: Not more than 0.60 percent total alkali when tested according to ASTM C114.

**B.** Hydrated Lime: ASTM C207, Type S.

**C.** Masonry Cement: ASTM C91/C91M.

**D.** Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C979/C979M. Use only pigments with a record of satisfactory performance in stone masonry mortar.

**E.** Colored Portland Cement-Lime Mix: Packaged blend of portland cement, hydrated lime, and mortar pigments. Mix produces color indicated or, if not indicated, as selected from manufacturer's standard colors. Pigments do not exceed 10 percent of portland cement by weight.

**F.** Colored Masonry Cement Mix: Packaged blend of masonry cement and mortar pigments. Mix produces color indicated or, if not indicated, as selected from manufacturer's standard colors. Pigments do not exceed 5 percent of masonry cement by weight.

**G.** Aggregate: ASTM C144 and as follows:

1. For pointing mortar, use aggregate graded with 100 percent passing **No. 16 (1.18-mm)** sieve.
2. Colored Aggregates: Natural-colored sand or ground marble, granite, or other sound stone; of color necessary to produce required mortar color.



- H. Water: Potable.

## 2.3 VENEER ANCHORS

A. Materials:

1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A1064/A1064M; with ASTM A153/A153M, Class B-2.
2. Stainless Steel Wire: ASTM A580/A580M, [Type 304] [Type 316].
3. Hot-Dip Galvanized-Steel Sheet: ASTM A1008/A1008M, cold-rolled, carbon-steel sheet, hot-dip galvanized after fabrication to comply with ASTM A153/A153M, Class B-2.
4. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, [Type 304] [Type 316].

- B. Size: Sufficient to extend at least halfway, but not less than **1-1/2 inches (38 mm)**, through stone masonry and with at least a **5/8-inch (16-mm)** cover on exterior face.

- C. Wire Veneer Anchors: Wire ties formed from W1.7 or **0.148-inch- (3.8-mm-)** diameter, **hot-dip galvanized** steel wire.

- D. Corrugated-Metal Veneer Anchors: Not less than **0.030-inch** thick by **7/8-inch- (22-mm-)** wide [**hot-dip galvanized**] [**stainless**] steel sheet with corrugations having a wavelength of **0.3 to 0.5 inch (7.6 to 13 mm)** and an amplitude of **0.06 to 0.10 inch (1.5 to 2.5 mm)**.

E. Adjustable Masonry-Veneer Anchors:

1. General: Provide anchors that allow vertical adjustment but resist a **100-lbf (445-N)** load in both tension and compression perpendicular to plane of wall without deforming or developing play in excess of **1/16 inch (1.5 mm)**.
2. Fabricate sheet metal anchor sections and other sheet metal parts from [**0.075-inch- (1.90-mm-)** thick steel sheet, galvanized after fabrication
3. Fabricate wire ties from [**0.187-inch- (4.76-mm-)**diameter, [hot-dip galvanized-steel]] wire unless otherwise indicated.
4. Fabricate wire connector sections from **0.187-inch- (4.76-mm-)** diameter, hot-dip galvanized-steel wire.
5. Contractor's Option: Unless otherwise indicated, provide any of the adjustable masonry-veneer anchors specified.
6. Masonry-Veneer Anchors; Double-Pintle Plate: Rib-stiffened, sheet metal anchor section with screw holes at top and bottom, projecting horizontal leg with slots for vertical legs of double pintle wire tie. Provide with seismic tie, clip, and continuous wire in veneer.
7. Masonry-Veneer Anchors; Slotted Plate: Sheet metal anchor section, with screw holes at top and bottom; and raised rib-stiffened strap, stamped into center to provide a slot between strap and base for wire tie. Use self-adhering tape to seal penetration behind anchor plate.
8. Masonry-Veneer Anchors; Slotted Plate with Prongs: Sheet metal anchor section, with screw holes at top and bottom; top and bottom ends bent to form pronged legs of length to match thickness of insulation; and raised rib-stiffened strap, stamped into center to provide a slot between strap and base for wire tie. Use self-adhering tape to seal penetration behind anchor plate.



- F. Metal Flashing: Provide metal flashing, where flashing is exposed or partly exposed and where indicated, complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:
1. Stainless Steel: ASTM A240/A240M, Type 304, 0.016 inch (0.4 mm) thick.
  2. Fabricate continuous flashings in sections 96 inches (2400 mm) long minimum, but not exceeding 12 feet (3.7 m). Provide splice plates at joints of formed, smooth metal flashing.
  3. Fabricate metal drip edges from stainless steel. Extend at least 3 inches (76 mm) into wall and 1/2 inch (13 mm) out from wall, with outer edge bent down 30 degrees **and hemmed**.
  4. Fabricate metal sealant stops from stainless steel. Extend at least 3 inches (76 mm) into wall and out to exterior face of wall. At exterior face of wall, bend metal back on itself for 3/4 inch (19 mm) and down into joint 1/4 inch (6 mm) to form a stop for retaining sealant backer rod.
  5. Fabricate metal expansion-joint strips from stainless steel to shapes indicated.
- G. Flexible Flashing: For flashing unexposed to the exterior, use the following unless otherwise indicated:
1. Rubberized-Asphalt or Butyl Flashing: Composite flashing product consisting of a pliable, adhesive, rubberized-asphalt compound, bonded to a high-density, cross-laminated, polyethylene film to produce an overall thickness of not less than [0.030 inch (0.76 mm)] [0.040 inch (1.0 mm)].

## 2.4 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene or PVC.
- B. Cementitious Damp-proofing: Cementitious formulation recommended by ILI and nonstaining to stone, compatible with joint sealants, and noncorrosive to veneer anchors and attachments.
- C. Asphalt Dampproofing: Asphalt emulsion complying with ASTM D1227, Type III or Type IV.
- D. Weep/Vent Products: Use **one of** the following unless otherwise indicated:
1. Round Plastic Tubing: Medium-density polyethylene, 3/8-inch (10-mm) OD by thickness of stone masonry.
  2. Mesh Weep Holes/Vents: Free-draining mesh; made from polyethylene strands, full width of head joint and 2 inches (50 mm) high by thickness of stone masonry; in color selected from manufacturer's standard.
- E. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.
1. Provide one of the following configurations:
    - a. Strips, full depth of cavity and 10 inches (250 mm) wide, with dovetail-shaped notches 7 inches (175 mm) deep that prevent mesh from being clogged with mortar droppings.



- b. Strips, not less than **[3/4 inch (19 mm)] [1-1/2 inches (38 mm)]** thick and **10 inches (250 mm)** wide, with dimpled surface designed to catch mortar droppings and prevent weep holes from being clogged with mortar.

## 2.5 MASONRY CLEANERS & SEALERS

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar and grout stains, efflorescence, and other new construction stains from stone masonry surfaces without discoloring or damaging masonry surfaces; expressly approved for intended use by cleaner manufacturer and stone producer.
- B. Proprietary sealer ; Use Pro Industrial grade low gloss High Performance Epoxy polyamine clear transparent sealer or equivalent low sheen silicone sealer product applied in 3 coats within the exposed masonry surface of the outdoor shower stalls.
- C. Provide small sample section for approval by architect and project manager before proceeding with full application.

## 2.6 FABRICATION

- A. Split or Select stone to produce pieces of thickness, size, and shape indicated, including details on Drawings and pattern specified in "Setting Stone Masonry" Article.
  - 1. Shape stone specified to be laid in three-course, random range ashlar pattern with **split** beds using appropriate sized stones.
- B. Thickness of Sloped Stone: Provide 4 1/2" minimum veneer thickness at top of wall and 12" thickness at the base. Provide fully jointed corner stones at intersections and exposed corners
- C. Finish exposed stone faces and edges to comply with requirements indicated for finish and to match approved samples.
  - 1. Finish: Sloped face of stone veneer to be smooth jointed with waterproof mortar at outdoor shower stalls and sealed with three coats of clear silicone or high performance epoxy waterproofing as specified. .
  - 2. The mortar and stone of the sloped wall surface to be troweled smooth and free of bumps or projections where the stall partitions are to be fastened to the sloped walls.
  - 3. The holes for fastening the steel partition supports are to be waterproofed with silicone sealant bedding to avoid water penetration at the fastening points.
  - 4. Layup pattern : The layup pattern for the sloped stone veneer walls will be as per the 8 sq.ft. sample prepared and approved on site by the architect and project manager.

## 2.7 MORTAR MIXES

- A. General: Do not use admixtures unless otherwise indicated.



1. Do not use calcium chloride.
  2. Use masonry cement mortar unless otherwise indicated.
  3. Mixing Pointing Mortar: Thoroughly mix cementitious and aggregate materials together before adding water. Then mix again, adding only enough water to produce a damp, unworkable mix that will retain its form when pressed into a ball. Maintain mortar in this dampened condition for one to two hours. Add remaining water in small portions until mortar reaches required consistency. Use mortar within 30 minutes of final mixing; do not retemper or use partially hardened material.
- B. Mortar for Stone Masonry: Comply with ASTM C270, Proportion Specification.
1. Mortar for Setting Stone: [**Type S**] [**Type N**].
  2. Mortar for Pointing Stone: [**Type N**] [**Type O**].
- C. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.
1. Pigments do not exceed 10 percent of portland cement by weight.
  2. Pigments do not exceed 5 percent of masonry cement by weight.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Coat concrete and unit masonry (CMU) backup with asphalt damp proofing.

### 3.2 INSTALLATION OF STONE MASONRY

- A. Perform necessary field cutting and trimming as stone is set.
1. Use hammer and chisel to split stone that is fabricated with split surfaces. Make edges straight and true, matching similar surfaces that were shop or quarry fabricated.
  2. Pitch face at field-split edges as needed to match stones that are not field split.
- B. Sort stone before it is placed in wall to remove stone that does not comply with requirements relating to aesthetic effects, physical properties, or fabrication, or that is otherwise unsuitable for intended use.
- C. Arrange stones in broken-range ashlar pattern with non-uniform course heights, random lengths, and uniform joint widths.
- D. Arrange stones in **coursed** pattern with joint widths within tolerances indicated. Insert small stones into spaces between larger stones as needed to produce joints as uniform in width as practical.
- E. Arrange stones with color and size variations uniformly dispersed for an evenly blended appearance.



- F. Maintain uniform joint widths except for variations due to different stone sizes and where minor variations are required to maintain bond alignment if any. Lay walls with joints not less than [**1/4 inch (6 mm)**] at narrowest points or more than [**3/8 inch (10 mm)**] at widest points.
- G. Provide sealant joints of widths and at locations indicated.
1. Keep sealant joints free of mortar and other rigid materials.
  2. Sealant joints are specified in Section 079200 "Joint Sealants."
- H. Install embedded flashing **and weep holes** at base flashings, shelf angles, lintels, ledges, other obstructions to direct downward flow of water in wall, and where indicated.
1. At concrete unit masonry (CMU) backing, extend flashing through stone masonry, turned up a minimum of **12 inches (300 mm)**, and insert in reglet provided. Reglets are specified in Section 076200 "Sheet Metal Flashing and Trim."
  2. At lintels and shelf angles, extend flashing full length of angles but not less than **6 inches (150 mm)** into masonry at each end.
  3. At sills, extend flashing not less than **4 inches (100 mm)** at ends.
  4. At ends of head and sill flashing, turn up not less than **2 inches (50 mm)** to form end dams.
  5. Extend sheet metal flashing **1/2 inch (13 mm)** beyond masonry face at exterior, and turn flashing down and hemmed to form a drip.
  6. Install metal flashing termination beneath flexible flashing at exterior wall face. Stop flexible flashing **1/2 inch (13 mm)** back from exterior wall face and adhere flexible flashing to top of metal flashing termination.
- I. Place weep holes and vents in joints where moisture may accumulate, including at base of cavity walls, above shelf angles, and at flashing.
1. Use round vinyl tubing inserted with downward **slope** to form weep holes.
  2. Space weep holes **24 inches (600 mm)**] o.c.
- J. Coat limestone with cementitious damp proofing as follows:
1. Stone at Grade: Beds, joints, and back surfaces to at least **12 inches (300 mm)** above finish-grade elevations.
  2. Stone Extending below Grade: Beds, joints, back surfaces, and face surfaces below grade.

### 3.3 CONSTRUCTION TOLERANCES

- A. Variation from Plumb: For vertical lines and surfaces, do not exceed **1/4 inch in 10 feet** or more. For external corners, expansion joints, control joints, and other conspicuous lines, do not exceed **1/4 inch in 20 feet (6 mm in 6 m)** or more.
- B. Variation from Level: For[ **bed joints and**] lines of exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines, do not exceed **1/4 inch in 20 feet (6 mm in 6 m)** or **1/2 inch in 40 feet (13 mm in 12 m)** or more.
- C. Variation of Linear Building Line: For position shown in plan, do not exceed **1/2 inch in 20 feet (13 mm in 6 m)** or more.



### 3.4 INSTALLATION OF ANCHORED STONE MASONRY

- A. Anchor stone masonry to unit masonry (CMU) with galvanized corrugated-metal veneer anchors unless otherwise indicated. Embed anchors in unit masonry mortar joints or grouted cells at a distance of at least one-half of unit masonry thickness.
- B. Embed veneer anchors in mortar joints of stone masonry at least halfway, but not less than **1-1/2 inches (38 mm)**, through stone masonry and with at least a **5/8-inch (16-mm)** cover on exterior face.
  - 1. Install continuous wire reinforcement in horizontal joints and attach to seismic veneer anchors as stone is set.
- C. Space anchors not more than **18 inches (450 mm)** o.c. vertically and **32 inches (800 mm)** o.c. horizontally, with not less than one anchor per **2.67 sq. ft. (0.25 sq. m)** of wall area. Install additional anchors within **12 inches (300 mm)** of openings, sealant joints, and perimeter at intervals not exceeding **12 inches (300 mm)**.
- D. Set stone in full bed of mortar with full head joints unless otherwise indicated. Build anchors into mortar joints as stone is set.
- E. Provide **1-inch (25-mm)** cavity between stone masonry and backup construction unless otherwise indicated. Keep cavity free of mortar droppings and debris.
  - 1. Slope beds toward cavity to minimize mortar protrusions into cavity.
  - 2. Do not attempt to trowel or remove mortar fins protruding into cavity.
- F. Rake out joints for pointing with mortar to depth of not less than **3/4 inch (19 mm)** before setting mortar has hardened. Rake joints to uniform depths with square bottoms and clean sides.

### 3.5 POINTING

- A. Prepare stone-joint surfaces for pointing with mortar by removing dust and mortar particles. Where setting mortar was removed to depths greater than surrounding areas, apply pointing mortar in layers not more than **3/8 inch (10 mm)** deep until a uniform depth is formed.
- B. Point stone joints by placing and compacting pointing mortar in layers of not more than **3/8 inch (10 mm)** deep. Compact each layer thoroughly and allow to it become thumbprint hard before applying next layer.
- C. Tool joints, when pointing mortar is thumbprint hard, with a smooth jointing tool to produce the following joint profile:
  - 1. Joint Profile: Smooth, flat face slightly below edges of stone as per sample of stone veneer approved by Architect and project manager.

### 3.6 ADJUSTING AND CLEANING

- A. In-Progress Cleaning: Clean stone masonry as work progresses. Remove mortar fins and smears before tooling joints.



B. Final Cleaning: After mortar is thoroughly set and cured, clean stone masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on mockup; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before cleaning stone masonry.
3. Protect adjacent stone and non masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.
4. Wet wall surfaces with water before applying cleaner; remove cleaner promptly by rinsing thoroughly with clear water.
5. Clean stone masonry with proprietary acidic cleaner applied according to manufacturer's written instructions.

3.7 EXCESS MATERIALS AND WASTE

- A. Excess Stone: Stack excess stone where directed by Owner for Owner's use.
- B. Disposal as Fill Material: Dispose of clean masonry waste, including mortar and excess or soil-contaminated sand, by crushing and mixing with fill material as fill is placed.
  1. Do not dispose of masonry waste as fill within 18 inches (450 mm) of finished grade.

END OF SECTION 044313.13







**SECTION 06 1600 - SHEATHING****1.1 SUMMARY****A. Section Includes:**

1. Wall sheathing including fiber cement siding
2. Plywood Roof sheathing.

**1.2 ACTION SUBMITTALS****A. Product Data:** For each type of process and factory-fabricated product.**B. Sustainable Design Submittals:**

Submit sustainable design text and Leeds Certification data for all products and materials of this section.

Submit sustainable design qualifications for all manufacturers and vendors of products and materials covered in this section for quality assurance purposes.

**1.3 INFORMATIONAL SUBMITTALS****A. Evaluation Reports:** For the following, from ICC-ES:

1. Wood-preserved-treated plywood.

**PART 2 - PRODUCTS****2.1 PRESERVATIVE-TREATED PLYWOOD**

- A. Preservative Treatment by Pressure Process: AWPAC U1; Use Category UC2 for interior construction , Use Category UC3b for exterior construction .
- B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.
- C. Application: Treat all plywood unless otherwise indicated
- D. Kiln-dry material after treatment to a maximum moisture content of 15 percent.

**2.2 WALL SHEATHING**

- A. Plywood Sheathing grade: Exterior, Structural I



- B. This sheathing, 1/2" thickness, is required as backing beneath all interior wall and exterior wall surfaces clad in fiber cement paneling and wood shingle cladding as shown on the drawings.

## 2.3 ROOF SHEATHING

- A. Plywood Sheathing: Exterior, Structural I grade Tongue and Groove preservative treated roof sheathing in 3/4" ( minimum) thickness.

## 2.4 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
  - 1. For roof and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M.

## 2.5 MISCELLANEOUS MATERIALS

- A. Adhesives for Field Gluing Panels to Wood Framing: Formulation complying with ASTM D3498 that is approved for use with type of construction panel indicated by manufacturers of both adhesives and panels.

# PART 3 - EXECUTION

## 3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
  - 1. Table 2304.10.1, "Fastening Schedule," in the ICC's International Building Code.
  - 2. ICC-ES evaluation report for fastener.
- D. Coordinate wall and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- E. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

END OF SECTION 061600



**SECTION 06 2020 –FINISH CARPENTRY (Interior & Exterior)****PART 1 - GENERAL****1.1 SUMMARY**

A.Section Includes but is not limited to :

1. Interior trim, including hollow metal or fiberglass or solid core-wood interior doors, installation of hardware and setting of door and window frames.
2. Installation of washroom accessories, coat-hooks, mirrors, shower curtains and backing for all wall mounted accessories, (except those included in toilet partition installation).
3. Interior Shelving and sloped wood shingle roofs over supply closets. (see wood shingles sect.073129)
4. Installation of rough sawn cedar plank window trim
5. Installation of solid cellular PVC roof facias (AZEK). (see spec. sect. 066500)
6. Installation of all interior and exterior wood shingle wall cladding as specified in section 073149
7. Exterior trim including rough sawn cedar planks installed over fiber cement cladding panels
8. Installation of wall mounted Access panels for maintenance purposes ( see section 092000)

B.1. Excluded is work pertaining to suspended cedar plank ceilings, (part of a manufactured system). This work is specified in section 095426 suspended wood ceilings to be performed by trades specialized in this work.

2. Excluded is the installation of fiber cement wall cladding and soffits. This work is specified in section 074646 fiber cement cladding and is to be performed by trades specialized in this work.

3. Exclude installation of high density polyethylene (HDPE) pipe-chase walls and solid laminate tops to these pipe-chases and all removable access panels. This installation is to be provided as part of bathroom partitions work ( see section 102113) .

1. 4. Installation and fitting of pre-molded solid surface sinks and countertops, aprons and thermoformed cove backsplashes, all work to be performed by specialized experienced craftsmen .( See Section 06616 )

**1.2 DEFINITIONS**

A.MDF: Medium-density fiberboard.

B.MDO: Plywood with a medium-density overlay on the face.

C.PVC: Polyvinyl chloride.

D.HDPE High density polyethylene

E. AZEK Trademark of proprietary composite PVC product



### 1.3 ACTION SUBMITTALS

A.Product Data: For each type of process and factory-fabricated product.

B.Sustainable Design Submittals:

Submit sustainable design text pertaining to all materials and products of this section.

Submit sustainable design qualifications documentation for all manufacturers and vendors .

Submit descriptive text background of experience and qualifications of the foremen, skilled craftsmen and lead carpenters proposed for this work, for the approval and acceptance of the Architect and the Project Manager.

C.Samples: Submit full samples for each exposed product and for each color and texture specified.

### 1.4 Shop Drawings

Submit fully detailed shop drawings based on site dimensions for each element or fabricated product for approval according to the procedures set out in the General Conditions for all items covered by this specification. The shop drawings shall fully describe the installation methods and all products to be used in the installation .

### 1.5 MATERIALS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with applicable rules of any rules-writing agency certified by the American Lumber Standard Committee's (ALSC) Board of Review. Grade lumber by an agency certified by the ALSC's 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, mark grade stamp on end or back of each piece .

B.Softwood Plywood: DOC PS 1.

C.Hardboard: ANSI A135.4.

D.MDF: ANSI A208.2, Grade 130..

E.Melamine-Faced Particleboard: Particleboard complying with ANSI A208.1, Grade M-2, finished on both faces with thermally fused, melamine-impregnated decorative paper and complying with NEMA LD 3, Grade VGL, for Test Methods 3.3, 3.4, 3.6, 3.8, and 3.10.

1. Color: To Be determined as selected by Architect from manufacturer's full range.

### 1.6 INTERIOR TRIM

A.Softwood Lumber Trim for Transparent Finish (Stain or Clear Finish):



## 1. Species and Grade:

- a. Eastern white pine; NeLMA or NLGA Finish grade
- b. Idaho white, lodgepole, ponderosa, radiata, or sugar pine; NLGA or WWPFA Finish grade
- c. Eastern white, Idaho white, lodgepole, ponderosa, radiata, or sugar pine; NeLMA, NLGA, or WWPFA Finish grade
- d. Douglas fir-larch or Douglas fir south; NLGA, WCLIB, or WWPFA] finish.
- e. Western red cedar; NLGA, WCLIB, or WWPFA Finish Grade

## 2. Maximum Moisture Content: 15 percent with at least 85 percent of shipment at 12 percent or less.

## 3. Finger Jointing: Not allowed.

4. Face Surface: **smooth**.

## B. Hardwood Lumber Trim for Transparent Finish (Stain or Clear Finish):

1. Species and Grade: Red oak Finish Grade
2. Maximum Moisture Content: **13** percent.
3. Finger Jointing: Not allowed.
4. Gluing for Width: Not allowed
5. Veneered Material: Not allowed
6. Face Surface: smooth.
7. Matching: Selected for compatible grain and color.

## C. Lumber Trim for Opaque Finish (Painted Finish):

## 1. Species and Grade:

- a. Eastern white pine; NeLMA or NLGA Finish
- b. Species and Grade: Douglas fir-larch or Douglas fir south; NLGA, WCLIB, or "Maximum Moisture Content for Softwoods"

## 2. Maximum Moisture Content for Softwoods: 15 percent with at least 85 percent of shipment at 12 percent or less.

## 3. Maximum Moisture Content for Hardwoods: [13] [10] [9] &lt;Insert number&gt; percent.

## 4. Finger Jointing: [Allowed] [Not allowed].

## 5. Face Surface: [Surfaced (smooth)] [Saw textured].

## 6. Optional Material: Primed MDF of same actual dimensions as lumber indicated may be used in lieu of lumber.

## D. Hardwood Moldings for Transparent Finish (Stain or Clear Finish): MMPA WM 4, N-grade wood moldings made to patterns included in MMPA's "HWM/Series Hardwood Moulding Patterns."

1. Species: Red oak or sustainably sourced equivalent.
2. Maximum Moisture Content: 9 percent.
3. Finger Jointing: Not allowed.
4. Matching: Selected for compatible grain and color.
5. Optional Material: Kiln-dried softwood or MDF, with exposed surfaces veneered with species indicated, may be used in lieu of solid wood.



E. Moldings for Opaque Finish (Painted Finish): Made to patterns included in MMPA's "WM/Series Softwood Moulding Patterns."

1. Softwood Moldings or exterior and interior trim boards:
  - a. Species: Western red cedar; NLGA, WCLIB, or WWPA **Grade A**
  - b. Maximum Moisture Content: 15 percent with at least 85 percent of shipment at 12 percent or less.
2. Hardwood Moldings: MMPA WM 4, P-grade.
  - a. Species: Aspen , soft maple, tupelo, or yellow poplar.
  - b. Maximum Moisture Content: 9 percent.
3. Finger Jointing: Not allowed.
4. Optional Material: Primed MDF.
5. Finish: transparent, UV-resistant, protective finish
6. Maximum Moisture Content: 15 percent with at least 85 percent of shipment at 12 percent or less.
7. Pattern: V-joint, tongue and groove, NeLMA EWP 4 or WWPA WP 4.
8. Net Coverage Width: Not less than **4" inches**

#### 1.7 SHELVING AND CLOTHES RODS

A. Closet Utility Shelving: Made from **3/4 inch (19 mm)** thick: Melamine-faced exterior grade plywood with applied-PVC front edge 12" wide.

B. Adjustable Shelf Brackets: BHMA A156.9, B04112; **natural aluminum**.

#### 1.8 MISCELLANEOUS MATERIALS

A. Fasteners for Exterior & Interior Finish Carpentry: Epoxy coated stainless steel Nails, screws, and other anchoring devices of type, size, material, required for application indicated to provide secure attachment, concealed where possible.

B. Glue: Aliphatic-resin, polyurethane, or resorcinol wood glue recommended by manufacturer for general carpentry use.

C. Multipurpose Construction Adhesive: Formulation, complying with ASTM D3498, that is recommended for indicated use by adhesive manufacturer.



## PART 2 - EXECUTION

### 2.1 PREPARATION

A.Clean substrates of projections and substances detrimental to application.

B.Before installing interior finish carpentry, condition materials to average prevailing humidity in installation areas for a minimum of 24 hours.

### 2.2 INSTALLATION, GENERAL

A.Install finish carpentry level, plumb, true, and aligned with adjacent materials.

1. Use concealed shims where necessary for alignment.
2. Scribe and cut finish carpentry to fit adjoining work. Refinish and seal cuts .
3. Where face fastening is unavoidable, countersink fasteners, fill surface flush, and sand unless otherwise indicated.
4. Install to tolerance of **1/8 inch in 96 inches** for level and plumb. Install adjoining interior finish carpentry with **1/32-inch** offset for flush installation and **1/16-inch** maximum offset for reveal installation.
5. Coordinate interior finish carpentry with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate interior finish carpentry.

### 2.3 INSTALLATION OF STANDING AND RUNNING TRIM

A.Install trim with minimum number of joints as is practical, using full-length pieces from maximum lengths of lumber available.

1. Do not use pieces less than 24 inches (610 mm) long, except where necessary.
2. Stagger joints in adjacent and related standing and running trim.
3. 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.
4. Use scarf joints for end-to-end joints.
5. Plane backs of casings to provide uniform thickness across joints where necessary for alignment.
6. Match color and grain pattern of trim for transparent finish (stain or clear finish) across joints.
7. Install trim after fiber-cement joint finishing operations are completed.
8. Install without splitting; drill pilot holes before fastening where necessary to prevent splitting.
9. Fasten to prevent movement or warping.
10. Countersink fastener heads on exposed carpentry work and fill holes.

### 2.4 INSTALLATION OF PLYWOOD BACKING PANELS

1. Leave **1/4-inch (6-mm)** gap to be covered with trim at top, bottom, and openings.
2. Install with uniform tight joints between panels.
3. Attach panels to supports with manufacturer's recommended panel adhesive and fasteners.
4. Space fasteners and adhesive as recommended by panel manufacturer.
5. Conceal fasteners to greatest practical extent.



6. Arrange panels with grooves and joints over supports.

## 2.5 INSTALLATION OF SHELVING

A. Cut shelf cleats at ends of shelves about **1/2 inch (13 mm)** less than width of shelves and sand exposed ends smooth.

1. Install shelf cleats by fastening to framing or backing with finish nails or trim screws, set below face and filled.
2. Space fasteners not more than **24 inches** c/c.
3. Apply a bead of multipurpose construction adhesive to back of shelf cleats before installing.
4. Remove adhesive that is squeezed out after fastening shelf cleats in place.

B. Install standards for adjustable shelf brackets according to manufacturer's written instructions, spaced not more than **36 inches (900 mm)** o.c. and within **6 inches (150 mm)** of ends of shelves. Fasten to framing members, or use toggle bolts or hollow wall anchors.

C. Cut shelves to neatly fit openings with only enough gap to allow shelves to be removed and reinstalled.

1. Install shelves, fully seated on cleats, brackets, and supports.

END OF SECTION 062023



**SECTION 06 6116 -SOLID SURFACING FABRICATIONS INCLUDING BATHHOUSE  
COUTERTOPS, INTEGRAL MOLDED SINKS, ADA SINKS, APRONS  
AND BACKSPLASHES**

## GENERAL

## 1.01 SUMMARY

- A. Section Includes: Provide solid surfacing fabrications including but not limited to following:
1. Pipe-chase tops.
  2. Bathroom countertops tops with integral sink bowls, front aprons and thermoformed cove backsplashes.
  3. ADA sinks
  4. Wireless charging units.
- B. Related Sections: Following description of work is included for reference only and shall not be presumed complete:
1. Provision of faucets, drains, plumbing and plumbing fixtures: [Division 22, Plumbing] .

## 1.02 REFERENCES

- A. Abbreviations and Acronyms:
1. LEED®: Leadership in Energy and Environmental Design; [www.cagbc.org](http://www.cagbc.org).
  2. MDF: Medium Density Fiberboard.
  3. VOC: Volatile Organic Compound.
- B. Definitions:
1. Solid Surface: Non-porous, homogeneous material maintaining the same composition throughout the part with a composition of acrylic polymer, aluminum trihydrate filler and pigment.
- C. Reference Standards:
1. ASTM D790-10 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
  2. CSA B45.5-11/  
IAPMO Z124-2011 - Plastic Plumbing Fixtures
  3. NFPA 255-06 - Standard Method of Test of Surface Burning Characteristics of Building Materials



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4. SCAQMD Rule 1168 - Adhesive and Sealant Applications (amended January 2005)
  5. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials
  6. UL Environment/  
Materials, - Standard for Chemical Emissions for Building  
UL Environment/  
Building Materials, - Gold Standard for Chemical Emissions for

### 1.03 SUBMITTALS

- A. Product Data: Indicate Product description including solid surface sheets, sinks, bowls and illustrating full range of standard colors, fabrication information and compliance with specified performance requirements. Submit Product data with resistance to list of chemicals.
- B. Shop Drawings: Submit Shop Drawings for work of this Section in accordance with Section 01 30 00. Indicate plans, sections, dimensions, component sizes, edge details, thermosetting requirements, fabrication details, attachment provisions, sizes of furring, blocking, including concealed blocking and coordination requirements with adjacent work. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, waste receptacles and other items installed in solid surface.
- C. Coordination Drawings: Submit coordination drawings indicating plumbing and miscellaneous steel work indicating locations of wall rated or non-rated, blocking requirements, locations and recessed wall items and similar items.
- D. Samples: Submit samples in accordance with Section 01 30 00. Submit minimum 6" x 6" samples. Cut sample and seam together for representation of inconspicuous seam. Indicate full range of color and pattern variation. Approved samples will be retained as standards for work.
- E. Test and Evaluation Reports: Submit flammability test reports

### 1.04 CLOSEOUT SUBMITTALS

- A. Operational and Maintenance Data:
  1. Submit manufacturer's care and maintenance data, including repair and cleaning instructions. Include in Project closeout documents.
  2. Provide a commercial care and maintenance kit and video. Review maintenance procedures and warranty details with Owner upon completion.

### 1.05 QUALITY ASSURANCE

- A. Qualifications:
  1. Installers: Provide work of this Section executed by competent installers with minimum 5 years experience in the application of Products, systems and



assemblies specified and with approval and training of the Product manufacturers.

B. Mock-Ups:

1. Prior to final approval of Shop Drawings, erect 1 full size mock-up of each component at Project site demonstrating quality of materials and execution for Architect review.
2. Should mock-up not be approved, rework or remake until approval is secured. Remove rejected units from Project site.
3. Approved mock-up will be used as standard for acceptance of subsequent work.
4. Approved mock-ups may remain as part of finished work.

1.06 DELIVERY, STORAGE AND HANDLING

A. Delivery and Acceptance Requirements: Deliver no components to Project site until areas are ready for installation.

B. Storage and Handling Requirements:

1. Store components indoors prior to installation.
2. Handle materials to prevent damage to finished surfaces.

1.07 WARRANTY

A. Manufacturer Warranty: Provide manufacturer's standard warranty for material only for period of 10 years against defects and/or deficiencies in accordance with General Conditions of the Contract. Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of Architect and at no expense to Owner.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturer List: Products of following manufacturers are acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:

1. Corian® by DuPont; [www.corian.com](http://www.corian.com)
2. Samsung Chemical USA; [www.staron.com](http://www.staron.com)
3. Wilsonart Contract; [www.wilsonartcontract.com](http://www.wilsonartcontract.com)

B. This Specification is based on Corian® Products. Comparable Products from manufacturers listed herein will be accepted provided they meet requirements of this Specification.

2.02 MATERIALS

1. Provide Product with regional content if applicable.



2. EQc4.1: Provide adhesives and sealants with VOC quantities lower than stated in SCAQMD Rule 1168. Ensure VOC quantities for sealants do not exceed 250 g/l under any circumstances.

B. Performance/Design Criteria:

|    | Property                      | Requirement<br>(min or max)        | Test Procedure                                 |
|----|-------------------------------|------------------------------------|--|
| 1. | Solid Surface Based Products: |                                    |  |
| a. | Tensile Strength              | 6000 psi min                       | ASTM D638                                      |
| b. | Tensile Modulus               | $1.5 \times 10^6$ psi min          | ASTM D638                                      |
| c. | Tensile Elongation            | 0.4% min.                          | ASTM D638                                      |
| d. | Flexural Strength             | 10000 psi min                      | ASTM D790                                      |
| e. | Flexural Modulus              | $1.2 \times 10^6$ psi min          | ASTM D790                                      |
| f. | Hardness                      | >85-Rockwell "M" scale min.        | ASTM D785                                      |
| g. | Thermal Expansion             | $2.2 \times 10^{-5}$ in./in./°F    | ASTM E228                                      |
| h. | Fungi and Bacteria            | Does not support microbial growth  | ASTM G21 & G22                                 |
| i. | Microbial Resistance          | Highly resistant to mold growth    | UL 2824  |
| j. | Ball Impact                   | No fracture - 1/2 lb. Ball:        |  |
|    | NEMA LD 3,<br>Method 3.8      |                                    | 6 mm slab - 36" drop<br>12 mm slab - 144" drop |
| k. | Weatherability                | $\Delta E^*_{94} < 5$ in 1,000 hrs | ASTM G155                                      |
| l. | Flammability                  |                                    | ASTM E84, NFPA & UL 255<br>723                 |
| m. | Flame Spread                  | <25                                | <25  |
| n. | Smoke Developed               | <25                                | <25  |
| o. | Class                         | A                                  | A  |
|    | Safety                        |                                    | NFPA 101®, Life                                |

C. Solid Surface Material:

- D. Non-porous, homogeneous material maintaining the same composition throughout the part with a composition of acrylic polymer, aluminum trihydrate filler and pigment; not coated, laminated or of composite construction; meeting following criteria:

- E. Flammability: Class 1 and A when tested to UL 723.



- F. Pipe chase tops and sills: 1/2" thick solid surfacing material, adhesively joined with inconspicuous seams, rounded edge details as indicated on Drawings. Color selected later by Architect from manufacturer's full color range.
- G. Counter Perimeter Frame: Ensure 1/2" [3/4"] thick, moisture resistant cores for counter tops in wet areas having sinks or lavatories are 3/4" thick exterior grade plywood with waterproof adhesive, Fir or Poplar plywood, veneer core only. [MDF core conforming to ANSI/NPA A208.2 balanced design, manufactured from recycled materials, meeting ANSI Standards for emissions, of minimum density of 48 lb/cu ft and surface character to match sample approved by Architect. Ensure fire retardant Product contains fire-retardant chemicals injected with raw materials during manufacturing and achieves a maximum flame-spread rating of 25 with a maximum smoke development of 200 when tested to ASTM E84.
- H. Ensure countertop and backsplash is thermoformed coved as selected by Architect. Integral sink bowls are to be similar or equal to Corian model 802P of same color as countertops .
- I. Countertops Tops with Integral Bowls: Molded countertop of solid polymer material minimum thickness of 1/2" in full length pieces no less than 22-1/2" , complete with integrally molded bowl[s] of solid polymer material; edge details as indicated on Drawings. Provide with thermoformed coved backsplash and end-splashes as shown on Drawings.
- J. Bathhouse sinks ( except for mop sinks in mechanical rooms-see MEP sections) are to be similar or equal to Corian model "Simplicity 881P" and ADA accessible sinks are to be similar or equal to Corian model "Accessible 5610".
- K. Wireless Charging Unit: A complete, self-contained system with a dual-mode transmitter that is compliant with PMA and WPC Qi standards.

Acceptable Product: "DuPont™ Corian® Charging Unit – Individual" by DuPont.

- L. Fabrication:
  - 1. Fabricate components in shop to greatest extent practical to sizes and shapes indicated, in accordance with approved Shop Drawings and solid polymer manufacturer requirements. Form joints between components using manufacturer's standard joint adhesive without conspicuous joints. Provide factory cutouts for plumbing fittings and bath accessories as indicated on Drawings.
  - 2. Where indicated, thermoform corners and edges or other objects to shapes and sizes indicated on Drawings, prior to seaming and joining. Cut components larger than finished dimensions and sand edges to remove nicks and scratches. Heat entire component uniformly prior to forming.
  - 3. Ensure no blistering, whitening and cracking of components during forming.



4. Fabricate backsplashes from solid surfacing material with optional radius cove where counter and backsplashes meet as indicated on Drawings. Backsplashes are to be prefabricated as per the techniques in Dupont Technical Bulletin K-28235 *Thermoformed Backsplash*.
5. Fabricate joints between components using manufacturer's standard joint adhesive. Ensure joints are inconspicuous in appearance and without voids. Attach 50 mm (2") wide reinforcing strip of solid polymer material under each joint. Reinforcing strip of solid polymer material is not required when using DuPont™ Joint Adhesive 2.0.
6. Provide holes and cutouts for plumbing and bath accessories as indicated on Drawings.
7. Rout and finish component edges to a smooth, uniform finish. Rout cutouts, then sand edges smooth. Repair or reject defective or inaccurate work.
8. Finish: Ensure surfaces have uniform finish:
  - a. Matte, with a 60° gloss rating of 5 - 20.
9. Fabrication Tolerances:
  - a. Variation in Component Size: +/-1/8".
  - b. Location of Openings: +/-1/8" from indicated location.

### PART 3 - EXECUTION

#### 3.01 EXAMINATION

##### A. Verification of Conditions:

1. Examine substrates and conditions, with fabricator present for compliance with requirements for installation tolerances and other conditions affecting performance of work. Proceed with installation only after unsatisfactory conditions have been corrected.
2. Verify actual site dimensions and location of adjacent materials prior to commencing work.
3. Examine cabinets upon which counter tops are to be installed. Verify cabinets are level to within 1/8" in 10' - 0".
4. Notify Architect in writing of any conditions which would be detrimental to installation.

##### B. Evaluation and Assessment: Commencement of work implies acceptance of previously completed work.

#### 3.02 INSTALLATION

- A. Install components plumb, level, rigid, scribed to adjacent finishes in accordance with reviewed Shop Drawings and Product installation details.
- B. Fabricate field joints using manufacturer's recommended adhesive, with joints being inconspicuous in finished work. Exposed joints/seams are not permitted. Keep components and hands clean when making joints. Reinforce field joints as specified herein. Cut and finish component edges with clean, sharp returns.



- C. Route radii and contours to template. Anchor securely to base component or other supports. Align adjacent components and form seams to comply with manufacturer's written recommendations using adhesive in color to match work. Carefully dress joints smooth, remove surface scratches and clean entire surface.
- D. Install countertops with no more than 1/8" sag, bow or other variation from a straight line.
- E. Seal between wall and components with joint sealant as specified herein and in Section 07 92 00, as applicable.
- F. Provide thermoformed coved backsplashes and end-splashes as indicated on Drawings. Adhere to countertops using a standard color-coordinated silicone sealant. Adhere applied sidesplashes to countertops using a standard color-matched silicone sealant. Provide coved backsplashes and sidesplashes at walls and adjacent millwork. Fabricate radius cove at intersection of counters with backsplashes to dimensions shown on reviewed Shop Drawings. Adhere to countertops using manufacturer's standard color-coordinated joint adhesive.
- G. Keep components and hands clean during installation. Remove adhesives, sealants and other stains. Ensure components are clean on date of Substantial Completion of the Work.
- H. Coordinate connections of plumbing fixtures with [Division 22] [Mechanical]. Make plumbing connections to sinks in accordance with [Division 22] [Mechanical].

### 3.03 REPAIR

- A. Repair minor imperfections and cracked seams and replace areas of severely damaged surfaces in accordance with manufacturer's "Technical Bulletins".

### 3.04 SITE QUALITY CONTROL

- A. Non-Conforming Work: Replace damaged work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of Architect at no cost to Owner.

### 3.05 CLEANING

- A. Remove excess adhesive and sealant from visible surfaces.
- B. Clean surfaces in accordance with manufacturer's "Care and Maintenance Instructions".

### 3.06 PROTECTION

- A. Provide protective coverings to prevent physical damage or staining following installation for duration of Project.
- B. Protect surfaces from damage until date of Substantial Completion of the Work.

END OF SECTION







**SECTION 06 6500 – Simulated Wood Trim****Plastic Simulated Wood Trim****PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Cellular PVC trim boards for:
  - 1. Corner boards
  - 2. Soffits
  - 3. Fascia

**1.2 RELATED SECTIONS**

- A. Section 06 20 00 – Finish Carpentry

**1.3 REFERENCES**

- A. ASTM D792 - Density and Specific Gravity of Plastics by Displacement.
- B. ASTM D570 - Water Absorption of Plastics.
- C. ASTM D638 - Tensile Properties of Plastics.
- D. ASTM D790 - Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
- E. ASTM D1761 - Mechanical Fasteners in Wood.
- F. ASTM D3679 - Standard Specification for Rigid Poly Vinyl Chloride (PVC) Siding.

**1.4 SUBMITTALS**

- A. General: Submit under provisions of Section 01 30 00 – Administrative Requirements.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation instructions and methods.
  - 4. Code compliance reports.
- C. LEED Submittals: Provide documentation of how the requirements of Credit will be met:
- D. Samples: For each product specified, two samples, minimum size 6 inches long, representing actual product, color, finish.

**1.5 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Manufacturer with a minimum of 15 years producing PVC trim products.



- B. Installer Qualifications: Installer with a minimum of 3 years experience with the installation of PVC trim products.
- C. Regulatory Requirements: Check with Local Building Code for installation requirements.
- D. Allowable Tolerances:
  - 1. Variation in component length: -0.00 / +1.00"
  - 2. Variation in component width:  $\pm 1/16$ "
  - 3. Variation in component thickness:  $\pm 1/16$ "
  - 4. Variation in component edge cut:  $\pm 2^\circ$
  - 5. Variation in Density -0% + 10%
- E. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
  - 1. Finish areas designed by Architect.
  - 2. Do not proceed with remaining work until workmanship, color, and sheen are approved by architect.
  - 3. Refinish mock-up area as required to produce acceptable work.
  - 4. Accepted mock-ups shall be comparison standard for remaining work.

## 1.6 DELIVERY, STORAGE AND HANDLING

- A. Trim materials should be stored on a flat and level surface on a full shipping pallet. Handle materials to prevent damage to product edges and corners.
- B. Store materials under a protective covering to prevent jobsite dirt and residue from collecting on the boards.

## 1.7 WARRANTY

- A. Provide manufacturer's Limited Lifetime warranty against defects in manufacturing that cause the products to rot, corrode, delaminate, or excessively swell from moisture.

## 2.1 PRODUCT MANUFACTURERS

### 2.2

Note : The term AZEK is used for convenience in these specifications and in the drawings. Notwithstanding that other fully tested and equivalent performance , appearance, and finish products will be considered.

- A. products: AZEK® Trimboards manufactured by The AZEK® Company, located at: 888 N Keyser Ave Scranton, PA 18508
- B. Substitutions: Products or manufacturers with fully tested and rated equivalent materials
- C. Requests for substitutions will be considered if accompanied by full supporting test documentation acceptable to project manager and the architect.

D.

## 2.3 MATERIALS

- A. PVC: Free foam cellular PVC material with a small cell microstructure and density of .55



grams/cm<sup>3</sup>.

- Material shall have a minimum physical and performance properties specified in the following Section C.

C. Performance and physical characteristic requirements:

| Property                        | Units                 | Value                      | ASTM Method |
|---------------------------------|-----------------------|----------------------------|-------------|
| PHYSICAL                        |                       |                            |             |
| Density                         | g/cm3                 | 0.55                       | D 792       |
| Water Absorption                | %                     | 0.15                       | D 570       |
| MECHANICAL                      |                       |                            |             |
| Tensile Strength                | psi                   | 2256                       | D 638       |
| Tensile Modulus                 | psi                   | 144,000                    | D 638       |
| Flexural Strength               | psi                   | 3329                       | D 790       |
| Flexural Modulus                | psi                   | 144,219                    | D 790       |
| Nail Hold                       | Lbf/in of penetration | 35                         | D 1761      |
| Property                        | Units                 | Value                      | ASTM Method |
| Screw Hold                      | Lbf/in of penetration | 680                        | D 1761      |
| Staple Hold                     | Lbf/in of penetration | 180                        | D 1761      |
| Gardner Impact                  | in-lbs                | 103                        | D5420       |
| Charpy Impact (@23°C)           | ft-lbs                | 4.5                        | D256        |
| THERMAL                         |                       |                            |             |
| Coefficient of Linear Expansion | in/in/°F              | 3.2 x 10 <sup>-5</sup>     | D 696       |
| Burning Rate                    | in/min                | No burn when flame removed | D 635       |
| Flame Spread Index              | --                    | 25                         | E 84        |
| Heat Deflection Temp 264 psi    | °F                    | 150                        | D 648       |
| Oil Canning (@140°F)            | °F                    | Passed                     | D 648       |

## 2.4 SIMULATED WOOD TRIM

- A. PVC Trimboard: AZEK® Trimboard with Sealed Edge, designed with a smooth finish.

1. Size:
  - a. Nominal Width:
    - 1) 6 inches



- 2) 8 inches
    - 3) 10 inches
    - 4) 12 inches
  - b. Nominal Thickness:
    - 1) 5/8 inch (5/8 inch actual size)
  - c. Length:
    - 1) 12 feet
    - 2) 18 feet
- 2. Finish:
  - a. Traditional/Smooth finish
    - Nominal Corner Size:
      - 1) 4 inches
      - 2) 6 inches
      - 3) 8 inches
  - b. Nominal Thickness:
    - 1) 5/8 inch
  - c. Length:
    - 1) 10 feet
    - 2) 20 feet

## 2.5 SIMULATED WOOD TRIM

A. PVC Trimboard: AZEK® Trimboard, designed for purpose of a roof fascia.

- a. Nominal Width:
    - 1) 4 inches
    - 2) 6 inches
    - 3) 8 inches
  - b. Nominal Thickness:
    - 1) 5/4 inch (1 inch actual size)
  - c. Length:
    - 1) 18 feet
- 2. Finish:
  - a. Traditional/Smooth finish
  - b.

## 2.6 SIMULATED WOOD TRIM FINISH

These products are to be self-finishing and for this purpose are not to be coated or painted. All joints are to be minimally visible and all adhesive used are to be non-damaging to smooth surfaced product.

## 2.7 ACCESSORY PRODUCTS

A. Fasteners:

1. AZEK® Cortex for Trim
2. Use fasteners design for wood trim and wood siding (thinner shank, blunt point, full roundhead) with AZEK®.
3. Use only a highly durable fastener such as epoxy coated stainless steel
4. Staples, small brads and wire nails must not be used as fastening members.
5. The fasteners should be long enough to penetrate the solid wood substrate a minimum of 1 1/2".



6. Standard nail guns work well with AZEK® trim products and are acceptable.
7. Use 2 fasteners per every framing member for trimboard applications. Trimboards 12" or wider, as well as sheets, will require additional fasteners.
8. Fasteners must be installed no more than 2" from the end of each board.
9. AZEK® should be fastened into a flat, solid substrate. Fastening AZEK® into hollow or uneven areas must be avoided.
10. Pre-drilling is typically not required unless a large fastener is used or product is installed in low temperatures.
11. 3/8" and 1/2" sheet product is not intended to be ripped into trim pieces. These profiles must be glued to a substrate and mechanically fastened.

**B. Adhesives:**

1. Glue all AZEK® to AZEK® joints such as window surrounds, long fascia runs, etc. with AZEK® Adhesive, a cellular pvc cement, to prevent joint separation.
2. The glue joint should be secured with a fastener and/or fastened on each side of the joint to allow adequate bonding time.
3. AZEK® Adhesive has a working time of 10 minutes and will be fully cured in 24 hours.
4. If standard pvc cements are used, keep in mind these products typically cure quickly which will result in limited working time and may reduce adhesive strength.
5. Surfaces to be glued should be smooth, clean and in complete contact with each other.
6. To bond AZEK® to other substrates, various adhesives may be used. Consult adhesive manufacturer to determine suitability.

**C. Sealants:**

1. Use urethane, polyurethane or acrylic based sealants without silicone.

## **2.8 FINISHES**

- A. AZEK products do not require paint for protection as such will remain unpainted.

## **PART III EXECUTION**

### **3.01 INSTALLATION**

**A. Manufacturer instructions:**

1. Comply with manufacturer's product catalog installation instructions and product technical bulletin instructions.

**B. Cutting:**

1. AZEK® products can be cut using the same tools used to cut lumber.
2. Carbide tipped blades designed to cut wood work well. Avoid fine tooth metal cutting blades.
3. Rough edges from cutting may be caused by excessive friction, poor board support, or worn or improper tooling.

**C. Drilling:**

1. AZEK® products can be drilled using the same tools used to drill lumber.



2. Drilling AZEK® products is similar to drilling a hardwood. Care should be taken to avoid frictional heat build-up.
3. Use standard woodworking drills. Do not use drills made for normal rigid pvc.
4. Periodic removal of AZEK® shavings from the drill hole may be necessary.

D. Milling:

1. AZEK® products can be milled using standard milling machines used to mill lumber.
2. Relief Angle 20° to 30°
3. Cutting speed to be optimized with the number of knives and feed rate.

E. Routing:

1. AZEK® products can be routed using standard router bits and the same tools used to rout lumber.
2. Carbide tipped router bits are recommended.

F. Edge Finishing:

1. Edges can be finished by sanding, grinding or filing with traditional woodworking tools.

G. Nail Location:

1. Use 2 fasteners per every framing member for trimboard applications.
2. Trimboards over 12" or wider, as well as sheets, will require additional fasteners.
3. Fasteners must be installed no more than 2" from the end of each board.

H. Thermal Expansion and Contraction:

1. AZEK® products expand and contract with changes in temperature.
2. Properly fastening AZEK® material along its entire length will minimize expansion and contraction.
3. When properly fastened, allow 1/8" per 18 foot of AZEK® product for expansion and contraction.
4. Joints between pieces of AZEK® should be glued to eliminate joint separation. When gaps are glued on a long run of AZEK®, allow expansion and contraction at ends of the run.

END OF SECTION



**SECTION 07 2500 – WEATHER BARRIERS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Air Barriers for exterior walls .
- B. Asphaltic coatings on concrete foundations
- C. Roofing membrane

**1.02 RELATED REQUIREMENTS**

- A. Section 03 3000 - Cast-In-Place Concrete: Vapor barrier under concrete slabs on grade.

**1.03 REFERENCE STANDARDS**

- A. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2013.
- B. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials; 2013.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on material characteristics.
- C. Manufacturer's Installation Instructions: Indicate preparation, installation methods, and storage and handling criteria.

**1.05 FIELD CONDITIONS**

- A. Maintain temperature and humidity recommended by the materials manufacturers before, during and after installation.

**PART 2 PRODUCTS****2.01 WEATHER BARRIER ASSEMBLIES**

- A. Air Barrier:
  - 1. On outside surface of CMU exterior walls use Tyvek or equivalent air barrier.

**2.02 AIR BARRIER MATERIALS**

- a. W.R.Grace Construction Products; Perm-A-Barrier VP: [www.graceconstruction.com](http://www.graceconstruction.com).
- b. Hohmann and Barnard, Inc.; Textroflash Liquid VP: [www.h-b.com](http://www.h-b.com).
- c. W.R. Meadows, Inc.; Air-Shield LMP: [www.wrmeadows.com](http://www.wrmeadows.com).
- d. Dupont Tyvek



**2.03 Roofing Membrane**

Install one full layer of W.R. Grace Ice N' Water Shield HT membrane as per manufacturer's instructions over all exposed plywood roof sheathing prior to installation of standing seam metal roofing.

**2.04 ACCESSORIES**

- A. Flexible Flashing: Self-adhesive sheet flashing complying with ASTM D1970,

**PART 3 EXECUTION****3.01 EXAMINATION**

- A. Verify that surfaces and conditions are ready to accept the work of this section.

**3.02 PREPARATION**

- A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.

**3.03 INSTALLATION**

- A. Install materials in accordance with manufacturer's instructions.
- B. Air Barriers: Install continuous air tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.
- C. Coatings:
  - 1. Prepare substrate in manner recommended by coating manufacturer; treat joints in substrate and between dissimilar materials as recommended by manufacturer.
  - 2. Use flashing to seal to adjacent construction and to bridge joints.
- D. Openings and Penetrations in Exterior Weather Barriers:
  - 1. Install flashing over sills, covering entire sill frame member, extending at least 5 inches (125 mm) onto weather barrier and at least 6 inches (150 mm) up jambs; mechanically fasten stretched edges.
  - 2. At openings to be filled with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with at least 4 inches (100 mm) wide; do not seal sill flange.
  - 3. At openings to be filled with non-flanged frames, seal weather barrier to all sides of opening framing, using flashing at least 9 inches (230 mm) wide, covering entire depth of framing.
  - 4. At head of openings, install flashing under weather barrier extending at least 2 inches (50 mm) beyond face of



- jams; seal weather barrier to flashing.
5. At interior face of openings, seal gap between window/door frame and rough framing, using joint sealant over backer rod.
  6. Service and Other Penetrations: Form flashing around penetrating item and seal to weather barrier surface.

#### **3.04 FIELD QUALITY CONTROL**

- A. Do not cover installed weather barriers until required inspections have been completed.

#### **3.05 PROTECTION**

- A. Do not leave materials exposed to weather longer than recommended by manufacturer.

**END OF SECTION**







**SECTION 07 3129 CEDAR SHINGLES****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Wood shingles.
- B. Installation on walls and on-site finish..
- C. Associated metal flashings and accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 1000 - Rough Carpentry: Roof sheathing.
- B. Section 072500 Weather Barriers
- C. Section 07 6200 - Sheet Metal Flashing and Trim: Edge and cap flashings.

**1.03 REFERENCE STANDARDS**

- A. CSSB (WEB) - [Grade Standards as posted at [www.cedarbureau.org](http://www.cedarbureau.org)]; Cedar Shake and Shingle Bureau; current edition.
- B. CSSB (WMAN) - Exterior and Interior Wall Manual; 2011.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating material characteristics, performance criteria, and limitations.
- C. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

**PART 2 PRODUCTS****SHINGLES MANUFACTURER**

Re-squared and rebuted pre-bleached or natural untreated shingles by Maibec Inc

**SPECIES:**

- Eastern White Cedar – *Thuja occidentalis*
- Pre-bleached Nantucket grade shingles to be used for exterior & interior application

**MANUFACTURING**

- Stellite-tipped blades: minimize raised grain
- Kiln-dried to 12% - 16% moisture content

**QUANTITY** Area to cover: 1,000 ft<sup>2</sup> For 5" exposure, add 3% to the area to cover 1,000 ft<sup>2</sup> x 1.03 Each box covers around 25 sq. ft at 5" exposure.

**Product :** Clear transparent prebleached white cedar shingles

**FACTORY-PRE-BLEACHING**

- Every shingle is factory-coated on all sides in a controlled environment for maximum bleach



absorption and retention.

- Following the bleach application, the shingles are sent through a state of the art drier for curing. this drier cures the shingle from the inside out. The shingles are then cooled down and packaged.

## **INSTALLATION**

Manufactured shingles feature a fastening reference line found 6 1/4" from the base of the shingle.

For the 5" required shingle exposure, fasten just below the reference line to respect the installation requirement. Each individual shingle is marked on one side. Consult manufacturers Shingles installation guides to know all installation requirements.

**STAPLES** • Stainless steel or aluminum staple with minimum 7/16" crown, minimum 16 gauge • Two fasteners per shingle, regardless of its width

**NAILS** • Stainless steel or hot dipped galvanized • Ring shank blunt tip nail with minimum 7/32" head • Two fasteners per shingle, regardless of its width  
• Standard round wire shingle type, of Stainless Steel, of sufficient length to penetratethrough sheathing or 3/4 inch (19 mm) into sheathing.

## **EXECUTION**

Install in full accordance with this specification and all applicable building Codes whichever is most stringent.

CSSB Exterior and Interior Wall Manual

Install in accordance with Manufacturers Instructions

Verify existing substrate before starting work.

Install using not less than two fasteners per shingle.

Install to produce straight coursing pattern with 5" weather exposure to produce double thickness.

END OF SECTION



**SECTION 07 4113 - STANDING SEAM METAL ROOFING****PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Metal roofing, including flashing and accessories.
- B. Metal soffit panels.
- C. Preformed metal rain gutters

**1.2 RELATED SECTIONS**

- A. Section 07 62 00 - Sheet Metal Flashing and Trim [07 62 00] - Sheet Metal Flashing and Trim.
- B. Section 07 71 13 - Manufactured Copings [07 71 00] - Manufactured Roof Specialties: Coping and gravel stops.
- C. Section 07 90 00 - Joint Protection [07 92 00] - Joint Sealers.

**1.3 REFERENCES**

- A. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2001.
- B. ASTM E 283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 1991 (Reapproved 1999).
- C. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000.
- D. ASTM E 408/C - 1371: "Standard Test Method for Total Normal Emittance of Surfaces Using inspection - Meter Techniques.
- E. ASTM E 1646 - Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference; 1995.
- F. ASTM E 1680 - Standard Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems; 1995.
- G. UL 580 - Standard for Tests for Uplift Resistance of Roof Assemblies; 1994.
- H. UL2218: Class 4 Impact Resistance Rating.
- I. SMACNA (ASMM) - Architectural Sheet Metal Manual; Sheet Metal and Air Conditioning Contractors National Association; 1993.

**1.4 SUBMITTALS**



- A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
- C. Shop Drawings: Submit shop drawings showing layout, profiles and product components, including anchorage, accessories, finish colors and textures.
- D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- E. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.
- F. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- G. Operation and Maintenance Data: Include methods for maintaining installed products and precautions relating to cleaning materials and methods that might be detrimental to finishes and performance.
- H. Close Out: Warranty documents specified herein.

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Installer with documented experienced in performing work of this section who has specialized in the installation of work similar to that required for this project.
- B. Pre-Installation Meeting: Conduct pre-installation meeting to acquaint installers of roofing and related work with project requirements, substrate conditions, manufacturer's installation instructions and manufacturer's warranty requirements.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging with identification labels intact until ready for installation.
- B. Store materials protected from exposure to harmful conditions. Store material in dry, above ground location.
  - 1. Stack pre-finished material to prevent twisting, bending, abrasion, scratching and denting. Elevate one end of each skid to allow for moisture to run off.
  - 2. Prevent contact with material that may cause corrosion, discoloration or staining.
  - 3. Do not expose to direct sunlight or extreme heat trim material with factory applied strippable film.

#### 1.7 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.



## 1.8 WARRANTY

- A. Manufacturer's Warranty: Provide manufacturer's standard warranty document executed by authorized company official covering finish, including color, fade, chalking and film integrity.
- B. Warranty Period: 20 years commencing on Date of Substantial Completion.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Petersen Aluminum Corp
- B. Everlast Metals
- C. Wrisco Industries
- D. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

### 2.2 SHEET METAL ROOFING

- A. General: Factory fabricated panels; panels fabricated on site using portable roll former are prohibited.
  - 1. Performance Requirements: Provide natural color aluminum sheet metal roofing that has been manufactured, fabricated and installed to achieve the following performance without defects, damage, failure or infiltration of water.
    - a. Wind Uplift: Provide UL 580 Class 90 rated assembly.
    - b. FM: Test Requirements for Class 1 panel roofs.
    - c. Static Air Infiltration: 0.06 cu ft/min/sq ft (1.1 cu m/h/sq m) at 6.24 lb/sq ft (300 Pa) air pressure differential, maximum, when tested in accordance with ASTM E 283 or ASTM E 1680.
    - d. Water Infiltration: No evidence of water penetration at inward static air pressure differential of 12.0 lb/sq ft (575 kPa), when tested in accordance with ASTM E 331 or ASTM E 1646.
    - e. Thermal Movement: Accommodate movement expected due to ambient and surface temperature ranges likely to occur at project site.
  - 2. Panel Lengths: As indicated on drawings; panels 55 feet (16.76 m) and less fabricated in one continuous length.
  - 3. Texture: Bright brushed texture, dull matte specular gloss 25 to 35 percent at 60 degrees F (15.5 degrees C).
- a. Finish: Factory finish: Class I, Bright Brushed Clear Anodic Finish: AA-M12C22A41 Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611. 12" x 12" Sample of material and finish to be approved by architect and project manager.
  - 4. Panel Fasteners: Non-penetrating type, as required to achieve wind uplift rating or otherwise as recommended by manufacturer.
- B. Roof Panels: Aluminum Panels; tension leveled flat panels with separate seam cover.



1. Type: High standing seam, with 2" seam height.
  2. Material: 0.040 inch aluminum, ASTM B 209 3105-H14 alloy.
  3. Panel Width: 16 inches (279 mm), center to center.
- C. Roof Panels:; tension-leveled panels with 2-5/8 inch (67 mm) high mechanically crimped standing seams.
1. Seam Style: Continuous interlock.
  2. Material: 0.040 inch (0.1mm) aluminum, ASTM B 209 3105-H14 alloy.
  3. Panel Type: natural brushed aluminum color Smooth Panel.
  4. Panel Width: 16 inch (406 mm), center to center.
  5. Sealant Bead: Factory applied sealant bead.
- D. Flashing and Trim: Manufacturer's standard flashing and trim profiles, factory formed; fabricated as recommended in SMACNA Architectural Sheet Metal Manual.
1. Material: 0.040 inch (0.1mm) aluminum, ASTM B 209 3105-H14 alloy.
  2. Finish: To match roof panels.
  3. Color: To match roof panels.

## 2.3 ACCESSORY MATERIALS

- A. Underlayment: ASTM D 226, Type II No. 30 asphalt saturated organic roofing felt.
- B. Plywood Deck: 3/4 inch (16 mm) nominal thickness tongue n' groove waterproof plywood; as specified in Section 06 10 00 - Rough Carpentry.
- C. Sealant: Elastomeric.
- D. Bituminous Coating: Cold-applied asphaltic mastic, free of asbestos fibers, sulfur, and other harmful impurities.
- E. Touch-Up Paint: Approved by panel manufacturer.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify that substrates are acceptable for roofing installation in accordance with manufacturer's instructions.
- B. Do not begin installation until substrates have been properly prepared.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

### 3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Coordinate metal roofing with other work, including but not limited to drainage, flashing and trim, deck substrates, parapets, copings, walls, and other adjoining work.
- C. Install metal roofing panels to profiles, patterns and drainage indicated, in accordance with manufacturer's instructions, and as necessary to achieve specified



performance and a leak-free Installation. Allow for structural and thermal movement.

- D. Separate dissimilar metals using bituminous coating to prevent galvanic action.
- E. Use fasteners recommended by panel manufacturer; conceal fasteners wherever possible; cover and seal exposed fasteners.
- F. Provide uniform, neat seams; provide sealant-type joint where indicated and form joints to conceal sealant.

### 3.3 FIELD QUALITY CONTROL

- A. Post Installation Testing: Owner reserves right to perform post installation testing of installed sheet metal roofing.
- B. Manufacturer's Field Services: Upon Owner's request, provide manufacturer's field service consisting of product use recommendations and periodic site visit for inspection of product installation in accordance with manufacturer's instructions.

### 3.4 CLEANING

- A. Remove temporary coverings and protection of adjacent work areas.
- B. Touch-up, repair or replace damaged products.
- C. Clean in accordance with manufacturer's instructions prior to Substantial Completion.
- D. Remove construction debris from project site and legally dispose of debris.

### 3.5 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION







## SECTION 07 4243 – FIBER CEMENT SIDING

### 1.1 SUMMARY

#### A. Section Includes:

1. Exterior panelized fiber-cement cladding system and accessories.
2. Interior panelized fiber-cement cladding system and accessories.
3. Composite poly-ash siding

### 1.2 MANUFACTURERS

- A. Nichiha Products Ltd.
- B. James Hardie Products
- C. Boral Composite Inc.
- D. Everlast Composite Siding

### 1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at **Project site**. If needed, insert list of conference participants not mentioned in Section 13100 "Project Management and Coordination."
  1. Review methods and procedures related to composite panel installation, including manufacturer's written instructions.
  2. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
  3. Review flashings, special siding details, wall penetrations, openings, and condition of other construction that affect composite panels.
  4. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
  5. Review temporary protection requirements for composite panel assembly during and after installation.
  6. Review procedures for repair of panels damaged after installation.
  7. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

### 1.4 ACTION SUBMITTALS

#### A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.



## B. Sustainable Design Submittals:

1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
2. Laboratory Test Reports: For ceilings and walls, indicating compliance with requirements for low-emitting materials.

## C. Shop Drawings:

1. Include details of panel dimensions, profiles, edge conditions, joints, corners, anchorages, attachment assembly, trim, flashings, closures, and accessories; and special details.
2. Accessories: Include details of the flashing, trim, and anchorage, at a scale of not less than 1-1/2 inches per 12 inches (1:10).

## D. Samples for Initial Selection: For each type of composite panel indicated with factory-applied color finishes.

1. Include similar Samples of trim and accessories involving color selection.

## E. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.

1. Composite Panels: 12 inches (305 mm) long by actual panel width. Include fasteners, closures, and other composite panel accessories. Submit custom color samples in paint manufacturer's standard size.

## 1.5 INFORMATIONAL SUBMITTALS

## A. Qualification Data: For Installer.

## B. Product Test Reports: For each product, tests performed by a qualified testing agency.

1. Composite Manufacturer's Material Test Reports: Certified test reports showing compliance with specific performance or third-party listing documenting compliance to comparable code sections IBC 1404.16.1 and IBC 1703.5.
2. Composite Panel System Fabricator's Certified System Tests Reports: Certified system test reports showing system compliance with specific performance or third-party listing documenting compliance code section. Base performance requirements on composite panel system type provided.

C. *Field quality*-control reports.

## D. Sample Warranties: For special warranties.

## 1.6 CLOSEOUT SUBMITTALS

## A. Maintenance Data: For composite panels to include in maintenance manuals.



## 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by composite panel fabricator.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for composite panel fabrication and installation.
  - 1. Build mockup of typical composite panel assembly as indicated on Drawings including corner, soffits, supports, attachments, and accessories.
  - 2. Water-Spray Test: Conduct water-spray test of mockup of composite panel assembly, testing for water penetration in accordance with AAMA 501.2.
  - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, composite panels, and other manufactured items so as not to be damaged or deformed. Package composite panels for protection during transportation and handling.
- B. Unload, store, handle, and erect composite panels in a manner to prevent bending, cracking, warping, twisting, and surface damage.
- C. Stack composite panels on platforms or pallets no more than two pallets high, covered with suitable weathertight and ventilated covering.
- D. Store composite panels to ensure dryness, with positive slope for drainage of water. Do not store composite panels in contact with other materials that might cause staining, denting, or other surface damage. Ensure panels are fully dry before installation.

## 1.9 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of composite panels to be performed in accordance with manufacturers' written instructions and warranty requirements.

## 1.10 COORDINATION

- A. Coordinate composite panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

## 1.11 WARRANTY

- A. Warranty on Panel Material: Manufacturer agrees to replace fiber cement that fails within specified warranty period.



1. Warranty Period: 15 years from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer agrees to repair finish or replace composite panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
  1. Finish Warranty Period: 15 years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 40 percent.
- B. Products shall comply with requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- C. Products shall comply with requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- D. Products shall comply with requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers." Formaldehyde emissions shall not exceed 16.5 mcg/cu. m or 13.5 ppb, whichever is less.
- E. Products shall comply with requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- F. Physical Performance: Provide composite panel system in accordance with ASTM C1186.
  1. Wet Flexural Strength: Result: **1418 psi (9777 kPa)**, Lower Limit: **1015 psi (6998 kPa)**.
  2. Water Tightness: No water droplets observed on any specimen.
  3. Freeze-Thaw: No damage or defects observed.
  4. Warm Water: No evidence of cracking, delamination, swelling, or other defects observed.
  5. Heat-Rain: No crazing, cracking, or other deleterious effects, or surface or joint changes observed in any specimen.
- G. Structural Performance: Provide composite panel systems capable of withstanding the effects of the following loads, based on testing in accordance with ASTM E330/E330M:
  1. Design Wind Loads: Minimum **58 psf (2.78 kPa)**
  2. Deflection Limits: For wind loads, panel deflection no greater than L/120 of the span.
- H. Thermal Expansion: Maximum **0.00000318 deg F to minus 1 (0.000005724 deg C to minus 1)** when tested in accordance with ASTM E228.



- I. Air Leakage: **1.53 cfm/sq. ft. (7.78 L/s/sq. m)** or less in accordance with AAMA5094.
- J. Water Penetration under Static Pressure: No water penetration to room side of assembly when tested for 15 minutes in accordance with ASTM E331 at the following test-pressure difference:
  - 1. Test-Pressure Difference: [**2.86 lbf/sq. ft. (137 Pa)**] [**6.24 lbf/sq. ft. (300 Pa)**].
- K. Fire Propagation Characteristics: Composite panel wall assembly passes NFPA 285.
- L. Surface-Burning Characteristics: Provide composite panels that meet the following values when tested in accordance with ASTM E84:
  - 1. Flame-Spread Index: Zero.
  - 2. Smoke-Developed Index: 5.
- M. Fire Resistance: Composite panel wall assembly passes ASTM E119.
- N. Ignition Resistance: Composite panel passes NFPA 268.

## 2.2 COMPOSITE WALL PANELS

- A. Composite Wall Panel Systems: Provide factory-formed and -assembled, composite wall panels fabricated from a pressed, stamped, and autoclaved mix of portland cement, fly ash, silica, recycled rejects, and wood fiber bundles; formed into profile for installation method indicated. Include attachment assembly components and accessories required for weathertight system.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Nichiha Architectural Wall Panels; Architectural Wall Panels or comparable product by one of the following:
    - a. Cembrit.
    - b. MEW USA Inc.
    - c. Swisspearl.
- B. Smooth, Matte finish Grooved Composite Wall Panels <
  - 1. Panel Dimensions: Maximum uncut panel sizes to suit installation.
  - 2. Panel Thickness: **5/8 inch**.
  - 3. Panel: Factory sealed on all six sides.
  - 4. Profiles: (Nichiha or equivalent ) Vintagewood spruce , matte finish or Rough sawn smoke, or vintagewood ash.
  - 5. Color: As above
  - 6. Accessory Components: Manufactured corners **with 3-1/2-inch (89-mm) returns**

## 2.3 MISCELLANEOUS MATERIALS

- A. Miscellaneous Metal Subframing and Furring: **Class AZ50 (Class AZM150)** aluminum-zinc-alloy coating designation unless otherwise indicated. Provide Fabricator's standard sections as required for support and alignment of composite panel system.



1. Basis-of-Design Product: Subject to compliance with requirements, provide Nichiha Architectural Wall Panels; Ultimate Horizontal Starter Track or comparable product by one of the listed alternate manufacturers.
- B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of composite panels unless otherwise indicated.
  1. Basis-of-Design Product: Subject to compliance with requirements, provide Nichiha Architectural Wall Panels; Ultimate Clip System or comparable product by or comparable product by one of the listed alternate manufacturers.
- C. Flashing and Trim: Provide anodized aluminum flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers.
  1. Aluminum Trim: Formed with 0.040-inch (1.00-mm-) thick, coil-coated aluminum sheet facings.
  2. Color: to match panel color and finish
- D. Panel Fasteners: Provide corrosion-resistant fasteners as required for construction method used.
- E. Panel Sealants: ASTM C920, Class 35; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in composite panels and remain weathertight; and as recommended in writing by composite panel manufacturer.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, composite panel supports, and other conditions affecting performance of the Work.
  1. Examine wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by composite panel manufacturer.
  2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by composite panel manufacturer.
    - a. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Examine roughing-in for components and assemblies penetrating composite panels to verify actual locations of penetrations relative to seam locations of composite panels before installation.



- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages in accordance with composite panel manufacturer's written instructions.

### 3.3 COMPOSITE PANEL INSTALLATION

- A. General: Install composite panels in accordance with Fabricator's written instructions in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to supports unless otherwise indicated. Anchor composite panels and other components of the Work securely in place, with provisions for thermal and structural movement.
  - 1. Shim or otherwise plumb substrates receiving composite panels.
  - 2. Flash or seal composite panels at perimeter of all openings. Fasten flashing with manufacturer-approved fasteners. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by composite panels are installed.
  - 3. Install screw fasteners in predrilled holes.
  - 4. Locate and space fastenings in uniform vertical and horizontal alignment.
  - 5. Install flashing and trim as composite panel work proceeds.
  - 6. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.
- B. Fasteners:
  - 1. Composite Panels: Use hot-dip galvanized, ceramic-coated, or stainless steel fasteners for surfaces exposed to the exterior; use galvanized-steel fasteners for surfaces exposed to the interior.
- C. Attachment Assembly, General: Install attachment assembly required to support composite wall panels and to provide a complete weathertight wall system, including subgirts, perimeter extrusions, tracks, drainage channels, panel clips, and anchor channels.
  - 1. Include attachment to supports, panel-to-panel joinery, panel-to-dissimilar-material joinery, and panel-system joint seals.
- D. Panel Installation: Attach composite wall panels to supports at locations, at spacings, and with fasteners recommended in writing by Fabricator to achieve performance requirements specified.
- E. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
  - 1. Install components required for a complete composite panel assembly including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by composite panel Fabricator; or, if not indicated, provide types recommended in writing by composite system Fabricator.



- F. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, or SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.
1. Install exposed flashing and trim that is without buckling and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof performance.
  2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 ft. (3 m) with no joints allowed within 24 inches (605 mm) of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).

### 3.4 ERECTION TOLERANCES

- A. Site Verifications of Conditions:
1. Verify that conditions of substrate previously installed under other Sections are acceptable for composite system installation. Provide documentation indicating detrimental conditions to composite system performance.
  2. Once conditions are verified, composite system installation tolerances are as follows:
    - a. Shim and align composite wall panel units within installed tolerance of 1/4 inch in 20 ft. (6 mm in 6 m), non-accumulative, on level, plumb, and location lines as indicated, and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

### 3.5 FIELD QUALITY CONTROL

- A. Testing Agency: **Owner will engage** a qualified testing agency to perform tests and inspections.
- B. Water-Spray Test: After installation, test area of assembly **indicated on Drawings** for water penetration in accordance with AAMA 501.2.
- C. Fabricator's Field Service: Engage a factory-authorized service representative to test and inspect completed composite wall panel installation, including accessories.
- D. Composite wall panels will be considered defective if they do not pass test and inspections.
- E. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.
- F. Prepare test and inspection reports.



### 3.6 CLEANING AND PROTECTION

- A. Remove temporary protective coverings, if any, as composite panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of composite panel installation, clean finished surfaces as recommended by composite panel manufacturer. Maintain in a clean condition during construction.
- B. After composite panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.
- C. Replace composite panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 074243







**SECTION 07 6200 - SHEET METAL FLASHING AND TRIM****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Fabricated sheet metal items, including flashings and counterflashings.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 1000 - Rough Carpentry: Wood nailers.
- B. Section 07 6100 - Sheet Metal Roofing.
- C. Section 08 6300 - Metal-Framed Skylights: Metal curbs.

**1.03 REFERENCE STANDARDS**

- A. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels; 2013.
- B. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels; 2013.
- C. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2010.
- D. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007 (Reapproved 2012)e1.
- E. SMACNA (ASMM) - Architectural Sheet Metal Manual; Sheet Metal and Air Conditioning Contractors' National Association; 2012.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Samples: Submit two samples 6x6 inch in size illustrating metal finish color.

**1.05 QUALITY ASSURANCE**

- A. Perform work in accordance with SMACNA Architectural Sheet Metal Manual requirements and standard details, except as otherwise indicated.
- B. Fabricator and Installer Qualifications: Company specializing in sheet metal work with 5 years of documented experience.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- B. Prevent contact with materials that could cause discoloration or staining.



## **PART 2 PRODUCTS**

### **2.01 SHEET MATERIALS**

- A. Clear anodized bright brushed Aluminum: ASTM B209 (ASTM B209M); 0.032 inch (0.8 mm) thick;
  - 1. Color: to match aluminum roofing material

### **2.02 ACCESSORIES**

- A. Fasteners: Aluminum or Stainless Steel, with soft neoprene washers.
- B. Underlayment: ASTM D226/D226M, organic roofing felt, Type I ("No. 15").
- C. Slip Sheet: Rosin sized building paper.
- D. Primer: Zinc chromate type.
- E. Protective Backing Paint: Zinc molybdate alkyd.
- F. Sealant: Type specified in Section 07 9005.
- G. Plastic Cement: ASTM D4586, Type I.

### **2.03 FABRICATION**

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Form pieces in longest possible lengths.
- C. Hem exposed edges on underside 1/2 inch (13 mm); miter and seam corners.
- D. Form material with flat lock seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- E. Fabricate corners from one piece with minimum 18 inch (450 mm) long legs; seam for rigidity, seal with sealant.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
- B. Verify roofing termination and base flashings are in place, sealed, and secure.

### **3.02 PREPARATION**

- A. Install starter and edge strips, and cleats before starting installation.
- B. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil (0.4 mm).

### **3.03 INSTALLATION**

- A. Secure flashings in place using concealed fasteners.
- B. Apply plastic cement compound between metal flashings and felt flashings.
- C. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.



- D. Seal metal joints watertight.

#### **3.04 FIELD QUALITY CONTROL**

- A. See Section 01 4000 - Quality Requirements, for field inspection requirements.
- B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

#### **3.05 SCHEDULE**

- A. Through-Wall Flashing in Masonry:  
Material: Prefinished aluminum sheet 0.040
- B. Cedar Shingle termination and Window Head Flashings: Pre-Finished Aluminum

**END OF SECTION**







**SECTION 07 8400 - FIRESTOPPING****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Firestopping systems.

**1.02 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance ratings, and limitations.

**1.03 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section and:
  - 1. With minimum 3 years documented experience installing work of this type.

**1.04 FIELD CONDITIONS**

- A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation. Maintain minimum temperature before, during, and for 3 days after installation of materials.

**PART 2 PRODUCTS****2.01 FIRESTOPPING - GENERAL REQUIREMENTS**

- A. Manufacturers:
  - 1. A/D Fire Protection Systems Inc: [www.adfire.com](http://www.adfire.com).
  - 2. 3M Fire Protection Products: [www.3m.com/firestop](http://www.3m.com/firestop).
  - 3. Hilti, Inc: [www.us.hilti.com](http://www.us.hilti.com).
  - 4. Nelson FireStop Products: [www.nelsonfirestop.com](http://www.nelsonfirestop.com).
  - 5. Specified Technologies, Inc: [www.stifirestop.com](http://www.stifirestop.com).
- B. Firestopping: Any material meeting requirements.
- C. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Type required for tested assembly design.
- D. Fire Ratings: See Drawings for required systems and ratings.

**PART 3 EXECUTION****3.01 EXAMINATION**

- A. Verify openings are ready to receive the work of this section.

**3.02 PREPARATION**

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter that could adversely affect bond of firestopping material.
- B. Remove incompatible materials that could adversely affect bond.



**3.03 INSTALLATION**

- A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.

**3.04 CLEANING**

- A. Clean adjacent surfaces of firestopping materials.

**3.05 PROTECTION**

- A. Protect adjacent surfaces from damage by material installation.

**END OF SECTION**



**SECTION 07 9005 – JOINT SEALERS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Sealants and joint backing.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 8400 - Firestopping: Firestopping sealants.
- B. Section 09 2116 - Gypsum Board Assemblies: Acoustic sealant.

**1.03 REFERENCE STANDARDS**

- A. ASTM C834 - Standard Specification for Latex Sealants; 2010.
- B. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications; 2012.
- C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.
- D. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2013.
- E. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition; [www.aqmd.gov](http://www.aqmd.gov).

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate the work with other sections referencing this section.

**1.05 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.

**1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- B. Applicator Qualifications: Company specializing in performing the work of this section with minimum three years documented experience and approved by manufacturer.

**1.07 FIELD CONDITIONS**

- A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

**1.08 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a five year period after Date of Substantial Completion.
- C. Warranty: Include coverage for installed sealants and accessories which fail to achieve airtight seal, exhibit loss of adhesion or cohesion, or do not cure.

**PART 2 PRODUCTS****2.01 MANUFACTURERS**

- A. Gunnable and Pourable Sealants:
  - 1. BASF Construction Chemicals-Building Systems: [www.buildingsystems.basf.com](http://www.buildingsystems.basf.com).
  - 2. Bostik Inc: [www.bostik-us.com](http://www.bostik-us.com).
  - 3. Dow Corning Corporation: [www.dowcorning.com](http://www.dowcorning.com).



4. Hilti, Inc: [www.us.hilti.com](http://www.us.hilti.com).
  5. Pecora Corporation: [www.pecora.com](http://www.pecora.com).
  6. Tremco Global Sealants: [www.tremcosealants.com](http://www.tremcosealants.com).
  7. Sherwin-Williams Company: [www.sherwin-williams.com](http://www.sherwin-williams.com).
  8. W.R. Meadows, Inc: [www.wrmeadows.com](http://www.wrmeadows.com).
- B. Preformed Compressible Foam Sealers:
1. EMSEAL Joint Systems, Ltd: [www.emseal.com](http://www.emseal.com).
  2. Sandell Manufacturing Company, Inc: [www.sandellmfg.com](http://www.sandellmfg.com).
  3. Dayton Superior Corporation: [www.daytonsuperior.com](http://www.daytonsuperior.com).
  4. Tremco Global Sealants: [www.tremcosealants.com](http://www.tremcosealants.com).

## 2.02 SEALANTS

- A. Sealants and Primers - General: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No.1168.
- B. General Purpose Exterior Sealant: Polyurethane; ASTM C920, Grade NS, Class 25, Uses M, G, and A; single component.
1. Color: Match adjacent finished surfaces.
  2. Applications: Use for:
    - a. Control, expansion, and soft joints in masonry.
    - b. Joints between concrete and other materials.
    - c. Joints between metal frames and other materials.
    - d. Other exterior joints for which no other sealant is indicated.
  3. Polyurethane Products:
    - a. Pecora Corporation; DynaTrol I-XL General Purpose One Part Polyurethane Sealant: [www.pecora.com](http://www.pecora.com).
    - b. Sherwin-Williams Company; Stampede-1/-TX Polyurethane Sealant: [www.sherwin-williams.com](http://www.sherwin-williams.com).
    - c. Sherwin-Williams Company; Stampede 1H Hybrid Sealant: [www.sherwin-williams.com](http://www.sherwin-williams.com).
    - d. Sherwin-Williams Company; Stampede 2NS Polyurethane Sealant: [www.sherwin-williams.com](http://www.sherwin-williams.com).
    - e. Substitutions: See Section 01 6000 - Product Requirements.
- C. General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C834, Type OP, Grade NF single component, paintable.
1. Color: Match adjacent finished surfaces.
  2. Applications: Use for:
    - a. Interior wall and ceiling control joints.
    - b. Joints between door and window frames and wall surfaces.
    - c. Other interior joints for which no other type of sealant is indicated.
  3. Products:
    - a. Pecora Corporation; AC-20 + Silicone Acrylic Latex Caulking Compound: [www.pecora.com](http://www.pecora.com).
    - b. Sherwin-Williams Company; 850A Acrylic Latex Caulk: [www.sherwin-williams.com](http://www.sherwin-williams.com).
    - c. Sherwin-Williams Company; 950A Siliconized Acrylic Latex Caulk: [www.sherwin-williams.com](http://www.sherwin-williams.com).
    - d. Substitutions: See Section 01 6000 - Product Requirements.
- D. Bathtub/Tile Sealant: White silicone; ASTM C920, Uses I, M and A; single component, mildew resistant.
1. Applications: Use for:
    - a. Joints between plumbing fixtures and floor and wall surfaces.
    - b. Joints between kitchen and bath countertops and wall surfaces.
  2. Products:
    - a. Pecora Corporation; 898NST Sanitary Silicone Sealant - Class 50: [www.pecora.com](http://www.pecora.com).



- b. Substitutions: See Section 01 6000 - Product Requirements.
- E. Acoustical Sealant for Concealed Locations:
  - 1. Applications: Use for concealed locations only:
    - a. Sealant bead between top stud runner and structure and between bottom stud track and floor.
  - 2. Products:
    - a. Pecora Corporation; AIS-919 Acoustical and Insulation Latex Sealant: [www.pecora.com](http://www.pecora.com).
    - b. Pecora Corporation; AC-20 FTR Acoustical and Insulation Sealant: [www.pecora.com](http://www.pecora.com).
    - c. Hilti, Inc.; CP 506 Smoke and Acoustical Sealant: [www.us.hilti.com](http://www.us.hilti.com).
    - d. Substitutions: See Section 01 6000 - Product Requirements.
- F. Interior Floor Joint Sealant: Polyurethane, self-leveling; ASTM C920, Grade P, Class 25, Uses T, M and A; single component.
  - 1. Approved by manufacturer for wide joints up to 1-1/2 inches.
  - 2. Color: Match adjacent finished surfaces.
  - 3. Applications: Use for:
    - a. Expansion joints in floors.
  - 4. Products:
    - a. Pecora Corporation; NR-201 Self-Leveling Traffic and Loop Sealant: [www.pecora.com](http://www.pecora.com).
    - b. Sherwin-Williams Company; Stampede 1SL Polyurethane Sealant: [www.sherwin-williams.com](http://www.sherwin-williams.com).
    - c. Sherwin-Williams Company; Stampede 2SL Polyurethane Sealant: [www.sherwin-williams.com](http://www.sherwin-williams.com).
    - d. Substitutions: See Section 01 6000 - Product Requirements.

## **2.03 ACCESSORIES**

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: Round foam rod compatible with sealant; ASTM D 1667, closed cell PVC; oversized 30 to 50 percent larger than joint width.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that substrate surfaces are ready to receive work.
- B. Verify that joint backing and release tapes are compatible with sealant.

### **3.02 PREPARATION**

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean and prime joints in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Protect elements surrounding the work of this section from damage or disfigurement.

### **3.03 INSTALLATION**

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C1193.



- C. Perform acoustical sealant application work in accordance with ASTM C919.
- D. Install bond breaker where joint backing is not used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- F. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- G. Tool joints concave.

**3.04 CLEANING**

- A. Clean adjacent soiled surfaces.

**3.05 PROTECTION**

- A. Protect sealants until cured.

**END OF SECTION**



## **SECTION 08 1113 - HOLLOW METAL DOORS and FRAMES**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Plastic laminate finished hollow steel doors and frames.
- B. Hollow Metal sliding barn doors, stainless steel rolling hardware and HM frames.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 08 7100 - Door Hardware.
- B. Section 09 9000 - Painting and Coating: Field FinishingC.

#### **1.03 REFERENCE STANDARDS**

- A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council;2009.
- B. ANSI A250.8 - SDI-100 Recommended Specifications for Standard Steel Doors and Frames;2003.
- C. ANSI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 1998 (R2011).
- D. BHMA A156.115 - Hardware Preparation in Steel Doors and Steel Frames;2006.
- E. NAAMM HMMA 840 - Guide Specifications for Installation andStorage of Hollow Metal Doors and Frames; The National Association of Architectural Metal Manufacturers; 2007.
- F. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; currentedition.

#### **1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorageand fastening methods, and finishes; and one copy of referencedgrade standard.
- C. Shop Drawings: Details of each opening, showing elevations,glazing, frame profiles, and identifying location of different finishes, if any.

#### **1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimumthree years documented experience.
- B. Maintain at the project site a copy of all reference standards



dealing with installation.

### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Store in accordance with NAAMM HMMA 840.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Steel Doors and Frames: plastic laminate surfaced hollow metal doors
  - 1. Republic Doors: [www.republicdoor.com](http://www.republicdoor.com).
  - 2. Steelcraft Doors, an Allegion brand: [www.allegion.com/us](http://www.allegion.com/us).
  - 3. All approved equivalent substitutions

- B. Custom fabricated hollow metal sliding barn door with rough sawn cedar wood trim on face over plastic laminate finish ,steel louvers in place of vision panel with insect screen on interior side.

(Please note : The hardware for this sliding barn door is specified in Section 087100 with stainless steel roller glides , stainless steel support rail ,locking Hardware, pull handle and floor guides)

Trim sliding barn door door with ½"x4" rough sawn cedar planks bonded to door surface as per dwg. A-10 and elevations. The wood trim-planks are to be treated with three coats of wood preservative ( see Section 09900).

The wall opening to be fitted with hollow metal door frame as per details. Stainless steel door bottom door guide to be located where door sliding will occur and locking mechanism for both open and shut positionsto be provided keyed to master key system.

### **2.02 DOORS AND FRAMES**

- A. Requirements for All Doors and Frames:
  - 1. Accessibility: Comply with ANSI/ICC A117.1.
  - 2. Door Top Closures: Flush with top of faces and edges.
  - 3. Door Edge Profile: Beveled on both edges.
  - 4. Door Texture: factory bonded plastic laminate .
  - 5. Glazed Lights: Non-removable stops on non-secure side;sizes and configurations as indicated on drawings.
  - 6. Hardware Preparation: In accordance with BHMA A156.115,with reinforcement welded in place, in addition to other requirements specified in door grade standard.
  - 7. Galvanizing for Units in Wet Areas: All components hot-dipped zinc-iron alloy-coated(galvannealed), manufacturer's standard



coating thickness.

8. Finish: Factory installed plastic laminate.

#### B. Steel Doors,

Steel stiffened core construction using 20 gauge stiffeners (18/16 gauge options) located 6" apart and welded 5" max OC the height of each stiffener, filled with 1 pound fiberglass batting (polystyrene option) between stiffeners

The standard stiffened core with fiberglass batting for sound absorption.

Square edge design allows for non-handed inventory control in local distribution.

Optional lock edge bevel 1/8" over 2" (~3°)

Hinge and lock edges are reinforced with continuous 16 gauge steel channel the full height of the door, welded at a max 5" OC (optional 10 gauge hinge and 14 gauge lock channel with DE Series)

Universal standard/heavy weight hinges are used with hinge fillers

Standard visible edges may be filled seamless, intermittently stitch welded and filled, or continuously welded and filled

Top flush and bottom inverted channels with 16 gauge steel channels, projection welded at a max 2-1/2" OC

Standard 14 gauge inverted top and bottom channels

16 gauge mortise or cylindrical lock reinforcements are of an integral type in accordance with ANSI A115 standards

Fire Rated Doors : Mechanical room Door D26

Grade ANSI250.8 level physical performance level B Model 1 with laminated safety glass vision panel Fire rating : 1 hour with ULC rating label attached to door and frame.

Concealed vertical rod panic Hardware ( see Section 087100)

### 2.03 STEEL FRAMES

#### A. General:

1. Comply with the requirements of grade specified for corresponding door.
  - a. ANSI A250.8 Level 1 Doors: 16 gage frames.
2. Finish: Same as for door.
3. Frames Wider than 48 Inches (1200 mm): Reinforce with steel channel fitted tightly into frame head, flush with top.

- #### B. Door Frames, Non-Fire-Rated, acoustic insulated except for door D26 to mechanical room which is a one hour fire rated door and frame.



**2.04 ACCESSORY MATERIALS**

- A. Glazing: Provide factory installed laminated safety glass for all vision panels with frosted laminated safety glass for vestibule doors ( D03, D04)
- B. Silencers: Resilient rubber, fitted into drilled hole; 3 on strike side of single door, 3 on center mullion of pairs, and 2 on head of pairs without center mullions.
- C. Temporary Frame Spreaders: Provide for all frames

**2.05 FINISH MATERIALS**

- A. Primer: Rust-inhibiting, complying with ANSI A250.10, door manufacturer's instructions

**PART 3 EXECUTION****3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.

**3.02 INSTALLATION**

- A. Install in accordance with the requirements of the specified door grade standard and NAAMM/MMA 840.
- B. In addition, install fire rated units in accordance with NFPA 80.
- C. Coordinate frame anchor placement with wall construction.
- D. Coordinate installation of hardware.

**3.03 TOLERANCES**

- A. Maximum Diagonal Distortion: 1/16 in (1.5 mm) measured with straight edge, corner to corner.

**3.04 ADJUSTING**

- A. Adjust for smooth and balanced door movement.

**END OF SECTION**



**SECTION 08 1613****FIBERGLASS LOUVER DOORS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Provide Solid Core Fiberglass reinforced plastic (FRP) doors for all indoor and outdoor shower stalls.

Note : These doors are to be installed complete with all hardware and accessories as part of the scope of work of Section 102116 Plastic Shower Compartments (including installation of doors and frames for outdoor shower stalls ).

The supplier of the fiberglass louver doors is to template and prepare the doors for all door stainless steel hardware or accessories to be supplied or installed by others.

- B. For locations see A-2 or Ab-2 floor plans :  
Provide interior bifold doors #D-18 & D-19 (see A-2a) and bifold doors #D-10 & D-11 (see Ab-2a) for accessible bathrooms.  
Provide 8 exterior doors for outdoor shower stalls for all (6) Camps.  
Provide 10 interior doors for shower stalls in each of Mills Camp, A & B Camps)  
Provide 8 interior doors for shower stalls in each of Main Camp, Fish Camp & Legion Town).  
C. Provide Prefinished welded reinforced fiberglass door frames ( jambs only) for the outdoor showers ( 8 per building).  
D. Fiberglass Louvers (fixed angle) set in door panels are to be factory installed.  
E. Provide fiberglass louver bifold closet doors for the supply closets in each Camp.

**1.02 RELATED REQUIREMENTS**

- A. Section 08 7100 - Door Hardware: Other door hardware.
- B. Section 102116 – Plastic Shower Compartments.

**1.03 REFERENCE STANDARDS**

- A. ANSI A250.4 - American National Standard Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors and Hardware Reinforcings; 2011.
- B. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position; 2010.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2013a.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination: Obtain hardware templates from hardware manufacturer prior to starting fabrication.
- B. Fiberglass Shower Stall Doors and hardware to be coordinated with shower stall suppliers.

**C. MANUFACTURERS**

Or approved substitutions as per specifications.

- A) Pella
- B) Etco
- C) Jen-Weld



### **1.05 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard details, installation instructions, and hardware and anchor recommendations.
- C. Shop Drawings: Show layout and profiles; include assembly methods.
  - 1. Indicate product components, including hardware reinforcement locations and preparations, accessories, finish colors, patterns, and textures.
  - 2. Indicate wall conditions, door and frame elevations, sections, materials, gages, finishes, location of door hardware by dimension, and details of openings; use same reference numbers indicated on Drawings to identify details and openings.
- D. Selection Samples: Submit two complete sets of color chips, illustrating manufacturer's available finishes, colors, and textures.
- E. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer; include detailed terms of warranty.

### **1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with not less than three years of documented experience.
- B. Installer Qualifications: Company specializing in installing products of the type specified in this section with not less than three years of documented experience.

### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- B. Store materials in original packaging, under cover, protected from exposure to harmful weather conditions and from direct contact with water.
  - 1. Store at temperature and humidity conditions recommended by manufacturer.
  - 2. Do not use non-vented plastic or canvas shelters.
  - 3. Immediately remove wet wrappers.
- C. Store in position recommended by manufacturer, elevated minimum 4 inches (102 mm) above grade, with minimum 1/4 inches (6 mm) space between doors.

### **1.08 FIELD CONDITIONS**

- A. Do not install doors until structure is enclosed.
- B. Maintain temperature and humidity at manufacturer's recommended levels during and after installation of doors.

### **1.09 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide five (5) year manufacturer warranty covering materials and workmanship, including degradation or failure due to chemical contact.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Molded Fiberglass Doors:
  - 1. ; MWG4 - Wood Grain Texture Mold: [www.chem-pruf.com](http://www.chem-pruf.com).
  - 2. Substitutions: See Section 01 6000 - Product Requirements.

### **2.02 DOOR AND FRAME ASSEMBLIES**

- A. Door and Frame Assemblies: Factory-fabricated, prepared and machined for hardware.



1. Door and frame pre-assembled, complete with hinges and hardware; shipped with braces, spreaders, and packaging as required to prevent damage.
  - a. Sliding doors do not require frames.
2. Mechanical Durability: Tested to ANSI A250.4 Level A (1,000,000 cycles), minimum; tested with hardware and fasteners intended for use on project.
3. Screw-Holding Capacity: Tested to 900 psi (6200 kPa), minimum.
4. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less; when tested in accordance with ASTM E84.
5. Flammability: Self-extinguishing when tested in accordance with ASTM D635.
6. Clearance Between Door and Frame: 1/8 inch (3 mm), maximum.
7. Clearance Between Bottom of Door and Finished Floor: 3/4 inch (19 mm), maximum; not less than 1/4 inch (6 mm) clearance to threshold.
8. Color: to be selected from manufacturer's samples.

## **2.03 ACCESSORIES**

- A. Glazing: Laminated safety glass, 1/4 inch (6 mm) thick, with minimum 0.030 inch (0.76 mm) thick interlayer, clear.
- B. Hardware: As specified in Section 08 7100.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Do not begin installation until substrates have been properly prepared.

### **3.02 PREPARATION**

- A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- B. Clean and prepare substrate in accordance with manufacturer's directions.

### **3.03 INSTALLATION**

- A. Install in accordance with manufacturer's instructions; do not penetrate frames with anchors.
- B. Set units plumb, level, and true-to-line, without warping or racking doors, and with specified clearances; anchor in place.
- C. Separate aluminum and other metal surfaces from sources of corrosion of electrolytic action at points of contact with other materials.

### **3.04 ADJUSTING**

- A. Lubricate, test, and adjust doors to operate easily, free from warp, twist or distortion, and to fit watertight for entire perimeter.
- B. Adjust hardware for smooth and quiet operation.
- C. Adjust doors to fit snugly and close without sticking or binding.

### **3.05 CLEANING**

- A. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance.

### **3.06 PROTECTION**

- A. Protect installed products from damage during subsequent work.

## **END OF SECTION**







## SECTION 08 3323 - WOODEN ROLL-UP DOORS Wooden Flat Slats

### 1.01 SUMMARY

#### A. Roll-Up Wooden doors

1. These doors are commercial grade, fully openable and lockable, heavy duty 8'-0" wide X 6'-0" high, crank operated, mounted to interior face of storage closet wall.

#### B. Related Sections: Related to this section,

1. Section 06 1000 – Rough Carpentry.
2. Section 08 3100 – Access Doors and Panels.
3. Section 08 7100 – Door Hardware.
4. Section 09 9000 – Paints and Coatings.

### 1.02 SUBMITTALS

#### A. Submit under provisions of Section 01 3000.

#### B. Product Data: Provide standard details and catalog data. Provide installation instructions.

#### C. Shop Drawings: Furnish shop drawings for architect's approval. Include elevation, sections, and details indicating dimensions, materials, finishes, conditions for anchorage and support of each door.

#### D. Submit manufacturer's recommended operation, troubleshooting, and maintenance instructions.

### 1.03 QUALITY ASSURANCE

#### A. Manufacturer: Rolling doors shall be manufactured by a firm with a minimum of five years' experience.

#### B. Single-Source Responsibility: Manufacturer shall provide doors, tracks, and accessories for each door.

### 1.04 DELIVERY, STORAGE, AND HANDLING

#### A. Deliver materials in original packaging supplied by manufacturer with intact labels. Store materials away from harmful environmental conditions and construction.

### 1.05 WARRANTY



- A. Door Warranty: Provide a two-year written warranty from date of installation against deficiencies due to defects in materials or workmanship. Installer agrees to repair or replace any defects in materials or workmanship.

## PART 2 –MANUFACTURERS AND PRODUCTS

### 1.01 Manufacturers:

Acceptable manufacturers include Overhead Door Corporation, Wooden Counter Shutter, Woodfold Corporation, and approved equivalents.

### 2.02 MATERIALS

A. Door Curtain:

1. Slats: Constructed of interlocking, 1-3/4" x 3/4" thick wooden slats held together by cables that run through vertical holes drilled in each slat at 22" or 24" intervals.
2. Bottom Bar: Bottom Bar of curtain assembly is constructed of solid wood 5-5/8" x 1-5/8" thick with a deadbolt lock installed at both jambs with Cylinder locks compatible with project hardware specifications.
3. Cable: Plastic coated aviation cable. Diameter 3/32" with a tensile strength of 480 pounds. The cable is anchored to the bottom bar with a compression spring that applies tension to the cable. The other end of the cable is securely fastened to the top slat of the curtain.

B. Guides:

1. Guides: Constructed of anodized aluminum. Extruded 1/8" material thickness and measure 1-1/4" x 1-1/2" for between jamb and 2" x 3" thick for mounting to face of wall.

C. Door Support Brackets and Mounting Plates:

1. Bracket plates: Material fabricated from 1/8" or [3/16"] thick steel.

D. Counterbalance Assembly: Torsion

1. Counterbalance assembly: Spring is housed in either a 2" or [4"] diameter pipe. Springs are helical torsion and are designed to withstand a 25% overload.

E. Hood:

1. Hood: The coil enclosure hood is constructed of brake-bent anodized aluminum sheets.
2. Shape: Square



F. Locking:

1. Thumb turn locks: Placed on both sides, located at coil side.
2. Best Core Key Cylinders: Compatible with project Hardware specs.

2.03 OPERATION:

- A. Opening/Closing: Manual hand crank operator.
- B. Manual hand crank:
  1. Provide crank hoist operator including crank gear box, steel crank drive shaft and geared reduction unit. Fabricate gear box to completely enclose operating mechanism and be completely oil-tight.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Verify that dimensions are correct and project conditions are in accordance with manufacturer's installation instructions; do not proceed with fabrication until unacceptable conditions have been corrected.

3.02 INSTALLATION

- A. Install units in accordance with manufacturer's instructions.
- B. Ensure that units are installed plumb and true, free of warp or twist, and within tolerances specified by manufacturer for smooth operation.

3.05 ADJUST AND CLEAN

- A. Clean units in accordance with manufacturer's instructions.
- B. Restore slight blemishes in finishes in accordance with manufacturer's instructions to match original finish. Remove and provide new units where repairs are not acceptable to the Architect.

END OF SECTION 08 3223







**SECTION 08 6000 - ALUMINUM FRAMED SKYLIGHTS****PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Furnish all labor, material, plant and services required to complete fabrication and shipment of skylights as specified herein.
- B. Work is limited to skylight system only and includes the following.
  - 1. Thermal aluminum vinyl frame system.
  - 2. Glazing and glazing gaskets.
  - 3. installation by factory approved contractor with site supervision as required.

**1.2 RELATED SECTIONS**

- A. Section 07 5000 – Metal Roofing.
- B. Section 07 6000 - Flashing and Sheet Metal.
- C. Section 07 9126 - Joint Fillers.

**1.3 REFERENCES**

- A. Aluminum Association (AA) M12C22A41 - Anodized Plus Finish.
- B. Aluminum Association (AA) M12C22A32/A34 - Color anodized: Class II, Color Anodic Finish.
- C. American Architectural Manufacturer's Association (AAMA) 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems.
- D. American Architectural Manufacturer's Association (AAMA) 605.2 - Voluntary Specification for High Performance Organic Coatings.
- E. Architectural Aluminum Manufactures Association (AAMA) 612 - Voluntary Specifications and Performance Requirements and Test Procedures for Combined Coatings of Anodic Oxide and Transparent Coatings on Architectural Aluminum, for Finishes such as Anodized Plus.
- F. American Society for Testing and Materials (ASTM) B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- G. American Society for Testing and Materials (ASTM) E331 - Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- H. American Society for Testing and Materials (ASTM) E774 - Standard Specification for the Classification of the Durability of Sealed Insulating Glass Units.
- I. AWS Structural Welding Code.

**1.4 SUBMITTALS**



- A. Submit under provisions of Section 01 30 00.
- B. [ Product Data ]: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Indicate materials, finishes and installation procedures recommended by manufacturer.
  - 4. Indicate compliance with specified design criteria.
  - 5. Indicate compliance with performance requirements.
  - 6. Include product specific glazing details.
- C. Shop Drawings:
  - 1. Indicate material types, gauges and finishes, fabrication details and installation details.
  - 2. Show glazing types, methods of attachment and thermal movement provisions.
- D. Indicate compliance with specified structural design criteria.
  - 1. Submitted design calculations shall bear seal of a professional engineer licensed in the State in which the skylight is to be installed.
  - 2. Certify that engineer has reviewed shop drawings.
- E. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- F. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

## 1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
  - 1. Skylight manufacturer shall have a minimum of five years experience in skylight manufacturing, qualified by having performed similar work and having experienced workmen to perform work of type required by contract documents and licensed where appropriate.
- B. Installer Qualifications:
  - 1. Installer shall be trained and approved by manufacturer.
  - 2. Installer shall have five years experience with skylight type, size and complexity.
- C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
  - 1. Finish areas designated by Architect.
  - 2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
  - 3. Refinish mock-up area as required to produce acceptable work.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of solvent-based materials, and materials used with solvent-



based materials, in accordance with requirements of local authorities having jurisdiction.

## 1.7 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

## 1.8 WARRANTY

- A. Skylights are guaranteed for a period of 5 years from date of purchase against defects in materials or workmanship.
- B. Custom skylight systems are guaranteed for a period of 2 years from date of installation against leakage and defects in materials or workmanship.
- C. The guarantee is limited to repair or replacement, at manufacturer's discretion, and does not cover freight, installation, or consequential damages.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Acceptable Manufacturers:  
Artistic Skylight Domes Ltd.,  
Velux USA  
Or approved equivalent
- B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00.

### 2.2 SKYLIGHT PERFORMANCE

- A. Load:
  - 1. Deflection of framing members shall not exceed  $L/180$  or 1 inch (25 mm) whichever is less.
  - 2. Acrylic unit skylights shall meet the requirements of uniform load test ASTM E330 that requires glazing to withstand a positive and negative test pressure of 60 psf.
- B. Air Infiltration:
  - 1. Acrylic unit skylights shall meet the requirements of ASTM E283 that allows a maximum air infiltration of 0.06 cfm (.0017 cu. m/m) of the total glazed surface area.
- C. Water Infiltration:
  - 1. Acrylic unit skylights shall meet the requirements of ASTM E547/E331 that allows for no water infiltration at a test pressure of 12 psf (571 Pa).

### 2.3 CURB MOUNT SKYLIGHTS



- A. Product: Aluminum Curb Frame.
  - 1. The skylight shall consist of corrosion resistant extruded aluminum curb frame, 6063-T5 alloy, with heliarc welded corners. The skylight curb frame shall have an extruded rigid vinyl thermal break to prevent thermal transfer to interior of building which incorporates a high capacity 8 degree sloped condensation gutter with drainage to exterior, and co-extruded rubber draft seal. Retaining cap frame shall be extruded, mill finish or baked enamel finish, 6063-T5 aluminum alloy with heliarc welded corners.
  - 2. Glazing shall consist of sealed double acrylic domes.

## 2.4 MODEL SIZE

- A. Model Size: 2'-0" x 4'-0" nominal or :
  - 1. Size 2852, 22.25 inches by 46.25 inches (565 by 1175 mm).

## 2.5 MATERIAL

- A. Non-operable Framing systems shall be extruded aluminum, 6063-T5 alloy, with extruded rigid vinyl thermal break.
- B. Exposed aluminum surfaces shall be bright brushed clear anodized finish to match color of standing seam roofing.
- C. Sealants, as designated on drawings, shall be neutral cure architectural grade silicone.
- D. Fasteners shall be stainless steel or cadmium plated steel. Exposed fasteners to match specified color of adjacent aluminum.
- E. Gaskets to be continuous co-extruded vinyl, neoprene, EPDM, or rubber held with constant pressure.
- F. Glazing shall be:
  - 1. Plastic glazed units to be double glazed acrylic of thickness and colors as required by design criteria.
    - a. Clear.

## 2.6 FABRICATION

- A. Skylights shall be factory assembled and shipped as such. Work which cannot be permanently assembled will be shipped in pre-assembled sections to minimize field assembly.

# PART 3 EXECUTION

## 3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

## 3.2 PREPARATION



- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

### 3.3 INSTALLATION

- A. Installer shall inspect area to receive skylights to determine that the conditions are in accordance with shop drawings and specifications. Any variance shall be recorded in writing and corrections made before beginning installation.
- B. Installation shall be in strict accordance with these specifications and the manufacturers shop drawings and installation instructions.
- C. All materials provided by installer shall be in accordance with those shown on the shop drawings.

### 3.4 PROTECTION

- A. Installer shall remove all labels and protective packaging from components and shall leave the installation free of all heavy construction dirt and sealant smears.
- B. Final cleaning and physical protection of all installed materials shall be performed by the general contractor.
- C. Protect installed products until completion of project.
- D. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION







**SECTION 086300 - METAL-FRAMED SKYLIGHTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes skylights with metal framing.

**1.2 PREINSTALLATION MEETINGS**

- A. Preinstallation Conference: Conduct conference at [**Project site**] <Insert location>.

**1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:
  - 1. Submit data and text for sustainable qualities of adhesives and sealants.
- C. Shop Drawings: For metal-framed skylights. Include plans, elevations, sections, and attachment details.
- D. Samples: For each type of exposed finish required, in manufacturer's standard sizes.

**1.4 INFORMATIONAL SUBMITTALS**

- A. Product test reports.
- B. Field quality-control reports.
- C. Sample warranties.

**1.5 WARRANTY**

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of metal-framed skylights that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: two years from date of Substantial Completion..
- B. Special Finish Warranty, Anodized Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of anodized finishes within specified warranty period.
  - 1. Warranty Period: five years from date of Substantial Completion.



## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Structural Loads: As per RI Building Code
- B. Deflection of Framing Members: At design wind pressure, as follows:
  - 1. Deflection Normal to Glazing Plane: Limited to **[edge of glass in a direction perpendicular to glass plane not exceeding L/175 of the glass edge length for each individual glazing lite]** **[1/175 of clear span for spans up to 13 feet 6 inches (4.1 m)]** or an amount that restricts edge deflection of individual glazing lites to **3/4 inch (19.1 mm)**, whichever is less.
  - 2. Deflection Parallel to Glazing Plane: Limited to **[L/360 of clear span or 1/8 inch (3.2 mm), whichever is smaller]** Usually retain "Lateral Bracing of Framing Members"
- C. Lateral Bracing of Framing Members: Compression flanges of flexural members are laterally braced by cross members with minimum depth equal to 50 percent of flexural member that is braced. Glazing does not provide lateral support.
- D. Structural-Test Performance: Metal-framed skylights tested in accordance with ASTM E330, as follows:
  - 1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified deflection limits.
  - 2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, and permanent deformation of main framing members exceeding **[0.2]** percent of span.
  - 3. Test Durations: As required by design wind velocity, but not less than **10** seconds.
- E. Windborne-Debris Impact Resistance: Passes ASTM E1886 missile-impact and cyclic-pressure tests in accordance with ASTM E1996 for local Wind Zone basic protection.
  - 1. Large-Missile Test: For glazing located within **[30 feet (9.1 m)]** of grade.
  - 2. Small-Missile Test: For glazing located between **30 feet (9.1 m)** and **60 feet (18.3 m)** above grade.
- F. Air Leakage: Metal-framed skylights with maximum air leakage through fixed glazing and framing areas of **[0.06 cfm/sq. ft. (0.03 L/s per sq. m)]** of when tested in accordance with ASTM E283 at a minimum static-air-pressure difference of **[1.57 lbf/sq. ft. (75 Pa)]** Usually retain "Water Penetration under Static Pressure" Paragraph below. For water-penetration under static pressure tests, air-pressure difference of 20 percent of wind-load design pressure provides satisfactory performance in most parts of the U.S. Locations where high winds and heavy rains frequently occur simultaneously require higher test-pressure differences. Lower test-pressure differences are acceptable for some locations. Revise paragraph to suit Project.
- G. Water Penetration under Static Pressure: Metal-framed skylights that do not evidence water penetration through fixed glazing and framing areas when tested in accordance with ASTM E331 at a minimum static-air-pressure difference of 20 percent of positive wind-load design pressure, but not less than **[6.24 lbf/sq. ft. (300 Pa)]**



- H. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
  - 1. Temperature Change: [120 deg F), ambient; 180 deg F material surfaces
- I. Condensation Resistance: Metal-framed skylights with fixed glazing and framing areas having condensation-resistance factor (CRF) of not less than [45] when tested in accordance with AAMA 1503.
  - 1. Haze Factor: Greater than 90 percent when tested in accordance with ASTM D1003.
- J. Energy Performance: Provide metal-framed skylights with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below.
  - 1. Thermal Transmittance (U-Factor): Fixed glazing and framing areas have U-factor of not more than [**0.80 Btu/sq. ft. x h x deg F (4.54 W/sq. m x K)**] as determined in accordance with NFRC 100.
  - 2. Solar Heat Gain Coefficient: Fixed glazing and framing areas have a solar heat gain coefficient of no greater than [**0.6**] [**0.7**] as determined in accordance with NFRC 200.

## 2.2 METAL-FRAMED SKYLIGHTS

- A. Metal-Framed Non-Operable Skylights: Acrylic glazed skylight assemblies supported by aluminum framing.
- B. Aluminum Framing Systems: Manufacturer's standard extruded-anodized aluminum members of thickness required and reinforced as required to support imposed loads.
- C. Aluminum: Alloy and temper as recommended in writing by manufacturer for type of use and finish indicated.
  - 1. Sheet and Plate: **ASTM B209 (ASTM B209M)**.
  - 2. Extruded Bars, Rods, Profiles, and Tubes: **ASTM B221**
  - 3. Extruded Structural Pipe and Tubes: ASTM B429/B429M.
  - 4. Structural Profiles: ASTM B308/B308M.
- D. Pressure Caps: Manufacturer's standard aluminum components that mechanically retain glazing.
  - 1. Include snap-on aluminum trim that conceals fasteners.
- E. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with non-staining, nonferrous shims for aligning skylight components.
- F. Fasteners and Accessories: Manufacturer's standard, corrosion-resistant, non-staining, nonbleeding fasteners and accessories compatible with adjacent materials.
- G. Concealed Flashing: Manufacturer's standard, corrosion-resistant, non-staining, nonbleeding flashing compatible with adjacent materials.
- H. Exposed Flashing and Closures: Manufacturer's standard aluminum components not less than [**0.030 inch**] thick.



- I. Corrosion-Resistant Coating: Cold-applied asphalt mastic.

## 2.3 GLAZING

- A. Glazing: Acrylic sheet As specified in Section 08 8400 "Plastic 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. Spacers and Setting Blocks: Manufacturer's standard elastomeric types.
- D. Glazing Sealants: As recommended in writing by manufacturer.
- E. Fabricate aluminum 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.
- F. Fabricate aluminum sill closures with weep holes and for installation as continuous component.
- G. Reinforce aluminum components as required to receive fastener threads.
- H. Factory-Glazed, Metal-Framed Skylights: Acrylic glazing sized for design loads as per code and to Comply with requirements in **Section 088400 "Plastic Glazing."**
- I. After fabrication, clearly mark components to identify their locations in Project in accordance with Shop Drawings.

## 2.4 ALUMINUM FINISHES

- A. Color Anodic Finish: AAMA 611, [AA-M12C22A42/A44, Class I, 0.018 mm] to match color of metal roofing.
  - 1. **gloss>**.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. General: Comply with manufacturer's written instructions.
  - 1. Do not install damaged components.
  - 2. Fit joints between aluminum components to produce hairline joints free of burrs and distortion.
  - 3. Rigidly secure nonmovement joints.



4. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
  5. Seal joints watertight unless otherwise indicated.
- B. Metal Protection: Where aluminum will contact dissimilar materials, protect against galvanic action by painting contact surfaces with protective coating or by installing nonconductive spacers as recommended in writing by manufacturer for this purpose.
- C. Install continuous aluminum sill closure with weatherproof expansion joints and locked and sealed or welded corners. Locate weep holes at rafters.
- D. Install components to drain water passing joints, and moisture migrating within skylight to exterior.
- E. Install components plumb and true in alignment with established lines and elevations.
- F. Glazing: Install glazing as specified in [Section 088400 "Plastic Glazing."]
- G. Erection Tolerances: Install metal-framed skylights to comply with the following maximum tolerances:
1. Alignment: Limit offset from true alignment to **1/32 inch (0.8 mm)** where surfaces abut in line, edge to edge, at corners, or where a reveal or protruding element separates aligned surfaces by less than **3 inches (76 mm)**; otherwise, limit offset to **1/8 inch (3.2 mm)**.
  2. Location and Plane: Limit variation from true location and plane to **1/8 inch in 12 feet (3.2 mm in 3.7 m)** but no greater than **1/2 inch (13 mm)** over total length.

### 3.2 FIELD QUALITY CONTROL

- A. Testing Agency: Roofing Contractor to **Engage** a qualified testing agency to perform tests and inspections..
1. Water-Spray Test: Before installation of interior finishes has begun, skylights are tested in accordance with AAMA 501.2 and do not evidence water penetration.
- B. Repair or remove work where test results and inspections indicate that it does not comply with specified requirements.
- C. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- D. Prepare test and inspection reports.

END OF SECTION 086300







**SECTION 08 7100 - DOOR HARDWARE****PART 1 - GENERAL****1.01 RELATED DOCUMENTS**

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

**1.02 SUMMARY**

- A. Section Includes

1. Furnishing and installation of all mechanical finish hardware necessary for all doors, and hardware as specified herein and as enumerated in hardware sets and as indicated and required by actual conditions at the building. The hardware shall include the furnishing of all necessary screws, bolts, expansion shields, drop plates, and all other devices necessary for the proper application of the hardware.
2. The hardware required for the fiberglass shower doors shall be purchased and installed by the shower stall manufacturer and coordinated with the door manufacturer for templating and preliminary preparation.

- B. Related Sections

1. Division 6 Section - Finish Carpentry
2. Division 8 Section - Hollow Metal Doors and Frames
3. Division 8 Section – Fiberglass Doors
4. Division 083313 -Wood overhead coiling doors

- C. Specific Omissions: Hardware for the following is specified or indicated elsewhere :

1. Windows
2. Complete shower stall hardware and toilet stall hardware is included with the work of those sections as are bathroom accessories including coat hooks and curtain rods unless note otherwise.

**1.03 REFERENCES**

- A. Applicable state and local building codes and standards.
- B. FIRE/LIFE SAFETY



1. NFPA - National Fire Protection Association
  - a. NFPA 80 - Standard for Fire Doors
  - b. NFPA 101 - Life Safety Code
  - c. NFPA 105 - Smoke and Draft Control Door Assemblies
- C. UL - Underwriters Laboratories
  1. UL 1784 - Air Leakage Tests of Door Assemblies
  2. UL 305 - Panic Hardware
- D. Accessibility
  1. ADA - Americans with Disabilities Act
  2. Rhode Island Accessibility Code – SBC-14, 15, 16
- E. DHI - Door and Hardware Institute
  1. Sequence and Format for the Hardware Schedule
  2. Recommended Locations for Builders Hardware
- F. ANSI - American National Standards Institute
  1. ANSI/BHMA A156.1 - A156.29, and ANSI A156.31 - Standards for Hardware and Specialties

#### **1.04 SUBMITTALS**

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 requirements. Advise architect within the submittal package of incompatibility or issues.
- B. Catalog Cuts: Product data including manufacturers' 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.
- C. Final Hardware Schedule Content: Submit schedule with hardware sets in vertical format as illustrated by the Sequence of Format for the Hardware Schedule as published by the Door and Hardware Institute. Indicate complete designations of each item required for each door or opening. Include the following information:
  1. Door Index; include door number, heading number, and Architects hardware set number.
  2. Opening Lock Function Spreadsheet; list locking device and function for each opening.



3. Type, style, function, size, and finish of each hardware item.
  4. Name and manufacturer of each item.
  5. Fastenings and other pertinent information.
  6. Location of each hardware set cross-referenced to indications on Drawings.
  7. Explanation of all abbreviations, symbols, and codes contained in schedule.
  8. Mounting locations for hardware.
  9. Door and frame sizes and materials.
  10. Name and phone number for the local manufacturer's representative for each product.
- D. Key Schedule: After a keying meeting between representatives of the Owner, Architect, hardware supplier, and, if requested, the representative for the lock manufacturer, provide a keying schedule, listing the levels of keying, as well as an explanation of the key system's function, the key symbols used, and the door numbers controlled.
- E. Utilize ANSI A156.28 "Recommended Practices for Keying Systems" as a guideline for nomenclature, definitions, and approach for selecting the optimal keying system.
- F. Samples: If requested by the Architect, submit production sample or sample installations as requested of each type of exposed hardware unit in the finish indicated, and tagged with a full description for coordination with the schedule.
1. Samples will be returned to the supplier. Units that are acceptable to the Architect may, after check of operations, be incorporated into the Work, within limitations of key coordination requirements.
- G. Templates: After final approval of the hardware schedule, provide templates for doors, frames, and other work specified to be factory prepared for the installation of door hardware..
- H. Operations and Maintenance Data: Provide in accordance with Division 1 and include the following:
1. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
  2. Catalog pages for each product.



3. Name, address, and phone number of local representative for each manufacturer.
  4. Parts list for each product.
  5. Copy of final approved hardware schedule, edited to reflect "As installed."
  6. Copy of final keying schedule.
  7. As installed "Wiring Diagrams" for each opening connected to power, both low voltage and 110 volts.
  8. One (1) complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.
  9. Copy of warranties including appropriate reference numbers for manufacturers to identify the project.
- I. Certificates of Compliance: Upon request of Architect or Authority Having Jurisdiction certificates of compliance for fire-rated hardware and installation instructions shall be made available.

#### **1.05 QUALITY ASSURANCE**

- A. Substitutions: Products are to be those specified to ensure a uniform basis of acceptable materials. Requests for substitutions must be made in accordance with Division 1 requirements. If proposing a substitute product, submit product data for the proposed item with product data for the specified item and indicate basis for substitution and savings to be made. Provide sample if requested. Certain products have been selected for their unique characteristics and particular project suitability.
1. Items specified as "no substitute" shall be provided exactly as listed.
  2. Items listed with no substitute manufacturers listed have been requested by the Owner or Architect to match existing for continuity and/or future performance and maintenance standards or because there is no known equal product.
  3. If no other products are listed in a category, then "no substitute" is implied.
- B. Supplier Qualifications: A recognized architectural hardware supplier, with warehousing facilities in the Project's vicinity, that has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that provides a certified Architectural Hardware Consultant (AHC) available to the Owner, Architect, and Contractor, at reasonable times during the course of the Work for consultation.
- C. Single Source Responsibility: Obtain each type of hardware (latch and locksets, hinges, exit devices, closers, etc.) from a single manufacturer.



**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Tag each item or package separately with identification related to the final hardware schedule, and include installation instructions with each item or package.
- B. Each article of hardware shall be individually packaged in manufacturer's original packaging.
- C. Contractor will provide secure lock-up for door hardware delivered to the Project, but not yet installed. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.
- D. Items damaged in shipment shall be replaced promptly and with proper material and paid for by whomever did the damage or caused the damage to occur.
- E. Hardware shall be handled in a manner to avoid damage, marring, or scratching. Irregularities that occur to the hardware after it has been delivered to the Project shall be corrected, replaced, or repaired by the Contractor. Hardware shall be protected against malfunction due to paint, solvent, cleanser, or any chemical agent.
- F. No direct shipments will be allowed unless approved by the Contractor.

**1.07 WARRANTY**

- A. Provide manufacturer's warranties as specified in Division 1 and as follows:
  - 1. Closers: 10 years.
  - 2. Exit Devices: 3 years,.
  - 3. Locksets: 3 years,
  - 4. All Other hardware: 3 years.
- B. Products judged to be defective during the warranty period shall be replaced or repaired in accordance with the manufacturer's warranty, at no additional cost to the Owner.

**1.08 MAINTENANCE**

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

**2.01 MANUFACTURERS**

- A. The Awarding Authority has determined that certain products should be selected for their unique characteristics and particular project suitability to insure continuity of existing and future performance and maintenance standards. After investigating available product offerings the Awarding Authority has elected to prepare proprietary specifications. These products are specified with the notation: "No Substitute" (NO OTHER PRODUCTS WILL BE CONSIDERED FOR THOSE LISTED IN PROJECTS DOCUMENTS.)



B. Approval of manufacturers other than those listed shall be in accordance with paragraph 1.05.A.

1. Note that even though an acceptable substitute manufacturer may be listed, the product must provide all the functions and features of the specified product or it will not be approved.
2. All hardware to be finish : US32d satin stainless steel unless otherwise indicated. .

C.

| Item               | Scheduled Manufacturer | Acceptable Substitute         |
|--------------------|------------------------|-------------------------------|
| Hinges             | Ives (IVE)             | Hager, Stanley                |
| Flush Bolts        | Ives (IVE)             | Burns, Rockwood               |
| Locksets           | Falcon (FAL)           | Best, Sargent                 |
| Exit Devices       | Falcon (FAL)           | Precision, Sargent            |
| Roller Latches     | Ives (IVE)             | Burns, Rockwood               |
| Door Closers       | FAL (FAL)              | Norton, Sargent               |
| Door Trim          | Ives (IVE)             | Burns, Rockwood               |
| Protection Plates  | Ives (IVE)             | Burns, Rockwood               |
| Overhead Stops     | Glynn-Johnson (GLY)    | Rixson, Sargent               |
| Stops & Holders    | Ives (IVE)             | Burns, Rockwood               |
| Silencers          | Ives (IVE)             | Burns, Rockwood               |
| Cylinders & Keying | Falcon (FAL)           | Best, Sargent                 |
| Sliding Barn Door  | HME stainless steel    | Pemko/Henderson (HEN)Or Equal |
| Thresholds         | Assa Abloy             |                               |

D. Hand of Door: Drawings show direction of slide, swing, or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door movement as shown.

- E. Where the hardware specified is not adaptable to the finished shape or size of the members requiring hardware, furnish suitable types having the same operation and quality as the type specified, subject to the Architect's approval.

## 2.02 MATERIALS

A. Fasteners

1. Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
2. Furnish screws for installation with each hardware item. Finish exposed (exposed under any condition) screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work as closely as possible including "prepared for paint" surfaces to receive painted finish.
3. Provide concealed fasteners for hardware units that are exposed when door is closed except to the extent that no standard units of type specified are available with concealed fasteners.
4. Hardware shall be installed with the fasteners provided by the hardware manufacturer of US32d satin stainless steel unless otherwise indicated. .

B. Hinges

1. Provide five-knuckle, ball bearing hinges of type, material, and height as outlined



in the following guide for this specification:

- a. 1-3/4 inch thick doors, up to and including 48 inches wide: Exterior or interior: heavy weight, bronze/stainless steel, 4-1/2 inches high
- b. 2 inches or thicker doors:  
Exterior or Interior : heavy weight, bronze/stainless steel, 5 inches high
2. Provide three hinges per door leaf for doors 96 inches or less in height.
3. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
  - a. Steel Hinges: Stainless 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
4. . Adjust hinge width as required for door, frame, and/or wall conditions to allow proper degree of opening.
5. Acceptable manufacturers and/or products: Ives 5BB series, Hager BB series, Stanley FBB Series.

C. Cylindrical Locks - Grade 1

1. Provide cylindrical locks conforming to ANSI A156.2 Series 4000, Grade 1. Cylinders: Refer to 2.04 KEYING.
2. Provide locks with a standard 2-3/4 inches backset, unless noted otherwise, with a 1/2-inch latch throw. Provide proper latch throw for UL listing at pairs.
3. Provide locksets with a separate anti-rotation through-bolts and shall have no exposed screws. Levers shall operate independently and shall have two external return spring cassettes mounted under roses to prevent lever sag.
4. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
5. Lever trim shall be solid cast levers without plastic inserts, and 4" square wrought roses on both sides. Locksets shall be thru-bolted to assure proper alignment.
  - a. Lever design shall be Falcon QUA-Quantum.
6. Acceptable manufacturers and/or products: Falcon T series, Best 93K series, Sargent 10-Line.

D. Doors D09 and D11 (access and egress)



1. Exiting swing doors to bathhouses/vestibules  
4" x 12" Stainless steel push plates on egress sides of doors,  
Automatic heavy-duty surface mounted door closure at head of door  
Automatic door opener for barrier free access, push-plate activated, mounted on exterior wall face at doorway  
4" x12" Pull handles and plates on access sides  
Provide Stainless steel hold-open device at base of door leaf and door stop  
Provide Assa Abloy's "Adams Rite" Heavy Duty Deadbolt #2331, with 1 5/32" diameter mortise cylinder or approved equivalent supplied to match other cylinders and keying on the project.
2. 3 pairs of hinges each leaf, kickplates both sides of doors, surface mounted automatic door closers.  
Provide barrier free stainless steel ADA thresholds and automatic lighting control switch for bathhouse lights.  
Provide clearly visible signage to indicate direction of traffic, "IN" on access sides, "OUT" on egress sides. (See signage specifications.)  
All vision panels to be clear laminated safety glazing.

E. Doors D08 and D09 (Exiting doors for egress)

1. Exit Doors from public part of bathhouse - Bar Type push bars with concealed vertical stainless steel throw bars within hollow metal door- Required for Exiting doors for egress only . Exterior side of door to have lockable access lockset allowing free public exit when locked. Metal kickplates to be mounted on both sides of door, surface mounted automatic door closers., 3 pair of hinges, door stops and barrier free ADA threshold.
2. Automatic door opener for barrier free egress, push-plate activated, mounted on interior wall face at doorway.

F. Door D07

1. Access door to Mechanical Room to have one hour fire rated exterior lockable service access lever lockset and interior egress push-bar with concealed throw bar within hollow metal door, metal kickplates both sides of door, 3 pair of hinges, automatic surface mounted door closure, door stops and bottom sweeps and ADA threshold
2. Vision panel to be clear laminated safety glazing.

G. Door D17 and D18

1. Supply Closets - Cedar slat Rollup doors with heavy duty st.stl.track and nylon guide bearings as per . Deadbolt, door pulls, astragal, bifold hinges and 3 pair per leaf concealed hinges, kickplates. Door stops, bottom sweeps and automatic operating switch for overhead light fixture.

General :

1. All visible door hardware finish will be smooth-polished stainless steel.
2. Concealed Vertical Rod devices shall have 5/8 inch thrown latch bolts.
3. Mechanism case shall sit flush on the inside face of all flush doors
4. Provide manufacturer's standard strikes.
5. Provide exit devices cut to door width and height. Locate ADA automatic exit devices at a height recommended by the exit device manufacturer and ADA requirements, allowable by governing building codes.



6. Exit devices meeting this specification: Falcon XX series, Precision Reliant series, and Sargent 90 Series with guarded latch.

#### H. Door Closers

1. Provide surface mounted door closers as indicated, certified to ANSI/BHMA A156.4 Grade 1 requirements by a BHMA certified independent testing laboratory. Closers shall be ISO 9000 certified. Units shall be stamped with date of manufacture code.
2. Door closers shall have fully hydraulic, full rack and pinion action with an aluminum cylinder.
3. Provide hydraulic fluid requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to 10 degrees F.
4. Spring power shall be continuously adjustable and allow for reduced opening force as required by ADA accessibility codes and standards. Hydraulic regulation shall be by tamper-proof, non-critical valves. Closers shall have separate adjustment for latch speed, general speed, and backcheck.
5. Closers shall not incorporate Pressure Relief Valve (PRV) technology.
6. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other finish hardware items interfering with closer mounting.
7. Door closers meeting this specification: Falcon, Norton, Sargent.

#### I. Protection Plates

1. Provide kick plates minimum of 0.050 inch thick on all hollow metal doors, both sides of doors. Install with permanent bond epoxy adhesive to unpainted door surface.
2.
  - a. Kick Plates – 8 inches high x 2 inches less width of door on single doors, 1 inch less width of door on pairs
3. Acceptable manufacturers and/or products: Ives, Burns, Rockwood.

#### J. Overhead Stops and Overhead Stop/Holders

1. Provide heavy duty concealed mounted overhead stop or overhead stop/holder as specified for exterior and interior vestibule doors.
2. Where overhead holders are specified provide positive type at doors with a closer.
3. Acceptable manufacturers and/or products: Glynn-Johnson, Rixson, Sargent.

#### K. Door Stops and Holders and Thresholds

1. Provide door stops for all doors in accordance with the following requirements:



- a. Provide wall stops wherever possible.
  - b. Where wall stops cannot be used, provide dome type floor stops of the proper height.
  - c. At any opening where a wall or floor stop cannot be used, a medium duty surface mounted overhead stop shall be used.
  - d. Provide low-profile ADA compliant Saddle style aluminum thresholds at all
  - e. exterior doorways and at vestibule to bathhouse doors, full width of the adjacent walls (10") . The thresholds are not to exceed a maximum height of ¼" above finished grade or ADA maximum and are to have a vertical edge to act as a pour stop for the 3/16" poured resinous flooring.
2. Acceptable manufacturers and/or products: Ives, Burns, Rockwood ASSA-Abloy.

#### L. Silencers

1. Provide "Push-in" type silencers for each hollow metal frame. Provide three for each single frame and two for each pair frame. Omit where gasketing is specified or required by code.
2. Acceptable manufacturers and/or products: Ives, Burns, Rockwood.

### 2.03 FINISHES

- A. Finish of all hardware shall be smooth polished stainless steel.

### 2.04 KEYING

- A. Provide a new key system from the same manufacturer as the locks conforming to the following requirements:

1. Provide removable core cylinders at all keyed devices, locksets, exit device trim. Provide construction cores with construction master keying for use during construction. The hardware supplier, accompanied by the Owner or Owner's agent, shall install permanent keyed cores upon completion of the project. The temporary construction cores are to be returned to the hardware supplier.
2. Provide permanent cores and cylinders keyed by the manufacturer or authorized distributor as directed by the Owner. Provide owner with a copy of the bitting list, return receipt requested.
3. The hardware supplier, accompanied by a qualified factory representative for the manufacturer of the cores and cylinders, shall meet with Owner and Architect to review keying requirements and lock functions prior to ordering finish hardware. Submit a keying schedule to Architect for approval.
4. Allow for two-hundred changes under the master key. All cylinders shall be keyed in alike or different sets as noted by their respective key set number. Do not use the letter "I" or "O" in the master key set.
5. Provide keys as follows



- a. Ten master keys for each set.
  - b. Three keys per core and/or cylinder.
  - c. Two construction core control keys
  - d. Two permanent core control keys
6. Visual key control:
  - a. Keys shall be stamped with their respective key set number and stamped "DO NOT DUPLICATE".
  - b. Master keys shall be stamped with their respective key set letters.
  - c. Do not stamp any keys with the factory key change number.
  - d. Do not stamp any cores with key set on face (front) of Core. Stamp on back or side of cores so not to be visible when core is in cylinder.
7. Deliver master keys, change keys, and/or key blanks from the factory or authorized distributor directly to the Owner in sealed containers, return receipt requested. Failure to comply with these requirements may cause to require replacement of all or any part of the keying system that was compromised at no additional cost to the Owner.
8. Approved products: Falcon, Best, Schlage, Sargent.

### **PART 3 - EXECUTION**

#### **3.01 EXAMINATION**

- A. Prior to installation of any hardware, examine all doors, frames, walls and related items for conditions that would prevent proper installation of finish hardware. Correct all defects prior to proceeding with installation.

#### **3.02 INSTALLATION**

- A. Coordination:
  1. Prior to installation of hardware, schedule and hold a meeting for the purpose of instructing installers on proper installation and adjustment of finish hardware. Representatives of locks, exit devices, closers, automatic operators, and electrified hardware shall conduct training; provide at least 10 days notice to representatives. After training a letter of compliance, indicating when the training was held and who was in attendance, shall be sent to the Architect.
- B. Hardware will be installed by qualified tradesmen, skilled in the application of commercial grade hardware.
- C. Mount hardware units at heights indicated in "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute.
- D. Install each hardware item in compliance with the manufacturer's instructions and recommendations, using only the fasteners provided by the manufacturer.
- E. Do not install surface mounted items until finishes have been completed on the substrate. Protect all installed hardware during painting.
- F. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.



- G. Operating parts shall move freely and smoothly without binding, sticking, or excessive clearance.

### **3.03 ADJUSTING and CLEANING**

- A. Adjust and check each operating item of hardware and each door, to insure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly.
- B. Where door hardware is installed more than one month prior to acceptance or occupancy of a space or area, return to the installation during the week prior to acceptance or occupancy and make a final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.
- C. Clean adjacent surfaces soiled by hardware installation.
- D. Instruct Owner's personnel in the proper adjustment, lubrication, and maintenance of door hardware and hardware finishes.

### **3.04 FIELD QUALITY CONTROL**

- A. Prior to Substantial Completion, the installer, accompanied by representatives of the manufacturers of locks, exit devices, closer, and any electrified hardware, shall perform the following work:
  - 1. Examine and re-adjust each item of door hardware as necessary to restore function of doors and hardware to comply with specified requirements.
  - 2. Consult with and instruct Owner's personnel in recommended additions to the maintenance procedures.
  - 3. Replace hardware items that have deteriorated or failed due to faulty design, materials, or installation of hardware units.
  - 4. Prepare a written report of current and predictable problems of substantial nature in the performance of the hardware.
  - 5. At completion of project, a qualified factory representative for the manufacturers of locksets, closer, exit devices, and access control products shall arrange and hold a training session to instruct the Owner's personnel on the proper maintenance, adjustment, and/or operation of their respective products. After training a letter of compliance, indicating when the training was held and who was in attendance, shall be sent to the Architect.

### **3.05 PROTECTION**

- A. Provide for the proper protection of complete items of hardware until the Owner accepts the project as complete. Damaged or disfigured hardware shall be replaced or repaired by the responsible party.

### **3.06 HARDWARE SCHEDULE**



- A. The door supplier is to provide the complete hardware schedule based on this specification guidelines and building plans, and to include in his bid price the specified hardware for each door to comply with requirements of Section "Finish Hardware," as indicated in door schedule and drawing A-10, and in the specified schedule of hardware sets.
- B. It is intended that the following schedule includes complete items of finish hardware necessary to complete the work. If a discrepancy is found in the schedule, such as a missing item, improper hardware for a frame, door or fire codes, the schedule is to be rectified and the missing item included in the work with the approval of the project manager.

END OF Section 08 7100







## SECTION 09 20 00 - WALL ACCESS PANELS

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Access Panels.

#### 1.2 RELATED SECTIONS

- a. 102113 – Plastic toilet compartments
- b. 102116-Plastic Shower Compartments
- c. 220000 – plumbing
- d. 23000- HVAC
- e. 062000 -Finish Carpentry

#### 1.3 SUBMITTALS

- A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
- C. Shop Drawings: Indicate locations, type, overall dimensions, profile and joint treatment.
- D. LEED Submittals: Provide documentation of how the requirements of Credit will be met:
  - 1. List of proposed materials with recycled content. Indicate post-consumer recycled content and pre-consumer recycled content for each product having recycled content.
  - 2. Product data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content.
- E. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- F. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.
- G. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

#### 1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer regularly engaged in the design and fabrication of access panel products or plastic shower /toilet compartments
- B. Installer Qualifications: Installer regularly engaged and experienced in the installation of access panel fabrications.



- C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
  - 1. Finish areas designated by Architect.
  - 2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
  - 3. Refinish mock-up area as required to produce acceptable work.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store products under cover on a level surface protected from weather, moisture and damage. Product shall be appropriately stored until installation
- C. Handling: Handle products to prevent damage to finished surfaces.

#### 1.6 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

### PART 2 PRODUCTS

#### 2.1 MANUFACTURERS

- A. Bauco Corporation or approved equal
- B. Manufacturer or supplier of plastic shower/toilet compartments.
- C. Substitutions: approved equals to be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

#### Application

- Designed to provide access in HDPE ( high density polyethylene) walls, while maintaining an invisible, architecturally pleasing appearance with concealed or dissimulated frames.

#### Specifications

- Frameless Door panel is to be one layer 1/2" HDPE
- Concealed stainless steel hinge
- Stainless steel access device with keyed lockable cylinder mechanism.

Internal Frame Material: concealed anodized Aluminum extrusion .064 thickness, color to match surrounding panels

Frameless Door: 1/2" HDPE panel to match surrounding partition drywall inserted into door panel . 1/4" tolerance gap.

Hinge: concealed non corroding two point pin hinge

Sizes : 12" x12" or 18" x 18" as required.



## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Verify field dimensions before beginning installation.

### 3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Install temporary and permanent supplementary supports as required for proper installation.

### 3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install plumb and true to line. Use shims where necessary.

### 3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION







**SECTOPM 09 5426 - WOOD PLANK CEILINGS****PART 1 – GENERAL****1.1 SUMMARY****A. Section includes:**

1. Concealed suspension system for Wood Plank ceilingS.
2. Wood plank linear ceiling panels for concealed suspension system.
3. Trim and accessories.
4. Seismic restraints for suspended ceiling system.

**1.2 RELATED WORK IN OTHER SECTIONS:**

- A. Division 1 – “General Conditions” for substitution requests, submittals, etc.
- C. Division 13 – “Integrated Assemblies.”
- D. Division 15 – “Mechanical” for work to be coordinated with ceiling.
- E. Division 16 – “Electrical” for light fixture coordination.

**1.3 REFERENCES**

- A. ASTM A 641: Standard Specification for Zinc Coated (Galvanized) Carbon Steel Wire; 1992.
- B. ASTM C 635: Standard Specifications for Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings.
- D. ASTM C 636: Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels; 1992.
- E. ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials; 1991.
- F. ASTM E 580: Standard Practice for Application of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Requiring Seismic Restraint; 1991.
- G. AWI (QSI): Architectural Woodwork Quality Standards Illustrated; 2003.
- H. CISCA: Ceiling Systems Handbook.

**1.4 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Manufacturers other than those listed in Paragraph 2.1 are required to submit for approval prior to bidding per Section One.
- B. Installer Qualifications: Engage an experienced Installer, approved by wood ceiling manufacturer, who has completed open joint wood plank ceilings similar in species, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- C. Inspection: All work must pass inspection and approval of architect and project manager, as well as the local codes and regulations or authorities having jurisdiction.
- D. Single-Source Responsibility for Wood Ceiling System: Obtain each type of Wood Plank ceiling panels from a single fabricator, with in-house Shop Drawing capabilities, in-house assembly and finishing capabilities, and with resources to provide products of consistent quality in appearance and physical properties without delaying the project.



- E. Single-Source Responsibility for Suspension System: Obtain each type of suspension system from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying project.
- F. Pre-Installation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings."

### **1.5 SUBMITTALS**

- A. General: Submit each item in this Section according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data: For each type of product specified.
- C. Samples: For verification of each type of exposed finish required, prepared on samples of size indicated below. Where finishes involve normal color and texture variations, include sample sets showing the range of variations expected.
  - 1. 12" x 12" samples of each plank type, pattern, and color with suspension clips and spacing as specified.

### **1.6 SHOP DRAWINGS & COORDINATION WITH OTHER TRADES**

- A. Shop Drawings: Provide Shop Drawings/Coordination Drawings for all ceilings, which should include RCP and product details. Coordinate Wood Plank ceiling panels layout and installation of wood panels and suspension system components with other construction elements that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system components, partition assemblies and all perimeter conditions.

### **1.7 PROJECT CONDITIONS**

- A. Space Enclosure and Environmental Limitations: Do not install wood panel ceilings until spaces are enclosed and weatherproof, wet-work in spaces is completed and dry, work above ceilings is complete, and ambient temperature and humidity conditions are being maintained at the levels indicated for Project when occupied for its intended use.

### **1.8 DELIVERY, STORAGE, AND HANDLING**

- A. Delivery & Unloading: Coordinate crate sizes, weights, unloading options, and delivery schedule with manufacturer prior to fabrication. Deliver wood panels and suspension system components to Project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other mistreatment.
- B. Acclimatization: Before installing wood planks or panels, permit them to reach room temperature and a stabilized moisture content not to exceed 15% (at least 72 hours) per AWI standards.
- C. Handling: Handle Wood Plank ceiling panels carefully to avoid chipping edges or damaging units in any way.
- D. Protection:
  - 1. Personnel: Follow good safety and industrial hygiene practices during handling and installing of all products and systems, with personnel to take necessary



precautions and wear appropriate protective equipment as needed. Read related literature for important information on products before installation. Contractor to be solely responsible for all personal safety issues during and subsequent to installation; architect, specifier, owner, and manufacturer will rely on contractor's performance in such regard.

2. Existing completed work: Protect completed work above suspension system from damage during installation of suspension system components.

## 1.9 EXTRA MATERIALS/WARRANTIES

- A. Extra Materials: Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels clearly describing contents.
  1. Wood Plank ceiling panels: Furnish quantity of full-size units equal to 1.0 percent of amount installed.
  2. Suspension System Components: Furnish quantity of each component equal to 1.0 percent of amount installed.
- B. Warranties: Provide owner with a (1) year warranty for material and workmanship on all installed products.
  1. Manufacturers: All materials, wood ceiling and grid, shall be warranted for (1) one year for material and workmanship.
  2. Installer: All work shall be warranted for (1) year from final acceptance of completed work.

## PART 2 – PRODUCTS

### 2.1 WOOD PLANK CEILINGS AND SUSPENSION SYSTEM

- A. General: The following manufacturers are acceptable :
  1. Ceiling Systems Inc. ([www.csi-wood.com](http://www.csi-wood.com))
  2. Hunter Douglas (USA)
  3. Certainteed Ceilings
  5. Norton Wood Panelized Ceiling Systems.
- B. Or equal, as prior approved by architect.

### 2.2 WOOD PLANK CEILINGS

- A. Basis of Design: Removable wood planks installed by individual clip system or in panels to aluminum carrier channels in a suspended ceiling system. Ceiling plans call for  $\frac{3}{4}$ " x 4" (nominal) planks with  $\frac{1}{2}$ " open joint spacing however these dimensions may vary depending on which manufacturer is retained for the work. The plank size may be  $\frac{3}{4}$ " x 3  $\frac{1}{4}$ " with  $\frac{1}{2}$ " spacing or similar. The product species may vary depending on the availability of species from the generic term "cedar" to Douglas Fir, Poplar or Pine.
  1. Product Number:
    - 1) Species: generic cedar, Douglas Fir or Poplar
    - 2) Member Size: 3  $\frac{1}{4}$ " x 3  $\frac{3}{4}$ "
    - 3) Members/LF: 3 units per lin.ft.



- 4) Assembly Style: Cross Piece Backer
- 5) Panel Sizes: dependent on manufacturer
- 7) Finish: Natural with Clear Finish, prefinished all faces
- 8) Spacing of planks: 1/2" open joint

## 2.3 METAL SUSPENSION SYSTEMS, GENERAL

- A. Metal T-Grid Suspension System: Provide standard interior Heavy Duty 15/16" Suspension system using Main Runners, Cross-tees, Wall Angle or Shadow Moldings of types, structural classifications, and black finishes indicated and that comply with applicable ASTM C 635 requirements. Comply with all applicable seismic codes and ordinances.
- B. Attachment Devices or clips: Size for 3 times the design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.
- C. Wire, Braces, Ties, Hanger Rods, Flat Hangers and Angle Hangers: Provide wires, rods and hangers that comply with applicable ASTM specifications.

## PART 3 – EXECUTION

### 3.1 EXAMINATION

- A. General: Examine substrates and structural framing to which ceilings attach or abut, with installer present, for compliance with requirements specified in this and other sections that affect ceiling installation and anchorage. Do not proceed with installation until unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Coordination: Furnish layouts for cast-in-place anchors, clips, and other ceiling anchors whose installation is specified in other Sections.
- B. Layout: Measure each ceiling area and establish the layout of Wood Plank Panel to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and conform to the layout shown on reflected ceiling plans in accordance with Shop Drawings approved or provided by Ceiling System Inc.

### 3.3 INSTALLATION

- A. General: Install CSI Wood Grille Panels to comply with manufacturer's guidelines.
- B. Attachments: Suspend ceiling hangers from building's structural members per manufacturer's instructions and in compliance with all local codes and regulations.
- C. Installation of Metal Suspension Grid: Install, align, brace, tie-off, mount, handle interferences, and space suspension T-Grid in accordance with suspension manufacturer's instructions and in compliance with all local codes and regulations.
- D. Install CSI Wood Plank Panels in accordance with manufacturer's installation instructions and in compliance with all local codes and regulations. Install with undamaged edges and fitted accurately to suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit, as required.



- E. Suspension Runners: Install suspension system runners so they are square and securely interlocked with one another. Install number and use on-center spacing per wood ceiling manufacturer's instructions, as indicated on approved Shop Drawings and in compliance with all local codes.

### **3.4 CLEANING**

- A. General: Clean exposed wood surfaces of CSI Wood Plank Panels. Comply with manufacturer's instructions for cleaning and touchup of minor finish damage.

END OF SECTION 095426







**SECTION 09 6700 - FLUID-APPLIED FLOORING****PART 1 GENERAL****SECTION INCLUDES**

Fluid-applied two part epoxy resinous flooring and cove base.

**SUBMITTALS**

See Section 01 3000 - Administrative Requirements, for submittal procedures.

Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns and colors available.

Provide 12" x 12" x 3/16" sample of proposed manufacturer's product and color charts .

Provide 3 year warranty on labor and materials against all defects including air bubbles, cracks, and uneven installation thicknesses.

**QUALITY ASSURANCE**

Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

Applicator Qualifications: Company specializing in performing work of this section with minimum 3 years experience.

**DELIVERY, STORAGE, AND HANDLING**

Store resin materials in a dry, secure area.

Store materials for three days prior to installation in area of installation to achieve temperature stability.

**FIELD CONDITIONS**

Maintain minimum temperature in storage area between 60 and 85 degrees F.

Store materials in area of installation for minimum period of 24 hours prior to installation.

Test humidity and moisture content of subsurface and submit test results for manufacturer's/installer's acceptance prior to application.

Provide manufacturer's or installers written approval and acceptance of condition of substrate and jobsite work area prior to application.

**PART 2 PRODUCTS****MANUFACTURERS**

Fluid-Applied Flooring acceptable manufacturers:

Stonhard: [www.stonhard.com](http://www.stonhard.com); Product Stonshield QBT.



Key Resin Co., Product Key Pool Deck

TrueBond – Product Surefoot Non-Skid

Tremco Flowcrete or Florock

Substitutions: See Section 01 6000 - Product Requirements.

## **MATERIALS**

Fluid-Applied Flooring Type A: Epoxy base coat(s) with embedded anti-slip quartz aggregate and anti-slip additives in top coat specifically formulated for sloped surfaces-to-drains installations.

Thickness: constant 3/16 inch (5 mm), nominal, when dry.

Texture: Medium, slip resistant.

Color: Flagstone.

Material to include aluminum oxide or silica aggregate anti-slip and shark grip in final coating. Add additional anti-slip aggregate to finish coat in sloped flooring of indoor showers.

All surfacing to be compatible with bare feet on wet shower floors. Submit 12"x 12" sample for architects review.

Base Coat: QBT epoxy resin or manufacturers recommended primer coat.

Aggregate: colored quartz broadcast aggregate

Finish : non-slip finish when wet, installed as per manufacturer's instructions specifically at drains and cove bases.

Sealer: two-component, high performance, UV resistant anti-slip epoxy sealer.

Wall Base: Provide 6" high cove base with right angle metal or plastic top joint at head of cove bead.

## **PART 3 EXECUTION**

### **EXAMINATION**

Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive flooring. Follow manufacturers instructions to maintain constant 3/16" thickness over sloped surfaces.

Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resin cove bases..

Verify that concrete sub-floor surfaces are ready for flooring installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within the following limits:

Moisture emission rate: Not greater than 3 lb per 1000 sq ft (7.1 kg per 100 sq m) per 24 hours when tested using calcium chloride moisture test kit for 72 hours.

Alkalinity: pH range of 5-9.

Verify that required floor-mounted utilities are in correct location.

### **PREPARATION**

Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with sub-floor filler.

Apply, trowel, and float filler to achieve smooth, flat, hard surface. Grind irregularities above the surface level.



Prohibit traffic until filler is cured.

Vacuum clean substrate.

Apply primer to surfaces required by flooring manufacturer.

### **INSTALLATION - FLOORING**

Apply in accordance with manufacturer's instructions.

Apply each coat to minimum 3/16" thickness indicated allowing curing and setting times as per manufacturer's instructions. Carefully maintain minimal thickness of 3/16" over sloped surfaces and at edge of floor drains.

Finish to smooth non-slip level surface.

Cove base of 6" height at all vertical surfaces.

### **PROTECTION**

Prohibit traffic on floor finish for 54 hours after installation.

Barricade area to protect flooring until cured.

### **END OF SECTION**







**SECTION 09900 – PAINTING****PART 1 - GENERAL****1.1 SUMMARY****A. Section Includes:**

1. Primers & sealers
2. block filler and high performance coating on exposed CMU
3. Water-based latex finish coatings.
4. Floor sealers.
5. Painting of hollow core steel doors and frames
6. Exposed back-side of fiber cement panels only where visible.
7. Mechanical equipment and piping.
8. Wood preservative treatment for wood shingles.

**1.2 ACTION SUBMITTALS****A. Product Data:** For each type of product.**B. Sustainable Design Submittals:**

1. Summit sustainable design text for paints and coatings.>
2. Samples: For each type of topcoat product.

**C. Product Schedule:** Use same designations indicated on Drawings and in the Interior Painting Schedule to cross-reference paint systems specified in this Section. Include color designations.**1.3 QUALITY ASSURANCE****A. Mockups:** Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.**PART 2 - PRODUCTS MANUFACTURERS**

- A. Sherwin Williams high performance epoxy
- B. Benjamin Moore
- C. PPG Architectural coatings



- D. Osmose-Pentox Wood Preservative
- E. Or approved equivalent substitutions

## 2.2 PAINT PRODUCTS, GENERAL

### A. 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 topcoat manufacturers for use in paint system and on substrate indicated.

### B.

- C. Colors: As selected by Architect from manufacturer's full range.

## 2.3 PRIMERS

- A. Epoxy Block Filler: Solvent-based, two-component, epoxy, high-solids coating; formulated to bridge and fill porous surfaces of CMUs in preparation for specified intermediate and topcoat coatings:
- B. Interior Latex Primer for Wood: Waterborne-emulsion primer formulated for resistance to extractive bleeding, mold, and microbes; for hiding stains; and for use on interior wood subject to extractive bleeding.
- C. Anti-Corrosive Epoxy Primer: Corrosion-resistant, solvent-based, two-component epoxy primer formulated for use on prepared, interior ferrous- and galvanized-metal surfaces.

## 2.4 WATER-BASED FINISH COATS

- A. Interior, Latex, Institutional Low Odor/VOC, Eggshell: White or colored latex paint with low-odor characteristics and a VOC of less than 10 grams per liter, for use in areas, such as hospitals and other occupied buildings, where the odor and VOC levels of conventional latex products would preclude their use

## 2.5 FLOOR SEALERS

1. Solvent-Based Concrete Floor Sealer: Clear, acrylic, solvent-based sealer formulated for oil, gasoline, alkali, and water resistance and for use on concrete traffic surfaces.
2. Slip-Resistant Aggregate: Manufacturer's standard additive



## 2.6 EPOXY COATINGS – Exposed CMU walls

- A. High-Build Epoxy, Low or semi-gloss finish: Two-component epoxy, high-solids, low-gloss coating for use on interior or exterior concrete, masonry, and primed metal surfaces. Two coats over block filler primed. ( See Sect. 3.4 – Painting)

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- B. Proceed with coating application only after unsatisfactory conditions have been corrected.
  - 1. Application of coating indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
- C. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

### 3.3 INSTALLATION

- A. Apply paints according to manufacturer's written instructions.
- B. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- C. Painting Fire-Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
  - 1. Paint the following work where exposed in equipment rooms:
    - a. Equipment, including panelboards and switch gear.
    - b. Uninsulated metal piping.
    - c. Uninsulated plastic piping.



- d. Pipe hangers and supports.
  - e. Metal conduit.
  - f. Plastic conduit.
  - g. Tanks that do not have factory-applied final finishes.
  - h. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
2. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

### 3.4 CLEANING AND PROTECTION

- A. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- B. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- C. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

### 3.5 INTERIOR PAINTING

- A. Concrete Substrates,
- B. Concrete Substrates, Traffic Surfaces:
  - 1. Solvent Based Concrete Floor Sealer System
    - a. First Coat: Matching topcoat.
    - b. Topcoat: Solvent -based concrete floor sealer with non-slip additive..
  - 2. INTERIOR CMU WALLS ( S-W Basis of design or approved equivalent)
    - 1) 1st Coat: S-W Pro Industrial Heavy Duty Block Filler, B42W150 (75-125 sq ft/gal).
    - 2) 2nd Coat: S-W Pro Industrial Pre-Catalyzed Water based Epoxy, K46- Series.
    - 3) 3rd Coat: S-W Pro Industrial Pre-Catalyzed Water based Epoxy, K46- Series (4 mils wet, 1.5 mils dry per coat). Semi-gloss finish.
- C. Steel Substrates:
  - 1. Latex System, Alkyd Primer
    - a. Prime Coat: Alkyd anticorrosive primer
    - b. Intermediate Coat: Matching topcoat.
    - c. Topcoat: Interior, latex, institutional low odor/VOC, satin finish



## D. Galvanized-Metal Substrates:

1. Latex System
2. Institutional Low-Odor/VOC Latex System
  - a. Prime Coat: Water-based galvanized primer.
  - b. Intermediate Coat: Matching topcoat.
  - c. Topcoat: Interior, latex, institutional low odor/VOC, **satin**

## E. Exposed White Cedar shingles

Exterior wood shingles are to be treated with 3 coats of Osmose-Pentox" Conservator" clear preservative for Exterior Wood: Solvent-based, penetrating anti-fungal treatment for exterior wood containing zinc or copper naphthenate and treats the wood by osmosis from within the material .

Interior wood shingles are to be treated with one coat of Osmose Pentox clear Conservator . Ventilate area well during and after application.

Osmose-Pentox is a patented Canadian product in use for over fifty years and available directly from the manufacturer (no known US equivalent product exists to our knowledge that protects and preserves the wood without surface coating or changing the texture and appearance of the shingles ).

## F. Wood Framing:

1. Institutional Low-Odor/VOC Latex System
  - a. Prime Coat: Interior latex primer for wood.
  - b. Intermediate Coat: Matching topcoat.
  - c. Topcoat: Interior, latex, institutional low odor/VOC, **satin**

G. Cotton or Canvas ASJ Insulation-Covering Substrates: Including **pipe and duct coverings**

1. Institutional Low-Odor/VOC Latex System
  - a. Prime Coat: Interior latex primer sealer.
  - b. Intermediate Coat: Matching topcoat.
  - c. Topcoat: Interior, latex, institutional low odor/VOC, **satin**

END OF SECTION 09 9123







**SECTION 10 1400**  
**SIGNAGE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Room and door signs.
- B. Interior directional and informational signs.
- C. Building Dedication Plaque.

**1.02 RELATED REQUIREMENTS**

- A. Section 22 0553 - Identification for Plumbing Piping and Equipment.
- B. Section 26 0553 - Identification for Electrical Systems.

**1.03 REFERENCE STANDARDS**

- A. 36 CFR 1191 - Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities; Final Rule; current edition; (ADA Standards for Accessible Design).
- B. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2009.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's printed product literature for each type of sign, indicating sign styles, font, foreground and background colors, locations, overall dimensions of each sign.
- C. Signage Schedule: Provide information sufficient to completely define each sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.
  - 1. When room number to appear on signs differ from those on the drawings, include the drawing room number on schedule.
  - 2. When content of signs is indicated to be determined later, request such information from Owner through Architect at least 2 months prior to start of fabrication; upon request, submit preliminary schedule.
  - 3. Submit for approval by Owner through Architect prior to fabrication.
- D. Samples: Submit two samples of each type of sign, of size similar to that required for project, illustrating sign style, font, and method of attachment.
- E. Selection Samples: Where colors are not specified, submit two sets of color selection charts or chips.
- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. Curved Sign Media Suction Cups: One for each 100 signs; for removing media.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Package signs as required to prevent damage before installation.
- B. Package room and door signs in sequential order of installation, labeled by floor or building.
- C. Store tape adhesive at normal room temperature.



**1.07 FIELD CONDITIONS**

- A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.
- B. Maintain this minimum temperature during and after installation of signs.

**PART 2 PRODUCTS****2.01 MANUFACTURERS**

- A. Flat Signs:
  - 1. Best Sign Systems, Inc; HC 300 System: [www.bestsigns.com](http://www.bestsigns.com).
  - 1. Gemini Incorporated; [www.geminiplaques.com](http://www.geminiplaques.com).
  - 2. Substitutions: See Section 01 6000 - Product Requirements.
- B. Plaques:
  - 1. Gemini Incorporated; Cast Bronze: [www.geminiplaques.com](http://www.geminiplaques.com).
  - 2. Substitutions: See Section 01 6000 - Product Requirements.

**2.02 FLAT SIGNS**

- A. Tactile characters/symbols shall be raised 1/32 inch from sign plate face. Signs shall be of one-piece construction; added-on and/or engraved characters are unacceptable.
- B. Text shall be accompanied by Grade 2 braille.
- C. 3/8" wide, 1/32" raised perimeter border with 1/8" inside radius typical.
- D. All letters, numbers and/or symbols shall contrast with their background – either light characters on a dark background or dark characters on a light background. Characters and background shall have matte finish.

**2.03 SIGNAGE APPLICATIONS**

- A. Accessibility Compliance: All signs are required to comply with ADA Standards for Accessible Design and ANSI/ICC A 117.1 and applicable building codes, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.
- B. Room and Door Signs: Provide a sign for every doorway, whether it has a door or not, not including vestibules, storage closets, mechanical rooms and similar open areas.
  - 1. Service Rooms: Identify with room names and numbers to be determined later, not those shown on the drawings.
  - 2. Rest Rooms: Identify with pictograms, the names "MEN" and "WOMEN", do not include room numbers, provide braille. All restroom signs will include the graphic symbol of a wheelchair. The single-user restroom in the front of each building shall bear a pictogram sign with no gender identification showing equal sized pictograms for men, women, families and wheelchairs, plus braille identification of each.
  - 3. Exterior entrance door signs are to bear the individual; pictogram symbols on the automatic door opener-pads on each door in addition to a separate sign on the adjacent wall surface
- C. Interior Directional and Informational Signs:
  - 1. Sign Type: Same as room and door signs.
- D. Building Identification Signs:
  - 1. Use individual metal letters.
  - 2. Mount on outside wall in location to be determined on site.
- E. Plaque: Provide one 16"x20" building dedication plaque in the Main Building. Copy to be determined by Owner including the date of construction, and the names of the Architect and Consultant Engineers as well as DEM and RI State officials responsible for the park rebuild program.

**2.04 SIGN SIZE**

- A. Restroom signs shall be 6" x 8".



- B. Directional signs shall be 6" x 6".
- C. Room identification signs shall be 6" x 6", 8" x 6", 8" x 8" or 10" x 3".

#### **2.05 CAST PLAQUES**

- A. Material: Bronze.
- B. Plaque depth based on shape and size.
- C. Border: 3/8" Single Line
- D. Bevel: None
- E. Finish: Brushed.
- F. Background Color: Dark Oxide.
- G. Background textures: Sand.
- H. Clear Coat: Matte.
- I. Text: Raised Copy.
- J. Mounting: Blind Mount.
- K. Optional Rosettes per catalog. Sizes per catalog.
- L. Squares, rectangles or custom shapes and logos are available.
- M. Available with inserts: Etched, Cast, Ceramic, or Laser Engraved. .

#### **2.06 ACCESSORIES**

- A. Concealed Screws: Stainless steel, galvanized steel, chrome plated, or other non-corroding metal.
- B. Tape Adhesive: Double sided tape, permanent adhesive.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that substrate surfaces are ready to receive work.

#### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install neatly, with horizontal edges level.
- C. Locate signs where indicated:
  - 1. Room and Door Signs: Locate on wall at latch side of door with centerline of sign at 60 inches (1525 mm) above finished floor.
  - 2. If no location is indicated obtain Architect's instructions.
- D. Protect from damage until Substantial Completion; repair or replace damage items.

**END OF SECTION**







## SECTION 10 2113.19

## PLASTIC TOILET COMPARTMENT

## PART 1 - GENERAL

## 1.1 SUMMARY

## A. Section Includes:

1. Solid-plastic toilet compartments.

## B. Related Requirements:

1. Section 061000 "Rough Carpentry" for **blocking** in adjacent masonry walls required for attachment or support.
2. Section 092216 "Non-Structural Metal Framing" for blocking.
3. Section 102800 "Toilet and Bath Accessories" for accessories mounted on toilet compartments.
4. Section 102116 – Plastic Shower Stalls
5. Section Access panels

## 1.2 ACTION SUBMITTALS

## A. Product data.

## B. Shop Drawings: Plans, elevations, sections, details, and attachment details.

## C. Samples: Manufacturer's standard color sheets, showing full range of available colors for each type of toilet compartment.

## D. Delegated Design Submittals: For grab bars mounted on toilet compartment panels, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1. Include structural design calculations indicating compliance with specified structural-performance requirements.

## 1.3 CLOSEOUT SUBMITTALS

## A. Operation and maintenance data.



## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire Performance: Tested in accordance with, and pass the acceptance criteria of, NFPA 286.
- B. Structural Performance: Where grab bars are mounted on toilet compartments, design panels to comply with the following requirements:
  - 1. Panels are able to withstand a concentrated load on grab bar of at least **250 lbf (1112 N)** applied at any direction and at any point, without deformation of panel.
- C. Regulatory Requirements: Comply with applicable provisions in [the USDOJ's "2010 ADA Standards for Accessible Design for toilet compartments designated as accessible

### 2.2 SOLID-PLASTIC TOILET COMPARTMENTS

- A. Note : The same installer, supplier and manufacturer must be selected for this Section and Section 102116 to simplify maintenance and repair purposes.
- B. Acceptable Manufacturers :
  - 1. Scranton Products
  - 2. Bobrick – Traditional Partitions
  - 3. US Partitions
  - 4. Ironwood Partitions
  - 5. Or Approved equivalent section 01600
- C. Toilet-Enclosure Style: Overhead braced
- D. Urinal-Screen Style: Wall hung
- E. Pipe-chase wall panels : integral braced and floor supported including solid laminate top
- F. Door, Panel, and Pilaster Construction: Solid, high-density polyethylene (HDPE) material, not less than **1 inch (25 mm)** thick, seamless, with eased edges, and with homogenous color throughout thickness of material. Provide with no-sightline system consisting of door and pilaster lapped edges on strike side of door and door continuous hinge system .
  - 1. Integral Hinges: Configure doors and pilasters to receive integral hinges.
  - 2. Heat-Sink Strip: Manufacturer's continuous, stainless steel strip fastened to exposed bottom edges of solid-plastic components to hinder malicious combustion.
  - 3. Color: One color in men's room and alternate color in women's rooms as selected by Architect from manufacturer's full range.
- G. Urinal-Screen Construction: Matching panel construction.
- H. Pilaster Shoes: Manufacturer's standard design; stainless steel.
- I. Pilaster Sleeves (Caps): Manufacturer's standard design; **stainless steel**.



- J. Urinal-Screen Post: Manufacturer's standard post design of material matching the thickness and construction of pilasters
- K. Brackets (Fittings):
  - 1. Full-Height (Continuous) Type: Manufacturer's standard design; **stainless steel**.

## 2.3 HARDWARE AND ACCESSORIES

- A. Door Hardware and Accessories: Manufacturer's operating hardware and accessories. All to be Mounted with through bolts.
  - 1. Hinges:
    - a. Manufacturer's integral hinge for solid-plastic doors, allowing emergency access by disassembly of door.
      - 1) Material, Integral Hinge: Nylon gravity cam unit with stainless steel pins/screws.
  - 2. Latch and Keeper: Manufacturer's surface-mounted latch unit, designed for emergency access, and with combination rubber-faced door strike and keeper. Provide units that comply with regulatory requirements for accessibility at toilet enclosures designated as accessible.
- B. All bathroom door hardware for wheelchair accessible toilet or indoor or outdoor shower stalls or handicapped designated stalls will be equipped with lever style heavy-duty stainless steel door handles.
  - a. Material: **Stainless steel**.
  - 2. Coat Hook: Manufacturer's combination hook and rubber-tipped bumper, sized to prevent inswinging door from hitting compartment-mounted accessories.
    - a. Material: **Stainless steel**
  - 3. Door Bumper: Manufacturer's rubber-tipped bumper at outswinging doors.
    - a. Material: **Stainless steel**.
  - 4. Door Pull: Manufacturer's unit at out-swinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at all toilet enclosures
    - a. Material: **Stainless steel..**
- C. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with anti-grip profile and in manufacturer's clear anodized finish.
- D. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, finished to match items they are securing, with theft-resistant-type heads. Provide



hex-type bolts for through-bolt applications. For concealed anchors, use stainless steel, hot-dip galvanized steel, or other rust-resistant, protective-coated steel compatible with related materials.

## 2.4 MATERIALS

- A. Aluminum Castings: ASTM B26/B26M.
- B. Aluminum Extrusions: ~~ASTM B221~~ (ASTM B221M).
- C. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, Type 304, stretcher-leveled standard of flatness.
- D. Stainless Steel Castings: ASTM A743/A743M.

Note : No Zamac products or commercial zinc-alloy die castings.

## 2.5 FABRICATION

- A. Fabricate toilet compartment components to sizes indicated. Coordinate requirements and provide cutouts for through-partition toilet accessories where required for attachment of toilet accessories.
- B. Overhead-Braced Units: Manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters and walls to suit floor and wall conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.
- C. Floor-and-Ceiling-Anchored Units: Manufacturer's standard corrosion-resistant anchoring assemblies at pilasters and walls, with leveling adjustment nuts at tops and bottoms of pilasters. Provide shoes and sleeves (caps) at pilasters to conceal anchorage.
- D. Urinal-Screen Posts: Manufacturer's standard corrosion-resistant anchoring assemblies at posts and walls, with leveling adjustment nuts at bottoms of posts. Provide shoes **and sleeves (caps)** at posts to conceal anchorage.
- E. Door Size and Swings: Unless otherwise indicated, provide ~~30-inch-~~ wide, in-swinging doors for standard toilet enclosures and ~~36-inch-~~ (914-mm-) wide, out-swinging doors with a minimum ~~32-inch-~~ (813-mm-) wide, clear opening for toilet enclosures designated as accessible.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.
  - 1. Maximum Clearances:



- a. Pilasters and Panels or Screens: 1/2 inch (13 mm).
  - b. Panels or Screens and Walls: 1 inch (25 mm).
- 2. Full-Height (Continuous) Brackets: Secure panels or screens to walls and to pilasters with full-height stainless steel brackets.
  - a. Locate bracket fasteners, so holes for wall anchors occur in masonry or tile joints.
  - b. Align brackets at pilasters with brackets at walls.
- B. Overhead-Braced Units: Secure pilasters to floor and level, plumb, and tighten. Set pilasters with anchors penetrating not less than 1-3/4 inches (44 mm) into structural floor unless otherwise indicated in manufacturer's written instructions. Secure continuous head rail to each pilaster with no fewer than two fasteners. Hang doors to align tops of doors with tops of panels and adjust, so tops of doors are parallel with overhead brace when doors are in closed position.
- C. Urinal Screens: Attach with full height anchoring devices to suit supporting structure. Set units level and plumb, rigid, and secured to resist lateral impact.

### 3.2 ADJUSTING

- A. Hardware Adjustment: Adjust and lubricate hardware in accordance with hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

END OF SECTION 102113.19







## SECTION 10 2116.19 - PLASTIC SHOWER COMPARTMENTS

## PART 1 - GENERAL

## 1.1 SUMMARY

## A. Section Includes:

1. Solid-plastic shower compartments complete with shower rods curtains, all accessories and louvered fiberglass doors

Note 1.: Floor surface of indoor shower stalls is 3/16" thick fluid applied resin flooring sloped to linear shower stall drains.

Note 2: Accessories for shower stalls including grab bars, mobile device holders , robe hooks and folding shower seats , curtain rods etc. are specified in this section. These may be pre-mounted to partitions in the factory or site installed.

2. Pipe-chase walls (cavity wall construction) as per dwg. A-2 or Ab-2 : 16" wide pipe-chase cavity of Matching 1" thick HDPE panel construction and including solid composite top 5/8"thick x 17"w ( Corian or equivalent see Solid Surfacing Fabrications Section 066116. ) Concealed Support for these walls to be stainless steel light gauge framing.
3. These pipe-chase walls are to be floor-mounted and are to receive 6" high site-applied resinous cove base on one side . Check for material compatibility. (for cove base see details dwg A-11)

## B. Related Sections :

1. Fiberglass louvered doors supplied as part of Section 081613 and installed as part of this Section.
2. Co-ordinate the installation of coin operated timing mechanisms for each shower unit supplied as part of mechanical equipment for each shower and to be mounted on the front wall of each shower stall.
3. Co-ordinate installation of all shower controls, floor mounted urinals and access panels to be located in or against pipe-chase walls
4. Solid Surfacing Fabrications -Section 066116

## 1.2 ACTION SUBMITTALS

## A.

## B. Product Data: For each type of product.

## C. Sustainable Design Submittals:

1. Submit data and text for recycled materials content



- D. Shop Drawings: For shower compartments.
  - 1. Include plans, elevations, sections, and all hardware and attachment details.
- E. Samples: For each exposed product and for each color and texture specified.

### 1.3 INFORMATIONAL SUBMITTALS

- A. Product certificates.

### 1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.

## PART 2 - PRODUCTS

## PART 3 - Acceptable manufacturers

Please Note : The same manufacturer, supplier and installer are to be selected for the work of this section and for Section 102113 Plastic Toilet Compartments

- A. Scranton Products : Hiny Hiders
- B. Bobrick : Traditional Partitions
- C. US Partitions
- D. Or Approved Equivalents

### 3.2 PERFORMANCE REQUIREMENTS

- A. Fire Performance: Tested in accordance with, and pass the acceptance criteria of, NFPA 286.
- B. Regulatory Requirements: Comply with applicable provisions in USDOJ's "2010 ADA Standards for Accessible Design for shower compartments designated as accessible.

### 3.3 SOLID-PLASTIC COMPARTMENTS

- A. Configuration: Single or Multiple Indoor Shower compartments as indicated on Drawings.
- B. Enclosure Style: Overhead braced



- C. Panel and Pilaster Construction: Solid, high-density polyethylene (HDPE) panel material, not less than 1 inch (25 mm) thick, seamless, with eased edges and with homogenous color and pattern throughout thickness of material.
1. Integral Hinges: Configure doors and pilasters to receive integral hinges.
  2. Heat-Sink Strip: Manufacturer's standard, continuous, anodized aluminum or stainless steel strip fastened to exposed bottom edges of solid-plastic components to hinder malicious combustion.
  3. Color and Pattern: One color and pattern as selected by Architect from manufacturer's full range to match toilet compartments specified in Section 102113.19 "Plastic Toilet Compartments".
- D. Door Construction: The hanging of the louvered fiberglass doors (Section 081613) for all shower stalls and installation complete with all hardware and accessories is part of the work of this section.
- E. These louvered fiberglass doors are specified in Section 081613 of this specification .
- F. Pilaster Shoes and Sleeves Caps: Manufacturer's standard design; stainless steel.
1. Plastic Color and Pattern: Match toilet compartments specified in Section 102113.19 "Plastic Toilet Compartments"
- G. Brackets (Fittings):
1. Shower Compartment Brackets: Match toilet-compartment brackets specified in Section 102113.19 "Plastic Toilet Compartments."
- Note : Each shower stall unit will be set on a sloped floor surface of fluid applied resinous flooring for accessible compartments. Adjust height of pilasters and supports accordingly and for thickness of resin flooring ( 3/16" ) .
- H. Finish: Manufacturer's standard finish on exposed surfaces, to match Section 102113 Plastic Toilet Compartments.

### 3.4 ACCESSORIES- see Bathroom Accessories -see Section 102800 for product standards

- A. Door Hardware and Accessories: Manufacturer's standard design, heavy-duty, operating hardware and accessories. Mount to panels with through-bolts.
1. Material: Stainless steel.
  2. One per shower stall 1 1/2 diam. " X 36" stainless steel grab-bar 0.40 wall thickness securely mounted on side wall at ADA recommended height for all indoor and outdoor shower stalls with escutcheon plate and concealed fasteners. Also, one 1 1/2" diam 18" knurled finish stainless steel grab -bar installed vertically per shower stall (indoor and outdoor.)
  3. Hinges: Manufacturer's standard, continuous, cam type that swings to a closed or partially open position allowing emergency access by lifting door.
  4. Latch and Keeper: Manufacturer's standard, surface-mounted latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide



- units that comply with regulatory requirements for accessibility. The entrance door hardware will include a lever style heavy-duty stainless steel door handle with suitable latching and privacy mechanism .
5. Clothing Hooks and mobile device holder : Supply and install a wall mounted two robe clothes hook type Bobrick-B7672 stainless steel and one wall mounted mobile device holder type Bobrick # B-635 with supporting stainless steel brackets in each shower compartment ( including one in each of the 8 outdoor shower stalls) and rubber-tipped bumper at in-swinging doors, sized to prevent door from hitting wall panel or compartment-mounted accessories.
  6. Door Bumper: Manufacturer's standard, rubber-tipped bumper at out -swinging doors.
  7. Door Pull: Manufacturer's standard stainless steel unit at out-swinging doors that complies with regulatory requirements for accessibility. Provide lever style heavy duty door handle privacy function units on both sides of doors at all shower compartments.
- B. Overhead Bracing: Manufacturer's standard, continuous, extruded-aluminum headrail or cap with anti-grip profile; in manufacturer's standard finish.
- C. Curtain Rod : Curved solid stainless steel rod **1-inch- (25-mm-)** diameter rod 0.040 wall thickness( see detail 4 drawing A-15) with Stainless steel supports and fittings at each extremity.
- D. Curtain: Flame-resistant, polyester-reinforced vinyl fabric that is stain resistant, self-sanitizing, antistatic, antimicrobial, and launderable to a temperature of not less than [**90 deg F (32 deg C)**] hemmed at top and bottom and fitted with stainless steel grommets sized for 1" curtain rod. ( see detail 4 dwg A-15) and dyneema-cord hold-back straps with plastic snaps and fasteners at one side of curtain.
1. Flame Resistance: Passes NFPA 701 tests when tested by a testing and inspecting agency acceptable to authorities having jurisdiction.
  2. Labeling: Identify fabrics with appropriate markings of applicable testing and inspecting agency.
  3. Length: Where curtain extends to a floor surface, size so that bottom hem clears finished floor by not more than **4" inch** and not less than **2 inch** above floor surface.
  4. Color and Pattern: As selected by Architect from manufacturer's full range
- E. Soap Holder: wall-mounted HDPE soap dish with perforated bottom for drainage .
- F. Folding Seats: ADA seats at comfort height for each indoor shower stall. Wall mounted welded tubular stainless steel frame, perforated seat bottom only, with stainless steel hinge. Bobrick #B5181 by Bobrick Equipment or ASI- 8203 by American Specialties.
1. Material: Solid 12" x 12" x 1" HDPE seat perforated for drainage at ADA comfort seating height.
  2. Finish: Match enclosure panels.
- G. Anchorages and Fasteners: Manufacturer's standard, exposed fasteners of stainless steel, finished to match the items they are securing; with theft-resistant-type heads. Provide hex-type bolts for through-bolt applications.
- H. Structural Performance: Design accessories and fasteners to comply with the following requirements:



1. Grab Bars: Installed units are able to resist **250 lbf** concentrated load applied in any direction and at any point.
2. Shower Seats: Installed units are able to resist **300 lbf** applied in any direction and at any point.

### 3.5 FABRICATION

- A. Overhead-Braced Compartments: Manufacturer's standard, corrosion-resistant supports, leveling method, and anchors at pilasters and walls to suit floor and wall conditions. Provide shoes at pilasters to conceal supports and leveling method.
- B. Floor-and-Ceiling-Anchored Compartments: Manufacturer's standard, corrosion-resistant anchoring assemblies at pilasters and walls, with leveling adjustment at tops and bottoms of pilasters. Provide shoes and sleeves (caps) at pilasters to conceal anchorage.
- C. Door Sizes and Swings: all shower doors to be 36" wide with swings as per ADA requirements and architectural drawings. (see Section 081613 for specification of louvered fiberglass doors)

## PART 4 - EXECUTION

### 4.1 INSTALLATION

- A. Curtains: Install curtains to specified length and verify that they hang vertically without stress points or diagonal folds.

### 4.2 ADJUSTING

- A. Curtain Adjustment: After hanging curtains, test and adjust each track or rod to produce unencumbered, smooth operation. Steam and dress down curtains as required to produce crease- and wrinkle-free installation. Remove and replace curtains that are stained or soiled or that have stress points or diagonal folds.
- B. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

END OF SECTION 10 2116.19







## SECTION 10 2123 - CUBICLE CURTAINS AND TRACK

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. Cubicle-curtain tracks and carriers.
2. Cubicle curtains.

#### 1.2 ACTION SUBMITTALS

##### A. Product Data: For each type of product.

#### 1.3 CLOSEOUT SUBMITTALS

##### A. Operation and maintenance data.

### PART 2 - PRODUCTS

Manufacturers and products listed in this Section are neither recommended nor endorsed by the AIA or Deltek. Before selecting manufacturers and products, verify availability, suitability for intended applications, and compliance with minimum performance requirements. For definitions of terms and requirements for Contractor's product selection, see Section 016000 "Product Requirements."

Product options commonly available from manufacturers are included in square brackets throughout the Section Text. Not every manufacturer listed can provide every option offered; verify availability with manufacturers. For definitions of terms and requirements for Contractor's product selection, see Section 016000 "Product Requirements."

#### 2.1 PERFORMANCE REQUIREMENTS

##### A. Cubicle Curtains: Provide curtain fabrics with the following characteristics:

Retain option in "Laundering" Subparagraph below for heavy-duty polyester fabrics made with "Avara FR" by INVISTA, "Trevira CS" by Trevira, or similar proprietary fibers.

1. Laundering: Launderable to a water temperature of not less than [**160 deg F (71 deg C)**] **<Insert temperature>**.

Coordinate "Flame Resistance" Subparagraph below with requirements of authorities having jurisdiction.

2. Flame Resistance: Provide fabrics identical to those that have passed NFPA 701 when tested by a qualified testing agency acceptable to authorities having jurisdiction.



- a. Identify fabrics with appropriate markings of a qualified testing agency.

## 2.2 CUBICLE-CURTAIN SUPPORT SYSTEMS

- A. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)

Retain "Extruded-Aluminum Curtain Track" or "PVC Curtain Track" Paragraph below. If necessary, insert requirements for hinged curtain tracks that allow one end of a track to be detached from the ceiling and lowered to within reach or other proprietary systems.

Retain first option in "Extruded-Aluminum Curtain Track" Paragraph below for standard tracks; retain second option for economy track.

- B. Extruded-Aluminum Curtain Track: Not less than [**1-1/4 inches wide by 3/4 inch high (32 mm wide by 19 mm high)**] [**5/8 inch wide by 1/2 inch high (16 mm wide by 13 mm high)**].

Radius in "Curved Track" Subparagraph below is standard with manufacturers. Verify availability and insert other radii if required.

1. Curved Track: Factory-fabricated, [**12-inch- (305-mm-)**] **<Insert radius>** radius bends.
2. Finish: [**Clear anodized**] [**Satin anodized**] [**Baked enamel, acrylic, or epoxy**] **<Insert finish>**.
- C. PVC Curtain Track: Not less than **1-1/4 inches wide by 15/16 inch high (32 mm wide by 24 mm high)**.
  1. Curved Track: Factory-fabricated, **12-inch- (305-mm-)** radius bends.
- D. Curtain Track Accessories: Fabricate splices, end caps, connectors, end stops, coupling and joining sleeves, wall flanges, brackets, ceiling clips, and other accessories from same material and with same finish as track.
  1. End Stop: [**Nonremovable**] [**Removable with carrier hook**].

Retain "Curtain Roller Carriers" or "Curtain Glide Carriers" Paragraph below. Coordinate type of curtain carrier with size of track and with products of manufacturers; 5/8-inch- (16-mm-) wide tracks typically use glides instead of rollers.

- E. Curtain Roller Carriers: Two nylon rollers and nylon axle with [**chrome-plated steel**] [**nylon**] [**aluminum**] hook.
- F. Curtain Glide Carriers: One-piece nylon glide with [**chrome-plated steel**] [**nylon**] hook.

Breakaway carriers in "Breakaway Curtain Carriers" Paragraph below are for psychiatric or detention applications. Not all manufacturers offer breakaway carriers; verify availability.

- G. Breakaway Curtain Carriers: [**One-piece nylon**] [**Velcro**] breakaway curtain carriers designed to allow curtains to detach from tracks with a pulling force of no more than **5 lbf (22.2 N)**.
- H. Exposed Fasteners: Stainless steel.



Retain second option in "Concealed Fasteners" Paragraph below for high-humidity installations.

- I. Concealed Fasteners: [**Hot-dip galvanized**] [**Stainless steel**].

## 2.3 CURTAINS

- A. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
- B. Fabric: Curtain manufacturer's standard, 100 percent polyester; inherently and permanently flame resistant, stain resistant, and antimicrobial.
  1. Proprietary Fiber:
    - a. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
  2. Pattern: **<Insert manufacturer's style name>**.
  3. Width: **<Insert dimension>**.
  4. Color: **[As selected by Architect from manufacturer's full range] <Insert requirements>**.
- C. Curtain Grommets: Two-piece, rolled-edge, rustproof, nickel-plated brass; spaced not more than **6 inches (152 mm)** o.c.; machined into top hem.

Retain "Mesh Top," "Beaded-Chain Curtain Drop," or "PVC-Strip Curtain Drop" Paragraph below if required to ensure curtains do not block water flow from sprinklers. Authorities having jurisdiction may have specific requirements about curtain drop height or mesh opening size. Verify requirements with authorities having jurisdiction.

Height of mesh top in "Mesh Top" Paragraph below is typically 20 inches (508 mm) to provide 22-inch (559-mm) total clearance from the ceiling as required by NFPA 13; however, some jurisdictions may interpret NFPA 13 to mean that 22 inches (559 mm) of mesh is needed. Verify requirements with authorities having jurisdiction.

- D. Mesh Top: Not less than [**20-inch- (508-mm-)**] [**22-inch- (559-mm-)**] **<Insert dimension>** high mesh top.

Retain one of three mesh opening sizes in "Mesh" Subparagraph below. The most commonly used, No. 50 mesh, is an open weave with openings of about 1/2 inch (13 mm) to comply with NFPA 13; No. 40 mesh is an open weave with openings of about 1/4 inch (6 mm); No. 42 mesh is closely woven with small openings. Verify acceptability with authorities having jurisdiction.

1. Mesh: No. [**50**] [**40**] [**42**] nylon mesh.
- E. Beaded-Chain Curtain Drop: [**6 inches (152 mm)**] [**9 inches (229 mm)**] [**12 inches (305 mm)**] [**15 inches (381 mm)**] [**18 inches (457 mm)**] long; nickel-plated steel with aluminum hook.
- F. PVC-Strip Curtain Drop: [**16 inches (406 mm)**] [**18 inches (457 mm)**] long with chrome-plated steel hook.

Retain "Snap Attachment" Paragraph below with "Modular Curtain Panels" Paragraph in "Curtain Fabrication" Article if required.



- G. Snap Attachments: Provide manufacturer's standard nickel-plated brass snap attachments for modular panels.
- H. Curtain Tieback: Nickel-plated brass chain; one at each curtain termination.

## 2.4 CURTAIN FABRICATION

### A. Continuous Curtain Panels:

- 1. Width: Equal to track length from which curtain is hung plus 10 percent of added fullness, but not less than **12 inches (305 mm)** of added fullness.
- 2. Length: Equal to floor-to-ceiling height, minus depth of track and carrier at top, and minus clearance above the finished floor of **[12 inches (305 mm)] [15 inches (381 mm)] [As indicated on Drawings]** **<Insert requirements>**.

### B. Modular Curtain Panels:

- 1. Fabric Panels: **[48 inches (1219 mm)] [66 inches (1676 mm)] <Insert dimension>** wide. Fabricate panels in quantity required to provide assembled curtains equal to track lengths plus 10 percent added fullness, but not less than **12 inches (305 mm)** added fullness.
- 2. Length: Equal to floor-to-ceiling height, minus depth of track and carrier at top, and minus clearance above the finished floor of **[12 inches (305 mm)] [15 inches (381 mm)] [As indicated on Drawings]** **<Insert requirements>**.
- 3. Mesh Top: **[Continuous for each track length, matching overall width of assembled curtains] [Modular, matching width of modular fabric panels with snap attachments at side hems of mesh-top panels]**.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install tracks level and plumb, according to manufacturer's written instructions.
- B. For tracks of up to **20 feet (6.0 m)** in length, provide track fabricated from single, continuous length.

Retain one of three options in "Curtain-Track Mounting" Subparagraph below. Surface mounting is typically recommended by manufacturers for ceiling heights of up to 108 inches (2743 mm); suspended mounting is recommended for higher ceilings.

- 1. Curtain-Track Mounting: **[Surface] [Suspended] [As indicated on Drawings]**.
- C. Track Accessories: Install splices, end caps, connectors, end stops, coupling and joining sleeves, and other accessories as required for a secure and operational installation.

Retain both subparagraphs below if required. Coordinate with accessories. If beds shown on Drawings do not define locations of accessories, revise to suit Project.

- 1. Provide one hinged loading unit for each bed.



- D. Curtain Carriers: Provide curtain carriers adequate for 6-inch (152-mm) spacing along full length of curtain plus an additional carrier.
- E. Cubicle Curtains: Hang curtains on each curtain track.[ **Secure with curtain tieback.**]

END OF SECTION 10 2123







## SECTION 10 2800 – TOILET AND BATHROOM ACCESSORIES

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Public-use washroom accessories.
2. Healthcare accessories.
3. Hand dryers.
4. Childcare accessories.

B. Please note : other accessories including ADA grab-bars and seats for the shower stalls are specified in Section 102116 – Plastic Shower Compartments

#### 1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product and for each finish specified, full size.

1. Approved full-size Samples will be returned and may be used in the Work.

C. Delegated Design Submittal:

1. Include structural design calculations indicating compliance with specified structural-performance requirements and ADA requirements.

#### 1.3 INFORMATIONAL SUBMITTALS

A. Sample warranties.

#### 1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

#### 1.5 WARRANTY

A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.

1. Warranty Period: **10** years from date of Substantial Completion.



## 1.6 MANUFACTURERS

- A. Bobrick Bathroom Accessories
- B. A&J washroom Accessories
- C. American Specialties
- D. Kimberley Clark
- E. Substitutions : Section 0 1600 product requirements

Electric Hand dryers

American Dryer Inc – model Extreme Air EXT

Excel Dryer-model Elerator Eco

World Dryer Corp. – model Smart DRi

- F. Manufacturer's Special Warranty for Hand Dryers: Manufacturer agrees to repair or replace hand dryers that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: Five years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 FINISHES : Stainless Steel - #4 brushed satin unless otherwise stated

### 2.2 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

### 2.3 PUBLIC-USE WASHROOM ACCESSORIES

- A. Electric Hair dryers : 1 per cloakroom men's & women's –wall mounted at 6'-0" high with adjustable nozzle and start button , concealed fasteners.
  - 1. Mediclinics style #sc0088HCS or World Dryer model Airstyle by Gen we
- B. Electric hand Dryers – 2 per each bathhouse , wall mounted at 38" height
  - 1. Automatic Sensor operated , surface mounted , provide ADA mounting accessory.
  - 2. Cover stainless steel
  - 3. Total wattage 500 watts



- C. Toilet Tissue (Roll) Dispenser – one per toilet compartment mounted not more than 7'-9" from front of toilet
  - 1. Concealed anchorage double roll surface mounted stainless steel jumbo roll dispenser
  - 2. Model Bobrick B-2892 equipped with tumbler lock or approved equivalent
- D. Grab Bar – one wall mounted per shower stall –(included in Section 10 2116)
- E. Grab-Bars – two per handicapped accessible toilet stall – Bobrick # B-6806 36" long x 1 ½" diam, stainless steel 0.40 tube with concealed fasteners and snap on escutcheon plate. Include Bobrick backing plate for grab bars. Provide one 18" long matching grab-bar in each toilet stall mounted in the vertical position. Ambulatory stalls are to include two full length ( 48" long x 1 ½" diam) grab bars each stall, one mounted on each wall to assist persons using crutches.
- F. Sanitary-Napkin Disposal Unit
  - 1. Mounting: Surface mounted.
  - 2. Door or Cover: Self-closing cover locking bottom panel, full length piano hinge stainless steel with hinged face panel with tumbler lockset.
  - 3. Receptacle: Removable plastic .
  - 4. Container Material and Finish: Stainless steel,
  - 5. Model : RM 6140 manufactured by Rubbermaid or Bobrick B-254
- G. Mirror Unit – one per sink unit
  - 1. Wall mounted 24" x 36" Bobrick Frameless stainless-steel mirror # B- 1556-2436 or equivalent
- H. Robe Hooks – one per toilet compartment door mounted.
  - 1. Bobrick Stainless steel type B-7672 two pronged stainless steel with concealed fasten
- I. Baby Changing Station – two for each man's and women's bathhouse or as shown on floor plans A-2 and Ab-2 mounted in men's and women's cloakrooms of each building and one in each single user bathroom.
  - 1. Description: Wall mounted folding commercial use diaper station that opens by folding down from stored position and with adjustable strap meeting or exceeding ASTM F2285  
  
Mounting: Surface mounted, with unit projecting not more than 4 inches (102 mm) from wall when closed, fully horizontal surface when open.
  - 2. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin), with replaceable insulated polystyrene tray liner and rounded plastic corners.
- J. ADA sinks (see mechanical specifications) – are to be mounted with lower edge not more than 27" from floor height and top surface not more than 32" from floor.
- K. ADA urinals –(see mechanical specifications) – one ADA compliant urinal is required per men's bathroom .
- L. ADA toilets (see mechanical specifications) – ADA toilets are to have flush mechanisms no higher than 36" from floor.



- M. Garbage disposal: Provide wall mounted garbage disposal with sanitary liners in each cloakroom.

Manufacturers:

- 1. American Specialties
- 2. Foundations worldwide
- 3. Koala Kare products

## 2.4 PUBLIC-USE SHOWER ROOM ACCESSORIES

- A. The shower stall accessories for indoor and outdoor showers are specified in Section 102116

## 2.5 CUSTODIAL ACCESSORIES

- A. Waste Receptacle -free standing type- 3 per bathhouse vestibule  
65 gallon Brute rollout waste containers
- B. Custodial Utility Shelf and Mop and Broom Holder  
  
wall mounted Bobrick #223 stainless steel broom and mop holders- 2 units per  
mechanicalroom.

## 2.6 FABRICATION

- A. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of **[six]** **<Insert number>** keys to Owner's representative.

# PART 3 - EXECUTION

## 3.1 INSTALLATION

- A. Install accessories in accordance with manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
  - 1. Remove temporary labels and protective coatings.
- B. Grab Bars: Install to comply with specified structural-performance requirements.
- C. Shower Seats: Install to comply with specified structural-performance requirements.

END OF SECTION 102800



**SECTION 12 4816 – ENTRANCE FLOOR GRILLES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Recessed floor grilles and frames.

**1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Shop Drawings:
  - 1. Divisions between grille sections.
  - 2. Perimeter floor moldings.
- C. Samples: For each exposed product and for each color and texture specified.

**1.3 CLOSEOUT SUBMITTALS**

- A. Maintenance data.

**PART 2 - PRODUCTS****2.1 MANUFACTURERS**

- A. Construction Specialties – Stainless Steel Gridline with anti-slip Rubber inserts
- B. Matsinc – Grate Grid – Aluminum grid with rubber inserts
- C. Approved equivalent.

**2.2 ENTRANCE FLOOR GRILLES, GENERAL**

- A. Accessibility Standard: Comply with applicable provisions in the DOJ's "2010 ADA Standards for Accessible Design"

**2.3 FLOOR GRILLES**

- A. Aluminum or Stainless Steel Floor Grilles: Provide manufacturer's standard floor grilles with extruded members, top-surfaced tread rails, and as follows:



1. Aluminum Color: Clear anodized
  2. Tread Rail Spacing: [**1-1/2 inches (38 mm)** o.c. with **1/8- to 3/16-inch-** wide openings between treads.
  3. Top Surface: Fusion-bonded, recycled rubber insert; **1/4 inch (6.4 mm)** high,
    - a. Top Surface Color: clear anodized
  4. Grille Size: see Floor Plan dwg. A-2 or Ab-2 ( Vestibules)
- B. Stainless Steel Floor Grille: Type 304.
1. Surface Treads: **0.071-by-0.177-inch (1.8-by-4.49-mm)** wire with **0.125-inch-(3.17-mm-)**wide openings between wires.
  2. Recycled rubber inserts treads
  3. Support Rods: Spaced **1 inch (25.4 mm)** o.c., welded to each wire.
  4. Pit Grating: **1-1/8 inches (28.5 mm)** deep.
  5. Stainless Steel Finish: **Mill**
  6. Grille Size: see Dwg. A-2 or Ab-2
- C. Lockdown:

## 2.4 FRAMES

- A. Provide manufacturer's standard frames of size and style for grille type. Provide manufacturers installation template for grill and drain pan.

## 2.5 SUPPORT SYSTEM

- A. Drainage Pit Applications: Provide manufacturer's special deep-pit frame and support extrusion system with intermediate support beams, sized and spaced as recommended by manufacturer for indicated spans and equipped with vinyl support cushions.

## 2.6 DRAIN PANS

- A. Provide manufacturer's standard aluminum or stainless steel sheet drain pan with **NPS 2 (DN 50)** drain outlet for each floor-grille unit and dirt strainer/filter. Coat bottom of pan with protective coating recommended by manufacturer.

## 2.7 MATERIALS

- A. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B.
- B. Stainless Steel Plate Sheet, and Strip: ASTM A240/A240M or ASTM A666, Type 304.
- C. Stainless Steel Flat Bars: ASTM A666, Type 304.
- D. Stainless Steel Angles: ASTM A276 or ASTM A479/A479M, Type 304.



- E. Aluminum Sheet: **ASTM B209** (ASTM B209M).
- F. Extruded Aluminum: **ASTM B221** (ASTM B221M).

## 2.8 FABRICATION

- A. Shop fabricate floor grilles to greatest extent possible in sizes as indicated.
- B. Fabricate frame members in single lengths or, where frame dimensions exceed maximum available lengths, provide minimum number of pieces possible.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install recessed floor grilles and frames and drain pans to comply with manufacturer's templates and written instructions at locations indicated and with top of floor grilles and frames in relationship to one another and to adjoining poured resinous flooring as recommended by manufacturer. Set floor-grille tops at height for most effective cleaning action. Coordinate top of floor-grille surfaces with doors that swing across grilles to provide clearance under door.

### 3.2 PROTECTION

- A. After completing frame installations, provide temporary filler of plywood or fiberboard in floor-grille recesses and cover frames with plywood protective flooring. Maintain protection until construction traffic has ended and Project is near Substantial Completion.

END OF SECTION 124816







**DIVISION 23 – MECHANICAL****SECTION 23 00 00 - MECHANICAL GENERAL REQUIREMENTS****PART 1 - GENERAL****1.01 RELATED DOCUMENTS:**

- A. Drawings, provisions of the Contract, and Division 01 Specification Sections, apply fully to work in this section.
- B. All requirements of this Section shall govern the work under all of the Sections of Division 23 - Mechanical including:

**Section 23 00 50 MECHANICAL: ELECTRICAL COMPONENTS****Section 23 01 50 MECHANICAL: VIBRATION ISOLATION****Section 23 02 50 MECHANICAL: PIPE HANGERS AND SUPPORTS****Section 23 03 00 MECHANICAL: FIRE SAFING / FIRESTOPPING****Section 23 04 00 MECHANICAL: INSULATION****Section 23 04 40 MECHANICAL: PIPE CLEANING TESTING****Section 23 10 00 PLUMBING****Section 23 15 00 PLUMBING: FIXTURES****Section 23 80 00 HVAC: AIR HANDLING SYSTEMS****Section 23 85 00 HVAC: EQUIPMENT****Section 23 90 00 HVAC: CONTROL SYSTEM / ANALOG****Section 23 94 00 HVAC: CONTROL SEQUENCE OF OPERATIONS****Section 23 95 00 HVAC: TESTING ADJUSTING BALANCING****1.02 DEFINITIONS:**

- A. The term "Mechanical" applies and refers to all work specified within Division 23 and as indicated on the Contract Drawings.
- B. The term "Mechanical Contractor(s)" applies and refers to all those furnishing labor and materials for the completion of the work specified within Division 23 and as indicated on the Contract Drawings. All subcontractors and sub-subcontractors, as defined within the General Conditions, are collectively termed "Mechanical Contractor(s)". The requirements of Section 23 00 00 apply to all Mechanical Contractor(s).
- C. The term "this Section" shall mean "this Section of the Specifications". The term "this Division" shall refer to "Division 23 - Mechanical" and all of its Sections.



- D. Wherever the word "provide" is used, it shall mean "furnish and install complete and ready for use".
- E. "Concealed" shall mean hidden from sight in trenches, chases, furred spaces, shafts, above hung ceilings, embedded in construction, in attic spaces or in crawl spaces.
- F. "Work by others" shall mean "not by Mechanical Contractor but provided or installed by the General Contractor or any other sub-contractor performing their respective work within this contract".

1.03 INTENT:

- A. The intention of these Specifications and Drawings is to call for finished work, tested and ready for operation.
- B. The drawings are diagrammatic and not intended to show every pipe, offset, associated equipment or other minor detail. Provide such parts, materials, and appliances as required to complete the systems for operation.
- C. Equipment and/or materials specified in the singular shall be provided in quantities as required for complete systems.

1.04 PROJECT MEETINGS:

- A. Provide knowledgeable personnel to attend meetings scheduled (Include all trades) as required.

1.05 COORDINATION / COOPERATION:

- A. Cooperate with all other tradesmen, Contractors and Subcontractors to facilitate the completion of the work as a whole, as indicated on the drawings and specifications.
- B. Wherever work interconnects with the work of other Contractors, coordinate the work with these Contractors to insure that all information is available such that all equipment and material may be installed properly with all necessary connections and appurtenances.
- C. Coordinate the location of all openings required for apparatus and transmit this information sufficiently in advance, so that all openings in walls, slabs, roofs, piping supports, inserts and equipment including sleeves and access doors may be properly installed.
- D. Where work will be installed in close proximity to, or interfere with the work of other trades, assist in coordinating space conditions to a satisfactory adjustment. If directed by the Architect, provide composite working drawings indicating the proposed adjustment.
- E. All distribution systems which require pitch or slope such as plumbing drains, sprinkler piping, and condensate drain piping shall have the right of way over those systems which do not require pitch. Where the work to be installed is located by detail and or elevation, that work shall have the right of way over items indicated as schematic or without indicated location (electrical conduits, control conduits etc). Confer, coordinate and cooperate with other trades as to the location of pipes, lights, and apparatus and install all work to avoid conflict and interference.
- F. Work that is installed to interfere with the work of others prior to proper coordination and cooperation, shall be adjusted to correct the situation without extra compensation.



## 1.06 DELAYS:

- A. Become fully informed as to availability dates of materials and equipment to be provided. Where availability dates interfere with the progress of the work or the Sequence of Operations, notify the Architect and transmit all recommendations, including any changes in costs, to remedy the situation.
- B. Final decisions as to the procedure in cases of delays, strikes, and acts of God shall be in writing by the Architect. DO NOT alter work, materials or equipment without written authority by the Architect.
- C. Order equipment and materials in advance of the time of installation to avoid project delays.

## 1.07 WORKMANSHIP:

- A. Workmanship shall be of the highest quality, in the best practice of the trade, and none but competent mechanics skilled in their respective trades shall be employed. Materials and apparatus shall be provided, delivered, erected, connected, and finished in every detail; and shall be so selected and arranged as to fit properly into building spaces.

## 1.08 DRAWINGS:

- A. Refer to all Contract Drawings for a full comprehension of the extent and detail of the work. Drawings are supplementary to the specification and work indicated, mentioned or implied in either is considered as specified by both.
- B. Work indicated on the drawings is intended to be approximately correct to scale, but dimensions and details are to assume precedence.
- C. Typical details apply to every like item. They are not repeated in full on all of the drawings, which are diagrammatic only, but with the intention that such typical details are fully applicable.

## 1.09 INTERPRETATION OF PLANS AND SPECIFICATIONS:

- A. The Architect, whose interpretation shall be final, conclusive and binding on all parties, shall decide questions or disagreements as to the true intent of this specification and drawings.

## 1.10 CODES, ORDINANCES, AGENCIES:

- A. The State Building Code, Fire Code and local ordinances, with all amendments to date, are hereby made a part of these specifications. Work shall conform to State Codes and Regulations.
- B. The codes and ordinances shall be considered as a minimum requirement, and work specified or indicated on the drawings in excess of code requirements shall be provided.
- C. Notify authorities and agencies; obtain all permits; obtain all official licenses and certificates; obtain all necessary approvals of authorities having jurisdiction; file all necessary plans; perform all necessary testing; and transmit to the Architect all certificates of inspection.



- D. Materials provided and work installed shall comply with the National Fire Codes of the NFPA; with the requirements of local utility companies; and with the requirements of agencies having jurisdiction.
- E. Electrical materials and equipment shall be U.L. approved or listed. All electrical equipment shall be in compliance with the Energy Conservation Code and shall meet or exceed all operating energy efficiency requirements.

1.11 FEES, PERMITS:

- A. Include the following costs within the bid amount;

The payment of all fees in connection with obtaining necessary permits, licenses, and inspections.

Note: All contractors and subcontractors must file for permits

The costs of all utility connections and extensions, to include the purchasing of meter(s) and appurtenances.

The payment of applicable taxes.

**PART 2 - SUBMITTAL GENERAL REQUIREMENTS**

2.01 SUBSTITUTIONS, CONTRACTOR'S OPTIONS:

- A. See Supplementary Conditions of the Contract for Construction.
- B. Where only one product is specified, and the intention is to match existing equipment or materials within the mechanical system, the contractor shall submit his base bid on the product specified.
- C. Where only one product is specified, but is followed by the phrase "or approved equal" the Mechanical Contractor(s) must submit his base bid on the product specified. Proposed substitutions for equivalent products shall be submitted for review under SUBSTITUTION PROPOSALS.
- D. Where two or more products are specified for one use, the Mechanical Contractor(s) shall select from those products mentioned. Where specific model of one manufacturer is specified and other manufacturers are listed, the products of listed manufacturers must be equal in all major respect.
- E. It remains the responsibility of the Mechanical Contractor to review the dimensions, weights, required clearances, required supporting structure, etc. of the equipment of "other" manufacturer's relative to the proposed use. The Mechanical Contractor is responsible for any changes to the design and to the building fabric (i.e. supporting structure, mechanical spaces, piping or ductwork connections and routing, etc.) resulting from the use of equipment of the "other" manufacturers.
- F. No proposal for extra charges resulting from the use of equipment of the "other" manufacturers will be entertained for approval.
- G. Where products are specified by reference standard, select any product that meets the standards by any reputable manufacturer.



## 2.02 SUBSTITUTION PROPOSALS:

- A. Refer to the Schedule of Submissions for the time period allowed for submission of substitution proposals. The proposal shall state the exact products proposed for substitution and include a cost difference in total savings to the Owner for each proposal.
- B. Include in the proposal complete engineering data, shop drawings, samples and state whether related changes in the project are involved if the proposal is accepted.
- C. No substitutions of products, materials or methods are permitted without written authority by the Architect.
- D. Where no substitution proposal is made within the specified time period, products, materials and equipment shall be submitted and installed as specified.
- E. See Division 01 Specification Sections: Review additional requirements for substitutions.

## 2.03 SUBMISSIONS:

- A. Refer to the Schedule of Submissions below. Also refer to SUBMITTALS within other Sections of Division 23 in which some of the shop drawings to be submitted are listed. The listing is a minimum listing only. Submit lists of products and subcontractors; detailed drawings, catalog data of all products, equipment and materials required to complete the project and no item shall be ordered, delivered or installed until the reviewed shop drawing submittal is in the possession of the installing contractor.

## 2.04 SCHEDULE OF SUBMISSIONS:

| ITEM                           | TIME PERIOD | COPIES |
|--------------------------------|-------------|--------|
| LIST OF SUBCONTRACTORS         | 10 days     | 7      |
| LIST OF MANUFACTURERS/PRODUCTS | 15 days     | 7      |
| SUBSTITUTION PROPOSALS         | 20 days     | 7      |
| SHOP DRAWINGS                  | 25 days     | 7      |

Note: The time period above is based on the number of working days after the signing of the contract.

## 2.05 LIST OF SUBCONTRACTORS:

- A. Submit a complete LIST OF SUBCONTRACTORS proposed for use; including complete firm names, address, and phone numbers.

## 2.06 LIST OF MANUFACTURERS / PRODUCTS:

- A. Submit a complete LIST OF MANUFACTURERS of materials and equipment specified within this section proposed for use; including materials and equipment proposed by all subcontractors. Partial lists will not be accepted.



**2.07 COORDINATION DRAWINGS:**

- A. Coordination Drawings are required to be completed by all trades for the project.
- B. The coordination drawings shall be based upon information contained in the design drawings. It shall be recognized that the work indicated on the design drawings is intended to be approximately correct to scale, but dimensions and details are to assume precedence. It shall also be recognized that the design drawings are schematic in nature and are not intended to indicate all offsets that may be required.
- C. Coordination Drawing Submittals shall contain sufficient plans, elevations, sections, details and schematics to describe work clearly. Drawings shall be 1/4" – 1'-0" scale and shall indicate work of other Sections where physical clearances are critical and where interferences are possible. Provide larger scale details as necessary. Fire Protection Drawings shall show elements of Architect's reflected ceiling plan, HVAC ductwork, walls, partitions, diffusers, registers, lights, grilles, fire dampers, sleeves and other aspects of construction as necessary for coordination.
- D. These Coordination Drawings shall be prepared electronically on AutoCad and shall be updated as required to reflect as installed conditions.
- E. Coordination Drawings at 1/4" = 1'-0" scale shall be prepared by the Plumbing Contractor in concert with the HVAC, Fire Protection, and Electrical Contractors and these drawings shall be used to work out the coordination of all work of all Trades as specified in each applicable Section. Plumbing, Fire Protection, HVAC, Automatic Control and Electrical systems shall be shown and coordinated on these drawings in the order listed by the respective Contractors.

**2.08 SHOP DRAWINGS:**

- A. Provide shop drawings (drawings, catalog cuts, spec sheets) for ALL equipment and products to be installed on the project.
- B. Label all shop drawing submittals as follows:
  - Project Name
  - Contractor's Name
  - Specification paragraph
- C. Mark in ink all catalog cuts, pamphlets to indicate options, accessories and model numbers.
- D. Data submitted which is general and not labeled and marked as required above will not be accepted.

**2.09 SHOP DRAWING REVIEW:**

- A. Review will be based on manufacturer's published data, and ratings. Any product, material or equipment submitted not in accordance with these specifications will be rejected.
- B. Where substitute products are proposed and no exception is taken, the Mechanical Contractor shall assume the entire responsibility for any changes in the work required or occasioned by the use of the substitute.



- C. Review of shop drawings is not a guarantee of suitable measurements, quantities required, or that other changes in the work are not required to permit proper installation. Review does not mean the submittal has been checked for every detail, or that the Contractor is relieved from responsibility of providing complete systems as required by the Contract Documents.

#### 2.10 RECORD DRAWINGS:

- A. During the period of on site construction, keep at the site, separate from construction documents, accurate construction drawings marked to indicate actual installation of all work of all of the trades specified within Division 23. Drawings shall reflect addenda, change orders, VE items or substitutions accepted for the project. Drawings shall be “red lined” with all modifications on a weekly basis.
- B. All under-slab, concealed or underground piping shall be located by dimension sufficient for exact location determination in the future.
- C. All concealed work shall be accurately located and all points of adjustment (dampers etc) shall be shown in actual locations.
- D. Final Record Drawings shall be prepared by the Mechanical Contractor on a set of reproducible drawings which accurately indicate all of the work as installed.
- E. All adjustable setpoints shall be indicated on the drawings at the device sensor or point of adjustment.
- F. Transmit originals and two sets of prints for review at project closeout.
- G. At project closeout transmit final Record Drawings in electronic format indicated below
  - AutoCad dwg files
  - PDF files

#### 2.11 OPERATING AND MAINTENANCE MANUALS:

- A. Compile complete manuals including manufacturer’s data, bulletins, maintenance instructions, approved shop drawings, parts lists, warranties etc for all equipment and materials provided.
- B. Equipment data shall include:
  - Manufacturer / Models
  - Input and output capacities
  - Service and maintenance recommended actions
  - Manufacturers published instructions
- C. Operations written narrative:
  - Assemble and index three copies of each manual within suitable binders (8 ½” x 11”). Provide cover clearly indicating project title and “OPERATION AND MAINTENANCE MANUAL”.



Transmit manuals to the Architect for review in advance of scheduled instruction periods.

2.12 GUARANTEE:

- A. Transmit to the Architect a written guarantee from each of the Mechanical Contractors stating that the work provided under these specifications is guaranteed against defects in material and workmanship which shall become apparent during the period of one (1) year two (2) years from acceptance of the systems.
- B. The written guarantee shall list all contractors with contact names and phone numbers, and shall indicate the dates of acceptance of systems and any extended warranties.
- C. The written guarantee shall be posted as directed by the Architect
- D. Extended guarantee or warranty of certain equipment may be required. See specification of individual items.

**PART 3 - PRODUCT HANDLING**

3.01 PROTECTION AND STORAGE OF MATERIALS:

- A. Equipment and materials furnished shall, at all times, be protected from weather, vandalism, and other construction phase exposures to include paint, plaster and dust.
- B. Outdoor storage of equipment not intended for outdoor use will NOT be permitted.
- C. Properly protect all pipe openings with temporary caps to prevent obstruction and damage. Post notices and prohibit use of fixtures, equipment and apparatus prior to the completion of the project.

3.02 RIGGING, HOISTING, STAGING:

- A. Furnish rigging, hoisting equipment, staging and other services necessary for delivery and installation of any product provided. Remove rigging, staging from the site when no longer required.

**PART 4 - PROJECT CONDITIONS**

4.01 FIELD MEASUREMENTS AND DISCREPANCIES:

- A. Base all measurements, both horizontal and vertical, from referenced points established by the General Contractor.
- B. Prior to the start of work, check drawings and specifications for discrepancies.
- C. Field verify spaces, dimensions and clearances where materials and equipment will be installed.
- D. Where discrepancies arise which prevent or alter installation, notify the Architect.



- E. Where discrepancies between drawings and specifications; between different drawings; or where the work of others is affecting work under this Division notify the Architect.
- F. Where the work herein required is not clearly understood apply to the Architect for further clarification.
- G. In each instance above, the Architect shall clarify the discrepancy and the Mechanical Contractor(s) shall complete the work at no additional cost to the Owner.

#### 4.02 ACCESSIBILITY:

- A. Install work so that parts requiring access are readily accessible for inspection, operation, maintenance, repair and removal. Minor deviations from the drawings may be made to accomplish this, but changes of magnitude shall not be made without written approval of the Architect.

#### 4.03 TEMPORARY OPENINGS:

- A. Examine contract documents and ascertain whether special, temporary openings will be required for the installation of apparatus and notify the Architect.

#### 4.04 SOLDERING, BRAZING, WELDING:

- A. Soldering, brazing, welding or other open flame operation shall be conducted only when a person, with approved firefighting equipment, trained in its use is on duty at the location of the operation.

#### 4.05 INTERRUPTIONS TO SERVICES:

- A. Where a temporary shutdown of an existing operating system is required, schedule the work at times designated by the Architect. Work requiring an interruption shall be completed by continuous performance, including overtime, to minimize the shutdown interruption.

#### 4.06 USE OF INSTALLATION BY OWNER:

- A. The Owner may use parts of the installation, including mechanical systems when complete, but such use shall not be considered as acceptance of the work in lieu of written certificate from the Architect.
- B. Schedule obnoxious, noisy, or otherwise objectionable portions of the work at times approved by the Architect. Overtime work must be approved in writing.

### **PART 5 - PRODUCTS AND INSTALLATION**

#### 5.01 MATERIALS:

- A. Provide new, first-class quality materials and apparatus, unless specifically directed otherwise by this specification or contract drawings.



**5.02 ON-SITE INSPECTIONS**

- A. Arrange for and coordinate all on-site inspections with the authorities having jurisdiction.
- B. Review project schedules and insure that such inspections as are necessary are completed in a timely manner.

**5.03 MANUFACTURER'S RECOMMENDATIONS, IDENTIFICATION:**

- A. Obtain necessary data on equipment and materials to insure proper installation and testing in accordance with manufacturers' recommendations. Install all equipment and material per the recommendations and instructions of the manufacturer; this requirement shall take precedence over other requirements of this specification unless specifically noted.
- B. Equipment and materials furnished for this work shall bear the manufacturers' nameplate, trademark or suitable identification permanently affixed. The nameplate of a contractor or distributor is not acceptable.

**5.04 COLOR SELECTION; MATERIALS / EQUIPMENT:**

- A. Exterior: Provide metal louvers, grilles, fans, intake units, etc of equal coloration as indicated for exterior metal trim for the project. All exterior metal trim shall match.
- B. Interior: Product color shall be selected by the Architect. Provide complete color selection charts, chips with product submittals. Equipment to be painted shall have prime coat, anti-rust as necessary, factory applied.

**5.05 QUIET OPERATION:**

- A. Equipment and apparatus provided shall operate under all conditions of load without sound or vibration which are considered objectionable by the Architect. Eliminate same in a manner approved by the Architect.

**5.06 ELIMINATION OF TRANSMISSION OF VIBRATION:**

- A. Eliminate objectionable transmission of vibration from mechanical systems to building structure. Select and install equipment with proper vibration control equipment and provide isolators on piping, equipment, ductwork and apparatus where necessary to prevent transmission of sound and vibration. Isolate all rotating equipment from the building structure.

**5.07 BASES AND SUPPORTS:**

- A. Provide all bases and supports for mechanical equipment not part of the building structure of required size, type and strength, as approved by the Architect.
- B. Equipment, bases, and supports shall be anchored to the building structure to prevent shifting of position under all conditions. Attachments shall be strong and of a durable nature and any attachments, anchors, piers, bases, or other supports that are, in the opinion of the Architect, not strong enough or durable shall be replaced as directed.



- C. Equipment bases required for roof mounted equipment shall be as recommended by the roof manufacturer and the Architect.

5.08 SUPPLEMENTARY STEEL, CHANNELS AND SUPPORTS:

- A. Provide steel members, channels as required for the proper installation, mounting and support of equipment provided. Pipe shall not be allowed for use as miscellaneous steel supports. All steel used for support shall be firmly attached to the building construction.
- B. Size and type of supporting steel shall be determined by the installer and shall be of sufficient strength and size to allow only a minimum deflection under all conditions of load.
- C. All steel provided for support shall be free from rust and shall be primed with antirust paint or shall be galvanized. All exterior steel shall be galvanized.

5.09 SLEEVES, PLATES:

- A. Provide and locate sleeves, plates, anchors, and inserts required; mark openings before floors and walls are constructed or core bored.
- B. Provide sleeves for piping passing through floors, walls, roofs, partitions and masonry. Sleeves for concrete or masonry shall be Schedule 40 steel pipe of size to allow for pipe expansion and passage of vapor barrier insulation. Other sleeves shall be 20 gauge galvanized sheet steel with lock-seam joint.

Terminate sleeves flush with walls, partitions, and ceiling.

Terminate sleeves 1/2" above finished floor where piping is exposed.

- C. Provide support systems such that access to equipment or appurtenances requiring access are not impeded in any way.

5.10 PIPE ESCUTCHEONS:

- A. Provide escutcheons for pipe penetrations of building construction exposed to view.
- B. Escutcheons shall closely fit bare or insulated pipe and shall conceal pipe sleeves.
- C. Escutcheons in unfinished areas shall be of solid or split pattern steel, cast iron or malleable iron.
- D. Escutcheons in finished areas shall be of chrome plated, solid pattern brass.

5.11 FIRE SAFING: PIPING, DUCTWORK AND EQUIPMENT OPENINGS:

- A. Fire Stop: Pack all piping, ductwork and equipment openings and sleeves full depth with approved fire safing material to fully seal all openings.
- B. Seal all sleeves, core holes, etc. through floors, walls and ceilings with approved fire safing material or fire safing system. Fire safing materials and systems shall be as manufactured by Nelson "Flame-seal", 3-M Systems, Hilti Systems, Metacaulk Firestopping or Dow Corning. Install in accordance with manufacturer's printed instructions.



- C. Firestopping is to meet UL ratings for each penetration type and material for floors, walls and ceilings. Coordinate with Architectural Drawings for exact requirements and ratings at various conditions.
- D. Refer to Section 23 03 00 Mechanical Fire Safing for Specific fire safing requirements.

5.12 MACHINERY DRIVES:

- A. V-belt drives shall be designed to transmit safely equal to or greater than 150% of motor horsepower rating, but not less than manufacturer's recommendation for type of service intended.

5.13 PROTECTIVE GUARDS:

- A. Provide protective guards at all belt drives, rotating shafts and rotating equipment. If not a part of equipment, guards shall be of galvanized angle frame with galvanized wire mesh, readily removable for service.

5.14 PORTABLE OR DETACHABLE PARTS:

- A. Retain and be responsible for all portable or detachable parts provided as a part of the work. Install these parts just prior to project closeout when the site is secure. Replace all lost, stolen or damaged items prior to project acceptance.

5.15 LABELING: LABELS, VALVE TAGS, PIPE, DUCTWORK, AND EQUIPMENT IDENTIFICATION:

- A. General:

All new systems provided as a part of the contract are to be labeled in a manner that conforms to the following specification. All existing systems, at points of new connection or reconfiguration, shall also be labeled in accordance with the following standards.

All labels, unless otherwise directed, shall be made of hard black plastic. Lettering shall be affected by engraving or incising, and shall be white. All labels shall be securely mechanically attached with screws or equal. Letters and numbers shall be at least 1/4" high, or larger, if required to read clearly from a normal viewing distance. All labels must be made to withstand the temperatures and atmosphere in the area they are to be mounted. Any labels which are to be mounted outdoors must be treated to prevent degradation from sunlight, and must be mounted with stainless steel screws.

Where air or hydronic systems have been balanced, the Contractor shall permanently mark, ON THE DEVICE, the correct balancing setting of each valve, damper, or similar device. This will allow our skilled tradesmen to restore proper operation if the device is tampered with.

All Mechanical Systems to be labeled in accordance with these requirements include, but are not specifically limited to, the following: Additional, specific items may require to be labeled as directed separately in other sections of this specification package.

- B. Pipe Labeling:



Labels for piping shall be Seton Setmark or equal. Labels to identify zone number may be self-stick type, but must wrap completely around pipe, and be adhered to itself. All self-stick labels must be plasticized to withstand washing with commercially available cleaning products.

C. Label must show:

Fluid contained and service

Flow direction

D. Pipe Marker Lettering:

| Outside Diameter of Pipe Covering | Required Size of Lettering | Tag Length |
|-----------------------------------|----------------------------|------------|
| 3/4" to 1-1/4"                    | 1/2"                       | 8"         |
| 1-1/2" to 2"                      | 3/4"                       | 8"         |
| 2-1/2" to 6"                      | 1-1/4"                     | 12"        |
| 8" to 10"                         | 1-1/2"                     | 24"        |
| Over 10"                          | 3-1/2"                     | 32"        |

E. Pipe Marker Color Standards:

| Pipe Line Type | Description        | Background Color | Lettering Color |
|----------------|--------------------|------------------|-----------------|
| Gas            | Natural Gas        | Yellow           | Black           |
| Water          | Hot Potable Water  | Yellow           | Black           |
|                | Cold Potable Water | Green            | White           |
| Waste          | Sanitary Waste     | Green            | White           |
|                | Sanitary Vent      | Green            | White           |

F. Valve Tagging:

Labels for valves shall be hard plastic and shall be no smaller than 2" in diameter.

Tags shall have the valve number incised or recessed into the plastic. The tag background and tag lettering shall conform to the color scheme as defined by this standard.

All valve labels shall be permanently attached with steel or brass jack chain, tags shall be color coded to correspond to the following color chart, if product is not listed, consult the Architect/Engineer.

Balancing Valves shall also be provided with tags, permanently marked, with the correct balancing setting. This will allow our skilled tradesmen to restore proper operation if the device is tampered with.

All valve labels must show a number that corresponds to a clearly posted valve legend.

G. Valve Tag Color Standards:

| Pipe Line Type | Description | Background Color | Lettering Color |
|----------------|-------------|------------------|-----------------|
| Gas            | Natural Gas | Yellow           | Black           |



|       |   |                 |                |
|-------|---|-----------------|----------------|
| Water | Hot Potable Water<br>Cold Potable Water | Yellow<br>Green | Black<br>White |
|-------|---|-----------------|----------------|

H. Equipment:

All pieces of equipment shall be labeled with hard plastic, black plate labels. Lettering shall be white and must be made by engraving or incising the plate.

Any unit which is designed to move volume air shall be appropriately labeled. The hard plastic plate shall show brand; model; system number and function; areas served; design CEM; type of sheave; voltage and phase of service; HP and frame of motor; number and size of belts.

EXAMPLE:

UNIT NUMBER: HVAC 1-1  
TRANE BU-15  
ZONE AC-1 / AIR COND / 21,000 CFM  
ADJ Shv - 5 HP - 208/3  
FRM - (3) 4L190 BELTS  
THIRD FLOOR NORTH

Show unit number as stated on the Drawings.

HVAC unit tags shall also state unit service or function.

I. Air Filter Racks and Media:

Filter racks shall be labeled adjacent to the nearest access plate or door, through which the filters may be changed. The hard plastic plate shall show the number of filters required for a complete change-out, and the size of the filters carried on the rack.

EXAMPLE:

24 FILTERS 30x30x4

J. Ductwork: Main Trunks, Main Branches Only:

Labels on ductwork shall be Seton Ventmark or equal. Each label shall show the required information as shown above. Labels shall be mounted over covering on the duct. The label must be mechanically attached. Adhesive backing alone is not acceptable.

Ducts shall be labeled every 30 linear feet of duct. Each duct branch shall be labeled with rooms and areas served.

Show number of system and identify what is carried within. Exhaust Air, Conditioned Air, etc.

Ductwork tags shall also state branch's service or function.

K. Ductwork Accessories:

Show, AT THE DEVICE OR ACCESSORY LOCATION, tags indicating the type of device or accessory located within the ductwork. (i.e. dampers; eliminators; access panels; filter racks; water coils; etc.)



Where systems have been balanced, the Contractor shall permanently mark ON THE DEVICE the correct balancing setting of each damper, or similar device. This will allow our skilled tradesmen to restore proper operation if the device is tampered with.

L. Electric Motor Starters/Variable Frequency Drives:

Show equipment controlled; Primary and control voltage and phase located within.

M. Automatic Control / Temperature Control Devices:

Show, AT THE LOCATION OF THE DEVICE, tags indicating the type of device or accessory,

i.e. temperature, humidity, pressure and current sensors; freezestats; etc. Identify device function.

N. Automatic Control Systems Electrical Conduits:

Labeling for conduit shall be factory-made. Painting or stenciling is not acceptable. Lettering shall include the highest voltage carried within, and shall identify phase. Labeling shall repeat every 30 linear feet. Adhesive backed labels are acceptable here provided the label wraps around the entire circumference of the conduit, and adheres to itself. Otherwise, mechanical fastening with strap is required.

O. Automatic Temperature Control Cabinets:

Each device in each control cabinet shall be affixed with a clear number that shall correspond to a clearly posted control legend. This legend shall identify each device by zone and function. The outer door of the cabinet itself must be labeled with its contents.

In a place within the Mechanical Room selected by the Owner, the Contractor shall mount a clear, reduced set of building prints, showing the systems installed by the Contractor, as-built. These prints shall show zoning by color coding, including all ducts and hydronic piping. Major pieces of equipment shall be highlighted. These prints shall be mounted under a sheet of clear Lexan or Plexiglass.

P. Contractor's Warranty Plate:

Must show the name, address, and telephone number of the contractor who completes the installation, and the date of final acceptance of the installation. THIS DATE WILL BE PROVIDED BY THE OWNER.

Q. Equipment and Systems Concealed above Suspended Ceilings:

Where valves, equipment, electric motor starters or other items subject to routine service are mounted in a concealed area above an opaque ceiling, the ceiling must be marked with an engraved plastic disc directly under the serviced device. The disc shall carry appropriate nomenclature that corresponds to a clearly posted legend. The legend shall be counted in the mechanical room. Use Seton or equal with push-in tack backing.

R. Access Panels:

On each access panel or door, clearly label the door with a legend description of what is behind the door.



**PART 6 - PROJECT CLOSEOUT****6.01 TESTING AND ADJUSTING:**

- A. Where testing leaks develop or the installation fails to function properly, make all necessary corrections and repeat tests until all defects have been remedied. Corrections made shall be to the satisfaction of the Architect prior to the acceptance of the work.
- B. Furnish labor, material, and instruments necessary for those tests required. See respective Sections for test requirements.
- C. In addition to required tests specified, provide qualified personnel to adjust all parts of systems such that proper, economical operation is achieved.
- D. Conduct and be responsible for all testing and adjusting of all complete systems to include providing all labor and equipment required and the submission of all reports. Systems shall be operated, tested and adjusted in all modes of operation.
- E. All defects and deficiencies or failing to operate properly shall be corrected by the Contractor and the systems shall be re-tested or readjusted prior to final acceptance.
- F. Any and all damage caused by tests shall be the responsibility of the Contractor.
- G. The balancing of the air conditioning systems shall be performed by an independent balancing contractor.
- H. SEE SECTION 23 95 00 TESTING AND BALANCING.

**6.02 OPERATION, MAINTENANCE INSTRUCTIONS:**

- A. Schedule and conduct, after the mechanical -- electrical systems are complete and operational, instruction periods for Owner's personnel. Operation and Maintenance Manuals shall be distributed to the Owner in advance of scheduled instruction periods.
- B. Instruction periods shall include:
  - Normal and emergency start up and shut down of all systems
  - Normal maintenance requirements for all systems and equipment
  - Maintenance tasks and schedules for proper operation.
  - Review of Operations and Maintenance Manuals
  - Review of AS BUILT drawings
- C. All instruction periods shall be video taped with two copies provided to the Owner.
- D. In addition to instruction periods; a thorough project walk through shall be conducted and the location and access to all points of operation, control and maintenance shall be indicated and noted.
- E. At the completion of instruction periods forward a letter (5 copies) stating the names of those giving and receiving instructions.



**6.03 LUBRICATION:**

- A. Lubricate, as required, all motors, bearings, fans, etc. before operation of any equipment. Provide a final lubrication when system is accepted by Owner.

**6.04 CLEANING:**

- A. At completion, thoroughly clean all parts of the installation. Equipment, materials and apparatus shall be free of grease, paint, plaster and debris. Any damage to the building due to leakage or by other means shall be properly and immediately cleaned and repaired to the satisfaction of the Architect.
- B. At completion, replace, clean, such parts of systems as filters, strainers, and traps. This work shall be done after site is substantially free of dust.

**6.05 SCRATCHES, SCRAPES, DENTS:**

- A. Repair and correct, to the satisfaction of the Architect, all minor equipment deficiencies such as scratches, scrapes, dents; where corrective methods are not satisfactory, replace the item.

**6.06 PROJECT CLOSEOUT SUBMITTALS:**

- A. Review all project closeout submittal requirements of this specification and transmit in a timely manner.
- B. Provide all required items including (but not limited to):

Record As Built Drawings

Written Guarantee including any extended warranties

Operating / Maintenance Instructions Memorandum

Testing / Adjusting Logs

**6.07 SERVICE:**

- A. At completion, provide the Architect with a complete listing of all service contractors including 24-hour phone numbers.
- B. Provide service on equipment furnished for a period of one year from the date of final acceptance. Render service promptly at the request of the Owner. This shall not be construed to include routine maintenance.

**END OF SECTION 23 00 00**







**SECTION 23 00 50 - MECHANICAL ELECTRICAL COMPONENTS****PART 1 - GENERAL****1.01 RELATED DOCUMENTS:**

- A. Drawings, provisions of the Contract, and Division 01 Specification Sections, apply fully to work in this section.
- B. Refer to all construction documents including all of the Sections of Division 23 for a complete understanding of the electrical components required. Coordinate with all trades.

Section 23 00 00 MECHANICAL GENERAL REQUIREMENTS

- C. Refer to and coordinate all work with the work of the following listed Sections:

|                  |  |
|------------------|--|
| Section 23 01 50 | MECHANICAL: VIBRATION ISOLATION        |
| Section 23 03 00 | MECHANICAL: FIRE SAFING / FIRESTOPPING |
| Section 23 10 00 | PLUMBING                               |
| Section 23 15 00 | PLUMBING: FIXTURES                     |
| Section 23 85 00 | HVAC: EQUIPMENT                        |
| Section 23 90 00 | HVAC: CONTROL SYSTEM / ANALOG          |
| Section 23 95 00 | HVAC: TESTING ADJUSTING BALANCING      |

**1.02 SCOPE:**

- A. Provide labor, equipment and materials to complete the work indicated on drawings and herein specified.

**1.03 RELATED WORK:**

- A. conjunction with this section shall be as designated below:

General Contractor:

Cutting, Patching, and Painting  
Openings in roofs / Flashing  
Openings in walls  
Equipment foundations and bases  
All temporary heating

Electrical Contractor:

Power wiring for electrical equipment provided within this section.



## 1.04 PROJECT ADMINISTRATION:

- A. Transmit questions, submissions, notices, and correspondence through the general contractor for transmittal to the Architect.
- B. Prepare and transmit to the Architect all submittal requirements within the time period allowed. See Schedule of Submissions.

## 1.05 SUBMITTALS:

- A. See SUBMITTAL GENERAL REQUIREMENTS within Section 23 00 00.
- B. The following submittals shall be prepared and submitted for approval within the time period stated (see SCHEDULE OF SUBMISSIONS in Section 23 00 00): (The list below is not intended to be all inclusive. Provide submittals for all materials and equipment proposed for use on this project.)

- Motor Contactors
  - Motors
  - Electrical connection diagrams
  - Electric Motor Starters

## 1.06 PROJECT CLOSEOUT:

- A. Review and provide closeout requirements of this section and Section 23 00 00 Mechanical General Requirements, including:
  - Testing and Adjusting
  - Record Drawings
  - Operating, Maintenance Instructions
  - Written Guarantee
  - Lubrication, Filters
  - Operating, Maintenance Manuals
  - Cleaning
  - Test Log
  - Letters of compliance.

**PART 2 - ELECTRICAL PRODUCTS / DATA**

## 2.01 GENERAL:

- A. Provide new, standard products, materials and equipment which comply with the specification; are undamaged and unused at the time of installation; are complete with accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use.

## 2.02 COMPONENT INSTALLATION:

- A. Provide the electrical components to the electrical equipment installer for mounting and installation.



- B. Combination Electric Motor Starters and Variable Frequency Drives shall not be mounted directly on any mechanical piece of equipment unless specifically indicated on the mechanical drawings.

#### 2.03 ELECTRICAL CURRENT CHARACTERISTICS:

- A. Refer to the Electrical Drawings and field coordinate the electrical components of the mechanical systems specified in this Division.

- B. Mills Camp:

Building Electrical Service: 120 / 208V, 3 phase, 4 wire

|         |                     |               |
|---------|---------------------|---------------|
| Motors: | 1/2 HP and larger:  | 208V, 3 phase |
|         | Smaller than 1/2 HP | 120V, 1 phase |

- C. All Other Camps:

Building Electrical Service: 120 / 240V, single phase, 3 wire

|         |                     |               |
|---------|---------------------|---------------|
| Motors: | 1/2 HP and larger:  | 240V, 1 phase |
|         | Smaller than 1/2 HP | 120V, 1 phase |

#### 2.04 ELECTRICAL CONNECTIONS AND WIRING:

- A. The Electrical Contractor shall provide power wiring complete from power source to motor or equipment junction, including power wiring through starters and line voltage control apparatus. The Mechanical Contractor(s) shall furnish and the Electrical Contractor shall install all electric motor starters.
- B. The mechanical/temperature controls contractor(s) shall provide all wiring, relays, transformers, devices, etc. necessary (regardless of voltage) for automatic controls.
- C. Wiring provided by Mechanical Contractor(s) shall be in accordance with the National Electric Code, local and state codes and Division 016. Wiring shall be in conduit, regardless of voltage, unless noted otherwise.

#### 2.05 ELECTRICAL DEVICE COORDINATION:

- A. Coordinate electrical devices, motors with the Electrical Contractor and electrical drawings as to voltage, starter location and control required. Provide electrical data and wiring diagrams to the Electrical Contractor.
- B. Power and / or signaling requirements for each mechanical device shall be coordinated with the Electrical Contractor prior to the start of the electrical systems installation
- C. Do NOT allow installation of starters and drives mounted directly to mechanical equipment without prior approval. All devices are to be mounted with separate supports as required.
- D. Do NOT operate electrical devices until:

Voltage available on all phases is in accordance with nameplate.



Direction of rotation is checked.

Full load voltage reading is not less than nameplate.

Full load amperage reading is not greater than nameplate.

- E. The Mechanical Contractor(s) shall furnish the Electrical Contractor with copies of the Mechanical System floor Plans, (Plumbing, Fire Protection and HVAC). These drawings shall have all equipment and systems requiring electrical connection clearly marked in red. Copies of these "Electrical Coordination Drawings" shall also be submitted for record.
- F. Power and / or signaling requirements for each mechanical device shall be coordinated with the Electrical Contractor prior to the start of the electrical systems installation.

## 2.06 ELECTRIC MOTOR STARTERS:

- A. Manufacturer: Cutler-Hammer  
Square D  
Allen Bradley  
General Electric
- B. Types Required:
  - Start/Stop Automatic control at Equipment:
  - Start/Stop Automatic control at Remote Location:
- C. Provide proper heater in all motor starters furnished.
- D. Check proper rating of thermal overloads. Replace any overloads found to be of an incorrect rating. Provide a spare set of thermal overloads for each starter and leave inside starter enclosure.
- E. Provide a minimum of two (2) sets of auxiliary contacts of convertible type N.O. to N.C. for each starter. Motor starters shall have NEMA I enclosures. Those in wet locations shall be NEMA 3R.

**END OF SECTION 23 00 50**



**SECTION 23 01 50 - MECHANICAL: VIBRATION ISOLATION****PART 1 - GENERAL****1.01 RELATED DOCUMENTS:**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 01 and the following listed sections as a minimum, apply fully to work in this section.
- B. Refer to all construction documents including all of the Sections of Division 23 for a complete understanding of the electrical components required. Coordinate with all trades.

Section 23 00 00 MECHANICAL GENERAL REQUIREMENTS

- C. Refer to and coordinate all work with the work of the following listed Sections:

Section 23 02 50 MECHANICAL: PIPE HANGERS AND SUPPORTS

Section 23 03 00 MECHANICAL: FIRE SAFING / FIRESTOPPING

Section 23 10 00 PLUMBING

Section 23 80 00 HVAC: AIR HANDLING SYSTEMS

Section 23 85 00 HVAC: EQUIPMENT

**1.02 GENERAL REQUIREMENTS:**

- A. Provide vibration isolation supports for all air systems, equipment and piping as outlined below.
- B. Devices shall be selected, installed, and adjusted in a manner to prevent objectionable vibration transmission to the structure.
- C. Seismic restraints are not included in this section of the specification. See Division 23, Section 23 02 00 MECHANICAL SEISMIC RESTRAINT for seismic restraint requirements. All restraints to be separate and not interfere with vibration isolation devices or must be fully consolidated to perform both tasks.

**1.03 APPROVED MANUFACTURERS:**

- A. Provide all vibration isolation devices, including auxiliary steel bases and pouring forms, as designed by a single manufacturer.
- B. Approved manufacturers: Mason Industries  
Kenetics  
Amber-Booth  
Vibration Mountings and Controls



- C. Engage manufacturer to provide technical supervision of installation of vibration control products.

#### 1.04 SUBMITTALS:

- A. The following submittals shall be prepared and submitted for approval within the time period stated (see SCHEDULE OF SUBMISSIONS in Section 23 00 00): (The list below is not intended to be all inclusive. Provide submittals for all materials and equipment proposed for use on this project.)
- B. Vibration Isolators: Provide catalog cuts, show drawings and other documents as necessary to indicate equipment unit number, isolator type, scheduled deflection, proposed deflection under operating load, spring free height, spring operating height, spring solid height (at coil bind), and spring coil diameter for each isolator. Indicate the weight and lowest rotational speed of equipment supported by each isolator.

| Submittal Format:    | Example:   |
|----------------------|------------|
| Supported Equipment  | AHU-1      |
| Isolator Type        | Mason SLF  |
| Equipment Weight     | 4900 lbs.  |
| Lowest Speed         | 800 RPM    |
| Schedule Deflection  | 2.5 inches |
| Operating Deflection | 2.6 inches |
| Spring Free height   | 9.6 inches |
| Operating Height     | 7.0 inches |
| Solid Height         | 5.6 inches |
| Spring Height        | 6.2 inches |
| Remarks:             |            |

- C. Shop Drawings: submit shop drawings and manufacturer's installation instructions for thrust restraints wherever they are required.

#### 1.05 DRAWINGS:

- A. Detailed drawings are schematic only. The size and number of mounts and hangers shall be chosen to meet these specifications.

### **PART 2 - PRODUCTS**

#### 2.01 GENERAL REQUIREMENTS:

- A. Steel springs and neoprene elements shall have static deflections under operating load equal or greater than deflections shown on the schedules. Isolators submitted on the basis of rated loads will be disapproved.
- B. All steel springs as installed shall have minimum additional travel to solid (coil bind) equal to 50% of the deflection under operating load.
- C. Spring diameter shall be no less than 0.8 of the compressed height of the spring at operating load.



- D. All neoprene components shall be selected for maximum hardness of 40 durometer, show A rating where possible. In no case shall hardness exceed 50 durometer. Bridge bearing quality neoprene meeting AASHTO Highway Bridge Specifications shall be used in all elastomeric components where installed in irretrievable locations and as noted elsewhere in the documents.
- E. All isolators supporting a given piece of equipment shall be selected for approximately equal spring deflection.
- F. Steel springs shall not take a permanent set when compressed to coil bind.
- G. Steel springs shall be color-coded to allow positive identification after installation.

## 2.02 CORROSION PROTECTION:

- A. All vibration isolators and associated hardware shall be designed or treated for resistance to corrosion.

## 2.03 BRATION ISOLATOR TYPES:

- A. Type A: Elastomeric pads shall be waffled or ribbed neoprene pads Mason model Super W., Amber-Booth model NR, Kinetics model NP or approved equal; or ribbed or waffled neoprene pads with steel shim plate Mason model WSW, Amber-Booth model SP-NR style E. or approved equal. Size pads for deflection equal to 10-20% of unloaded height; bridge bearing quality pads shall be loaded 10-15%.
- B. Type B: Neoprene-In-Shear floor mount isolators shall have steel bottom plates with bolt holes for bolting to foundations, a threaded steel insert at top of the mounting for attaching equipment, and friction surfaces both top and bottom. All metal surfaces shall be neoprene covered to resist corrosion. Mounts shall be double deflection and designed for 0.25 – 0.35 inches deflection at rated load. Isolators shall be Mason model ND, Amber-Booth model RVD, Kenetics model RD or approved equal.
- C. Type D: Open spring floor mount isolators shall be free standing and laterally-stable with no housing, and shall have leveling adjustment bolts which shall be rigidly bolted to the equipment. Provide with ¼ inch minimum elastomeric friction pad Type A between the baseplate and the support. Vibration isolator vendor shall size elastomeric pads and associated load distributing shim plates to achieve deflection equal to 10-20% of the vertical thickness of the pads. If the mounting base plate is to be bolted to the structure, elastomeric grommets shall be used between the bolts and the isolators to prevent mechanical short-circuit. Bolt holes shall be properly sized to allow for bushings. The hold-down bolt shall use steel washers to distribute load evenly over neoprene washers. Isolators shall be Mason model SLF, Amber-Booth model SW, Kinetics model FDS or approved equal.
- D. Type E. Restrained open spring floor mount isolators for windy rooftop locations and/or for equipment with operating weight greater than installed weight shall have built-in adjustable limit stops to prevent equipment from rising when weight is removed. Isolators shall be as Type D above plus height-limiting studs and adjustable nuts, with ½ inch minimum clearance around the studs. Isolators shall be Mason model SLR, Amber-Booth model CT, Kinetics model FLS or approved equal.
- E. Type F. Elastomeric hanger shall be a neoprene-in-shear element mounted in a hanger box. The neoprene element shall be molded with a rod isolation bushing that prevents the rod from contacting



the hanger box. Design for 0.25 – 0.35 inch minimum static deflection at rated load. Isolators shall be Mason model HD, WHD, Amber-Booth model BRD, Kinetics model RH or approved equal.

- F. Type G: Spring-and-neoprene-in-series hangers shall contain a steel spring and 0.3 inch deflection elastomeric element in series. Neoprene elements shall be molded with a rod isolation bushing that passes through the hanger box. The diameters of the spring and the hole in the mounting box shall allow for 15 degree misalignment from vertical before mechanical short circuit occurs. Isolators shall be Mason model 30N, Amber-Booth model BSRA, Kinetics model SRH or approved equal.
- G. Type H: Precompressed spring-and-neoprene-in-series hangers shall be equal to Type G including 15 degrees misalignment capability. Isolator shall be precompressed to the rated deflection to allow installation at a fixed elevation. Hangers shall have a release mechanism to free the spring after installation and the hanger is subject to its full load. Deflection shall be indicated by means of a scale. Isolators shall be Mason model PC30N, Amber-Booth model PBSRA or approved equal.
- H. Reference electrical specification for flexible conduit specification.

### **PART 3 - EXECUTION**

#### **3.01 MANUFACTURER'S RESPONSIBILITY:**

- A. The vibration isolation manufacturer or his authorized representative shall alert the Engineer to any isolator selections which may experience resonance with the approved equipment and upgrade any isolators that are found to resonate with the supported equipment. He shall provide supervision as may be necessary to assure correct installation and adjustment. He shall submit a written report to the Architect at completion of the Work, certifying correctness of the installation and compliance with Contract Documents.

#### **3.02 GENERAL:**

- A. All equipment and piping shall be resiliently mounted on or suspended from approved foundations and supports, with isolation pads, mounts and hangers as specified herein and as shown on drawings. Contractor shall cooperate with the Architect to replace any isolators that need to be upgraded from what is shown on the drawings if equipment operating results in resonance with building natural frequencies.

#### **3.03 MOUNTS AND HANGERS:**

- A. Location of all vibration isolation equipment shall be selected for ease of inspection and adjustment as well as proper operation.
- B. Installation of vibration isolation equipment shall be in accordance with the manufacturer's instruction.
- C. All vibration isolators shall be aligned squarely above or below mounting points of the supported equipment.
- D. Isolators for equipment with bases shall be located on the sides of the bases that are parallel to the equipment shaft unless this is not possible because of physical constraints.



- E. Hanger rods for vibration isolated support shall be connected to structural beams or joists, not from the floor slab between beams and joists. Provide intermediate support members as necessary.
- F. Vibration isolation hanger elements shall be positioned as high as possible in the hanger rod assembly, but not in contact with the building structure so that the hanger housing may rotate a full 360 degrees about the rod axis without contacting object.
- G. Adjust all leveling bolts and hanger rod so that the isolated equipment is level and in proper alignment with connecting ducts or pipes.
- H. Limit stops shall be out of contact during normal operation.

3.04 CORROSION RESISTANCE:

- A. Treat isolation systems for corrosion resistance. Coatings damaged during installation shall be repaired.

3.05 INDEPENDENT SUPPORTS:

- A. Isolated systems shall be independent. Piping, ductwork, conduit or mechanical equipment shall not be hung from or supported on other equipment, pipes or ductwork installed on vibration isolators. Maintain 2" clearance between isolated equipment and walls, ceilings and other equipment. Drain piping connected to vibration isolated equipment shall not contact the building structure or other non-isolated systems.

3.06 MOUNT SUSPENDED HORIZONTAL FANS AS FOLLOWS:

- A. Units shall be hung by spring and neoprene in Type G series hangers.
- B. If equipment to be mounted is not furnished with integral structural frames and external mounting lugs of suitable strength and rigidity, approved structural sub-base shall be installed in the field which shall support equipment and to which hangers shall be attached.

3.07 SUPPORT DUCTWORK AS FOLLOWS:

- A. Flexible duct connections as described elsewhere in this specification shall be provided at all fan inlets and outlets between the fan and the first duct hanger or support.
- B. In slabs and walls, provide a ½" to 1" clearance for all penetrating ducts when not precluded by fire dampers. Pack the clear space full-depth with fiberglass insulation, and caulk penetration airtight on both sides of wall or slab.

3.08 SUPPORT PIPES AS FOLLOWS:

- A. For all pipes over 1" in diameter, provide metal sleeves sized for ¼" to ½" clearances at wall and slab penetrations, and seal tightly in place. Pack with fiberglass insulation, and caulk airtight at each end of the sleeve.

**END OF SECTION 23 01 50**







**SECTION 23 02 50 - MECHANICAL: PIPE HANGERS AND SUPPORTS****PART 1 - GENERAL****1.01 RELATED DOCUMENTS:**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 01 and the following listed sections as a minimum, apply fully to work in this section.
- B. Refer to all construction documents including all of the Sections of Division 23 for a complete understanding of the electrical components required. Coordinate with all trades.

Section 23 00 00 MECHANICAL GENERAL REQUIREMENTS

- C. Refer to and coordinate all work with the work of the following listed Sections:

Section 23 00 50 MECHANICAL: ELECTRICAL COMPONENTS

Section 23 01 50 MECHANICAL: VIBRATION ISOLATION

Section 23 04 00 MECHANICAL: INSULATION

Section 23 10 00 PLUMBING

**1.02 SCOPE:**

- A. Section Includes: Pipe hangers and supports, pipe saddles and shields, and pipe guides and anchors for piping systems except for fire protection piping systems.

**1.03 PROJECT ADMINISTRATION:**

- A. Transmit questions, submissions, notices, and correspondence through the general contractor for transmittal to the Architect.
- B. Prepare and transmit to the Architect all submittal requirements within the time period allowed. See Schedule of Submissions.

**1.04 SUBMITTALS:**

- A. See SUBMITTAL GENERAL REQUIREMENTS within Section 23 00 00.
- B. The following shop drawings shall be prepared and submitted for approval within the time period stated (see SCHEDULE OF SUBMISSIONS in Section 23 00 00): (The listing below is not intended to be all-inclusive. Provide submittals for all materials and equipment proposed for use on this project.)



- C. Product data sheets: Provide product data sheets for all hangers and supports intended for use on the project.

Pipe Hangers  
Hanger Rod  
Structural Attachments  
Insulation Shields

1.05 QUALITY ASSURANCE:

- A. Pipe hangers, pipe supports, hanger and support accessories, pipe saddles and pipe shields, where applicable, shall comply with provisions of latest edition of ASME Code for Pressure Piping ANSI/ASME B31.1 - Power Piping, Fed. Spec. No. WW-H171, Manufacturers' Standardization Society Standard Practice SP-58 and SP-69, and these Specifications. Where there is conflict, these Specifications shall govern.
- B. Hangers, supports, accessories, saddles and shields shall be load-rated. Load ratings shall be established by manufacturers based upon testing and analysis in conformance with above referenced codes. Manufacturers load tests shall be made on both supporting materials and configurations. Tests shall be performed by independent testing laboratory. Results of these tests shall be made available to the Owner upon request.
- C. Manufacturers shall select hangers, supports, accessories, saddles and shields based on load ratings for applications involved.

**PART 2 - PRODUCTS**

2.01 PIPE HANGERS AND SUPPORTS:

- A. Manufacturer(s) Specified:

Grinnell Corp.  
Carpenter & Paterson, Inc.  
Michigan Hanger Co., Inc.  
Penn Pipe Hangers Div. of Penn Construction Industries  
Power Piping Co.  
Basic Engineers, Inc.  
National Pipe Hanger Corp.  
B-Line Systems, Inc.

- B. General Requirements:

Pipe hangers, supports and accessories specified herein are from master specifications and include hangers, supports and accessories for various piping materials and applications. Refer to related Sections for actual piping materials required for the Project and select hangers, supports and accessories for applications involved.

Auxiliary structural steel, not part of building structure, required for support of piping shall be as required and necessary. Provide unistrut of strength required. Pipe used as supports is not acceptable. All metal surfaces shall be painted. Metal exposed to weather shall be galvanized.



Unless otherwise shown or specified, hangers, supports and accessories for insulated piping systems shall be sized to accommodate pipe insulation system, and shall fit around outside of pipe insulation without crushing and penetrating pipe insulation. Refer to specifications for piping insulation for detailed specifications of insulation and inserts at hangers and supports.

Hangers, supports and accessories exposed to weather or corrosive environments shall be protected with factory-applied corrosion-resistant finish. Provide galvanized or cadmium-plated finish except when it is specified that components and assemblies are to be constructed of stainless steel, or copper-plated steel.

Certain piping shall be resiliently supported. Refer to requirements for vibration isolation.

C. Upper Attachments:

Hanger rod shall be threaded steel, Grinnell Fig. 146 or 140.

Rod couplings shall be steel, Grinnell Fig. 135.

Extension pieces shall be malleable iron, Grinnell Fig. 157

Eye rods shall be threaded steel, Grinnell Fig. 248.

U-bolts shall be steel, Grinnell Fig. 137 with nuts.

D. Pipe Attachments:

Hangers for bare steel pipe 2" and smaller shall be Grinnell Fig. 65 light-duty steel clevis hangers. For 2-1/2" and larger use Grinnell Fig. 260 standard-duty steel clevis hangers.

Hangers for bare copper tubing 4" and smaller shall be Grinnell Fig. CT-69 adjustable, copper-plated steel, swivel ring hangers or Grinnell Fig. CT-65 lightweight, copper-plated steel, adjustable clevis hangers. For 5" and larger use Carpenter & Paterson Fig. 800 CT adjustable, swivel type, copper-plated steel ring hangers.

Hangers for bare cast iron soil pipe shall be Grinnell Fig. 260 standard-duty steel clevis hangers.

Hangers for insulated pipe and tubing of 4-1/2" OD combined and smaller shall be Grinnell Fig. 65 light-duty steel clevis hangers. Above 4-1/2" OD combined, use Grinnell Fig. 260 standard-duty steel clevis hangers.

E. Risers:

Riser clamps for bare steel pipe 20" and smaller shall be Grinnell Fig. 261 steel riser clamps. Weld support lugs on pipe 4" and larger.

Riser clamps for bare copper tubing 4" and smaller shall be Grinnell Fig. CT-121 copper-plated steel riser clamps. For 5" and larger use Grinnell Fig. 261 steel riser clamps with 4 psf lead sheet between pipe and clamp. Braze bronze support lugs on tubing 4" and larger.

Riser clamps for bare cast iron pipe shall be Grinnell Fig. 261 steel riser clamps. Locate under coupling or bell of pipe.

F. Supports:

Supports for bare steel and cast iron run vertically on walls shall be Grinnell Fig. 103 offset pipe clamp, unless shown or specified otherwise.



Supports for bare copper tubing 2" and smaller run vertically on walls in unfinished areas shall be Grinnell Fig: CT-122R copper-plated, rod-threaded, split tubing clamp, with Fig. CT-128R copper-plated, rod-threaded flange and Fig. CT-146 copper-plated threaded rod. In finished areas, provide copper tube to enclose threaded rod.

Supports for bare steel 1-1/2" and smaller, run vertically on walls in finished areas, shall be Carpenter & Paterson Fig. 68 adjustable stamped brass hanger with concealed threaded post and polished brass finish.

Supports for insulated pipe and tubing 12" OD (pipe and insulation combined) and smaller, run vertically on walls shall be Grinnell Fig. 103 offset pipe clamp, unless shown or specified otherwise.

Floor supports for bare and insulated pipe and tubing shall be as follows:

For supporting less than 2-7/8" OD, pipe attachment shall be Michigan Hanger Co. Model No. 723BJ split ring type support, similar to Model No. 455, with matching adjustable support extension.

For supporting from 2-7/8" up to 36" OD, pipe attachment shall be Michigan Hanger Co. pipe saddle support with U-bolt, Model No. 72 1 or No. 724 with fixed or adjustable support extension.

Include matching welded baseplate or screwed flange base for floor mounting.

## 2.02 PIPE SHIELDS:

A. Provide the following at pipe hangers and supports:

B. Insulation Shields:

Provide galvanized steel insulation shields at locations of pipe hangers for piping systems with ID less than 2". Insulation shields shall extend 6" on either side of hanger and shall be with rounded edges.

## **PART 3 - EXECUTION**

### 3.01 PIPE HANGERS AND SUPPORTS:

A. General:

Supports shall secure pipes in place, prevent swaying and vibration, maintain required grading by proper adjustments and provide for expansion, contraction, anchorage and piping insulation protection. Design supports of strength and rigidity to suit loading and service. Include weight of water and fluids wed for cleaning and testing. Supports shall not unduly stress building construction.

Installation of pipe hangers and supports shall conform to:

Manufacturers Standardization Society (MSS) Standard Practice:

SP-69 Pipe Hangers and Supports - Selection and Application

In case of conflict, more stringent requirements shall apply.



B. Hanger and Support Spacing:

Pipe hangers and supports shall be selected and spaced on basis of building structure, loading limitations, imposed loads, and pipe stress. Tables below are based on pipe stress only.

Maximum pipe hanger and support spacing dimensions specified or listed herein are for bare pipe without additional loads such as flanges, valves, piping specialties, accessories, insulation or other forces. Certain spacing dimensions are recommended by piping manufacturers or are accepted good practice. Reduce spacing from maximums shown or specified as required to accommodate actual imposed loads of piping systems in conjunction with load limitations of building structure and elements of pipe hanger and support systems including pipe saddles, pipe shields and inserts.

Maximum spacing of hangers and supports for standard weight steel pipe shall conform to requirements of ANSI/ASME B31.1 - Power Piping and Manufacturer's Standardization Society Standard Practice (MSS) SP-69. Pipe Hangers and Supports for reference as follows:

| Pipe Size<br>Inches | Maximum Spacing<br>Feet<br>Water Service | Maximum Spacing<br>Feet<br>Vapor Service |
|---------------------|--|--|
| ½ and smaller       | 7  | 8  |
| ¾, 1, 1-1/4         | 7  | 9  |
| 1-1/2               | 9  | 12                                       |
| 2                   | 10                                       | 13                                       |
| 2-1/2               | 11                                       | 14                                       |
| 3                   | 12                                       | 15                                       |
| 4                   | 14                                       | 17                                       |

Maximum horizontal spacing of hangers and supports for copper tubing shall conform to requirements of manufacturers Standardization Society (MSS) Stand Practice SP-69 listed for reference as follows:

| Nominal Size<br>Inches | Maximum Spacing<br>Feet<br>Water Service | Maximum Spacing<br>Feet<br>Vapor Service |
|------------------------|--|--|
| ½ & 3/8                | 5  | 6  |
| ¾                      | 5  | 7  |
| 1                      | 6  | 8  |
| 1-1/4                  | 7  | 9  |
| 1-1/2                  | 8  | 10                                       |
| 2                      | 8  | 11                                       |
| 2-1/2                  | 9  | 13                                       |
| 3                      | 10                                       | 14                                       |
| 3-1/2                  | 11                                       | 15                                       |
| 4                      | 12                                       | 16                                       |

For cast iron and Schedule 40 PVC type piping systems (including ductile iron and high silicon), provide minimum of one (1) hanger per pipe section and locate close to joint on pipe bar. Provide hangers at changes in direction and at branch connections. Maximum hanger spacing shall not exceed 10 feet.

Provide supports for riser (vertical) piping at each floor except where shown or specified otherwise.

C. Intermediate Attachments:



Attachments shall be selected on basis of building structure and loads to be supported. Maximum applied loads shall not exceed manufacturer's published load data. Install per manufacturer's instructions.

D. Pipe Attachments:

Do not hang one pipe from another nor from ductwork and conduits. Do not use perforated band iron, wire nor chain as hangers.

Unless otherwise specified or shown on the Drawings, piping shall be suspended by individual hangers.

Drainage piping shall be suspended by individual hangers only.

Where piping must be suspended closer to overhead than is possible with single rod clevis hangers, trapeze supports shall be used as specified further herein.

At pipe bends, place hanger no more than 1/2" from bend.

Apply double wraps of 3M Co. No. 51 Scotchwrap PVC tape with pressure-sensitive adhesive around bare piping where piping materials are dissimilar from pipe attachments. Scotchwrap is not required where pipe attachments are specified to have protective coating or match piping material being supported.

Select and install pipe attachments to permit expansion and contraction.

3.02 PIPE SHIELDS:

- A. Install pipe shields on insulation such that shield is centered under insulation inserts. Coat inserts with compatible wet adhesive and insert into snugly cut undersized holes in pipe insulation. Stabilize large and heavy pipes with additional inserts (hardwood dowels) at 4 and 8 o'clock positions. After installation, coat outer surface and vapor-seal with adhesive, then apply layer of pressure-sensitive adhesive vapor barrier tape.
- B. Coordinate the Work with insulation subcontractor.

**END OF SECTION 23 02 50**



**SECTION 23 03 00 - MECHANICAL FIRE SAFING / FIRESTOPPING****PART 1 - GENERAL****1.01 RELATED DOCUMENTS:**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 01 and the following listed sections as a minimum, apply fully to work in this section.
- B. Refer to all construction documents including all of the Sections of Division 23 for a complete understanding of the electrical components required. Coordinate with all trades.

Section 23 00 00 MECHANICAL GENERAL REQUIREMENTS

- C. Refer to and coordinate all work with the work of the following listed Sections:

Section 23 00 50 MECHANICAL: ELECTRICAL COMPONENTS

Section 23 04 00 MECHANICAL: INSULATION

Section 23 10 00 PLUMBING

Section 23 80 00 HVAC: AIR HANDLING SYSTEMS

Section 23 90 00 HVAC: CONTROL SYSTEM / ANALOG

**1.02 SCOPE:**

- A. Provide labor, equipment and materials to complete the Firesafing / Firestopping work as herein specified.

**1.03 RELATED WORK:**

- A. Work in conjunction with this section shall be as designated below:

|                     |                                 |
|---------------------|---------------------------------|
| General Contractor: | Cutting, Patching, and Painting |
|                     | Flashing                        |
|                     | Openings in walls               |

**1.04 PROJECT ADMINISTRATION:**

- A. Transmit questions, submissions, notices, and correspondence through the general contractor for transmittal to the Architect.
- B. Prepare and transmit to the Architect all submittal requirements within the time period allowed. See Schedule of Submissions.



## 1.05 SUBMITTALS:

- A. See SUBMITTAL GENERAL REQUIREMENTS within Section 23 00 00.
- B. The following shop drawings shall be prepared and submitted for approval within the time period stated (see SCHEDULE OF SUBMISSIONS in Section 23 00 00): (The list below is not intended to be all-inclusive. Provide submittals for all materials and equipment proposed for use on this project.)
- C. Shop Drawings: For each different firestopping configuration, provide the following:
  - Listing agency's detailed drawing showing opening, penetrating items, and firestopping materials, all of which are identified with listing agency's name and number or designation, fire rating achieved, and date of listing.
  - Identify which rated assembly each system is to be used in.
  - Any installation instructions that are not included on the detailed drawing.
  - For proposed systems that do not conform strictly to the listing, submit listing agency's drawing marked to show modifications and stamped approved by firestop system manufacturer's fire protection engineer.
- D. Submit listing agency's test report showing compliance with requirements, based on testing of current products.
- E. Product Certificates: Submit certificates signed by firestop system manufacturer certifying that materials furnished comply with requirements.
- F. Product Data: Manufacturer's data sheets on each material to be used in firestop system systems, including:
  - Product characteristics and Material Safety Data Sheets.
  - Listing numbers of systems in which each product is to be used.
  - Preparation instructions and recommendations.
  - Storage and handling requirements and recommendations.
  - Installation methods.
  - Installer's Qualification Documentation.

## 1.06 REFERENCES:

ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2000a.

ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2000a.

ASTM E 814 - Standard Test Method for Fire Tests of Through-Penetration Fire Stops; 2000.

ASTM E 1399 - Standard Test Method for Cyclic Movement and Measuring the Minimum and Maximum Joint Widths of Architectural Joint Systems; 1997 (Reapproved 2000).

ASTM E 1529 - Standard Test Methods for Determining Effects of Large Hydrocarbon Pool Fires on Structural Members and Assemblies; 2000.



ASTM E 1725 - Standard Test Methods for Fire Tests of Fire-Resistive Barrier Systems for Electrical System Components; 1995 (Reapproved 2001).

UL 1479 - Standard for Fire Tests of Through-Penetration Firestops; 1994.

UL 1709 - Rapid Rise Fire Tests of Protection Materials for Structural Steel; 1994.

ANSI/UL 2079 - Tests for Fire Resistance of Building Joint Systems; 1998.

#### 1.07 DEFINITIONS:

- A. Construction Gap: An open joint between adjacent rated assemblies; may be a moving joint or static opening, without penetrating items.
- B. Firestop System: Specific firestop material or materials, which when installed in openings in a specific rated assembly, achieve the performance required.
- C. Firestopping: Result of installation of firestop system.
- D. Listing: The current, published listing of a system in a qualified listing agency's directory.
- E. Listing Agency: Independent testing agency that has conducted tests and classified firestop systems for particular applications, which conducts routine in-plant follow-up inspections, and which lists tested systems in a published directory.
- F. Penetrating Item: Any item (pipe, duct, conduit, cable, etc.) that passes completely through a rated assembly through an opening of any size.
- G. Rated Assembly: A wall, floor, roof/ceiling, or other construction that is required to have an hourly fire rating or a smoke resistance rating.
- H. Through Penetration: A hole through a rated assembly made to accommodate the passage of a penetrating item or an empty hole made for another purpose and not repairable using the original materials of construction.

#### 1.08 QUALITY ASSURANCE:

- A. Installer Qualifications: Firm who is qualified by having experience, staff, and training to install the specified products, and who:
  - Is a Certified and Trained contractor in the field of fire stopping and fire safing.
  - Is acceptable to or licensed by manufacturer.
  - Is acceptable to or licensed by authority having jurisdiction.
  - Has completed the manufacturer's certified product installation training.
  - Can provide a list of completed projects as evidence of experience; include project name and address, Owner's name and address, and Architect's name and phone number.
- B. ting: Conduct a meeting at the project site to discuss installation conditions and requirements; require the attendance of all relevant installers.



**1.09 DELIVERY, STORAGE, AND HANDLING:**

- A. Deliver and store products until ready for installation in manufacturer's original unopened packaging, legibly marked with manufacturer's name and product identification, date of manufacture, lot number, shelf life, listing agency's classification marking, curing time, and mixing instructions if applicable.
- B. Following manufacturer's instructions, store and handle in such a manner as to prevent deterioration or damage due to moisture, temperature changes, contaminants, and or other causes.
- C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

**1.10 PROJECT CONDITIONS:**

- A. Coordinate construction and cutting of openings so that each particular firestop system may be installed in accordance with its listing, including sizing, sleeves, and penetrating items.
- B. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install firestopping under environmental conditions outside manufacturer's absolute limits.
- C. Provide ventilation as required by firestopping manufacturer, including mechanical ventilation if required.

**PART 2 - PRODUCTS****2.01 MANUFACTURERS:**

- A. Acceptable Manufacturer:
  - 3M Fire Protection Products, Inc
  - Hilti Fire Stop Products.
- B. Single Source: All instances of a specific firestop system shall be made using products of the same manufacturer; where multiple installers (e.g. different subcontractors) are responsible for installation of firestopping, all installers shall use the same system made by the same manufacturer.
- C. Where a proposed system is not listed by one of the listing agencies specified as acceptable, submit evidence prepared by a qualified independent testing agency that the system complies with the requirements.

**2.02 MATERIALS:**

- A. Rated Assemblies: Provide installed firestopping that limits the spread of fire, heat, smoke, and gasses through otherwise unprotected openings in rated assemblies, including walls, partitions, floors, roof/ceilings, etc.<sup>45</sup>
- B. Provide firestopping that has fire resistance rating equal to or greater than the fire-resistance rating of the assembly in which it is to be installed.



- C. Provide firestopping that has movement capability appropriate to the potential movement of the gap.
- D. Requirements for All Types of Firestopping:

Listing Agency: Provide systems that are listed by at least one the following:

Underwriters Laboratories Inc. (UL), in "Fire Resistance Directory" category XHEZ or XHBN as appropriate.

ITS, in "Directory of Listed Products."

Omega Point Laboratories (OPL), in "Directory of Listed Products, Through Penetration Fire Resistance Directory."

Any other qualified independent testing and inspection agency that conducts periodic follow-up inspections and is acceptable to authorities having jurisdiction.

Furnish products identical to those tested for classification by listing agency.

Mark product packing with classification marking of listing agency.

Unlisted Systems: Where firestop systems not listed by any listing agency are required due to project conditions, submit a substitution proposal with evidence specified.

Firestopping Exposed To View: Provide products with flame spread index of less than 25 and smoke developed index of less than 450, when tested in accordance with ASTM E 84.

Firestopping Exposed to View, Traffic, Moisture, or Physical Damage: Provide products that after curing do not deteriorate when exposed to those conditions during and after construction.

Materials: Use only products specifically listed for use in listed systems.

Compatibility: Provide products that are compatible with each other, with the substrates forming openings, and with the items, if any, penetrating the firestopping, under the conditions represented by this project, based on testing and field performance demonstrated by manufacturer.

- E. Through Penetration Firestop Systems (All Types Except Electrical Penetrations): Provide firestop systems listed for the specific combination of fire rated construction, type of penetrating item, annular space requirements, and fire rating, and:

F-Rating: Provide firestopping that has F-rating equal to or greater than the fire-resistance rating of the assembly in which the firestopping will be installed.

T-Rating: In habitable rooms and areas, where penetrating items are exposed to potential contact with materials on fire side(s) of rated assembly, provide firestopping that has a T-rating equal to its F-rating.

Wall Penetrations: Provide systems that are symmetrical, with the same rating from both sides of the wall.

Cold Smoke Resistance: Provide firestopping that has L-rating of 1 cfm per linear foot (5.5 cu m/h/m), maximum.

Testing: Determine ratings in accordance with ASTM E 814 or UL 1479.

Provide asbestos-free products.



Schedule of Systems: Indicated on the drawings

- F. Through Penetration Firestop System For Electrical Penetrations: Provide firestopping complying with UL system No.5, R11044, tested in accordance with UL 1709, ASTM E 119, ASTM E 1529, and ASTM E 1725.

Smoke and Flame Sealant: 3M FireDam(tm) 150+ Caulk, 3M Fire Barrier CP 25WB+ Caulk, or 3M Fire Barrier IC 15WB Caulk.

Tape for Vapor Barrier, Heat Reflector, and Installation Aid: 3M Interam(tm) T-49 aluminum foil tape.

Tape for Installation: Scotch 898 Filament Tape.

Sheet to Cover Openings and as Collar: 3M Fire Barrier CS-195+ Composite Sheet.

- G. Cast In Place Devices: 3M Fire Barrier Cast In Place Devices.

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

#### **3.01 EXAMINATION:**

- A. Do not begin installation until substrates have been properly prepared.
- B. Conduct tests according to manufacturer's written recommendations to verify that substrates are free of oil, grease, rolling compounds, incompatible primers, loose mill scale, dirt and other foreign substances capable of impairing bond of firestopping.
- C. Verify that items penetrating fire rated assemblies are securely attached, including sleeves, supports, hangers, and clips.
- D. Verify that openings and adjacent areas are not obstructed by construction that would interfere with installation of firestopping, including ducts, piping, equipment, and other suspended construction.
- E. Verify that environmental conditions are safe and suitable for installation of firestopping.
- F. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

#### **3.02 PREPARATION:**

- A. Prepare substrates in accordance with manufacturer's instructions and recommendations.
- B. Install masking and temporary coverings as required to prevent contamination or defacement of adjacent surfaces due to firestopping installation.

#### **3.03 INSTALLATION:**

- A. Install in strict accordance with manufacturer's detailed installation instructions and procedures.
- B. Install so that openings are completely filled and material is securely adhered.



- C. Where firestopping surface will be exposed to view, finish to a smooth, uniform surface flush with adjacent surfaces.
- D. After installation is complete, remove combustible forming materials and accessories that are not part of the listed system.
- E. Repair or replace defective installations to comply with requirements.
- F. At each through penetration, attach identification labels on both sides in location where label will be visible to anyone seeking to remove penetrating items or firestopping.
- G. Clean firestop materials off surfaces adjacent to openings as work progresses, using methods and cleaning materials approved in writing by firestop system manufacturer and which will not damage the surfaces being cleaned.
- H. Notify authority having jurisdiction when firestopping installation is ready for inspection; obtain advance approval of anticipated inspection dates and phasing, if any, required to allow subsequent construction to proceed.
- I. Do not cover firestopping with other construction until approval of authority having jurisdiction has been received.

3.04 PROTECTION:

- A. Protect installed systems and products until completion of project; where subject to traffic, provide adequate protection board.
- B. Touch-up, repair or replace damaged systems and products before Substantial Completion.

**END OF SECTION 23 03 00**







**SECTION 23 04 40 - MECHANICAL: PIPE CLEANING AND TESTING****PART 1 - GENERAL****1.01 RELATED DOCUMENTS:**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 01 and the following listed sections as a minimum, apply fully to work in this section.
- B. Refer to all construction documents including all of the Sections of Division 23 for a complete understanding of the electrical components required. Coordinate with all trades.

Section 23 00 00 MECHANICAL GENERAL REQUIREMENTS

- C. Refer to and coordinate all work with the work of the following listed Sections:

Section 23 10 00 PLUMBING

**1.02 SCOPE:**

- A. Provide labor, equipment and materials to complete the work indicated on drawings and herein specified.
- B. This specification defines the requirements and procedures for field pressure testing of above ground and underground piping systems, connected equipment and integral components to assure mechanical strength and tightness. Also included are flushing and cleaning requirements for open and/or closed piping systems. Any deviation from this specification shall require written approval from the Engineer.
- C. Testing Exclusions: The following are excluded from the testing requirements of this specification:
  - Any package unit previously tested by the manufacturer in accordance with the applicable codes.
  - Lines and systems open to the atmosphere such as safety valve discharges, vents or drains downstream of the last shutoff valve. These lines shall be visually inspected to determine that all joints are properly made up.

**1.03 RELATED WORK:**

- A. Work in conjunction with this section shall be as designated below:

General Contractor:

Cutting, Patching, and Painting  
Openings in roofs  
Openings in walls  
All temporary heating



## 1.04 PROJECT ADMINISTRATION:

- A. Transmit questions, submissions, notices, and correspondence through the general contractor for transmittal to the Architect.
- B. Prepare and transmit to the Architect all submittal requirements within the time period allowed. See Schedule of Submissions.

## 1.05 SUBMITTALS:

- A. See SUBMITTAL GENERAL REQUIREMENTS within Section 23 00 00.
- B. The following submittals shall be prepared and submitted for approval within the time period stated (see SCHEDULE OF SUBMISSIONS in Section 23 00 00): (The list below is not intended to be all-inclusive. Provide submittals for all materials and equipment proposed for use on this project.)

Sources of All Cleaning and Testing Agents  
Pressures and Temperatures for Final Testing  
Date of Test for Each System  
Name and Address of Testing and Cleaning Contractor / Contractors  
Test pressures and holding time  
Calibration record of pressure measuring devices and relief devices settings  
Cleaning and Testing Materials to be used with Recommended Temperatures  
Chemical Treatment Materials to be used with Recommended Temperatures

Summary report of testing and cleaning results, including testing log for all systems, chemical treatment solutions in place and chemical analysis of system water after testing and cleaning procedures are complete.

## 1.06 QUALIFICATIONS:

- A. Qualified Contractors shall be recognized as firms specializing in providing services related to the requirements of this specification. All Contractors providing Pipe Cleaning and Testing Services shall have a minimum of three years of documented experience.

## 1.07 PROJECT CLOSEOUT:

- A. Review and provide closeout requirements of this section and Section 23 00 00 Mechanical General Requirements.

**PART 2 - PRODUCTS**

## 2.01 CLEANING PRODUCTS:

- A. Liquid alkaline compound with emulsifying agents and detergents to remove grease and petroleum products.
- B. Cleaning and rinsing solutions for Specialized Piping Systems applied as recommended by manufacturer.



- C. Combined Chelant solution system for passivation of Specialized Piping Systems. Application shall follow the recommendations of specialized Contractor.

## 2.02 PIPE CLASS TABLE:

| PIPE CLASS | PIPE MATERIALS          | NOTES:          |
|------------|-------------------------|-----------------|
|            | <u>Copper and brass</u> |                 |
| U2         | Copper Tubing Type L    | Soldered Joints |
| U3         | Copper Tubing Type K    | Soldered Joints |
|            | 1) <u>Plastic</u>       |                 |
| P1         | PVC drainage            | Solvent joints  |
| P2         | PVC Sewer               | Tyton fittings  |

## 2.03 CLEANING CLASS:

### A. Cleaning Class C1:

Covers water flushing and cleaning of piping systems after assembly and erection. Cleaning shall be accomplished by thoroughly flushing with clear water at sufficient velocity to remove all foreign matter.

### B. Cleaning Class C2:

Covers the blowing-out of piping systems after assembly and erection. Blow out agent shall be steam (S), oil free air (A), or nitrogen (N)

### C. Cleaning Class C3:

Covers water flushing and disinfecting of above and below ground potable water piping systems after assembly and erection. Cleaning of piping shall be accomplished by first thoroughly flushing with potable water at sufficient velocity (2.5 fps mm.) to remove all foreign matter and then sterilizing with chlorine solution (100 ppm of available chlorine for a minimum contact time of 2 hours).

## 2.04 TESTING CLASS:

### A. Testing Class T1:

Covers initial service leak testing per ASME B31 .3, Category D, at operating pressure and leak test inspection of piping systems after assembly and erection.

### B. Testing Class T2:

Covers hydrostatic leak and pressure testing and inspection of piping systems after assembly and erection.

### C. Testing Class T3:



Covers pneumatic leak and pressure testing and inspection of piping systems after assembly and erection. Pneumatic agent shall be oil free air, or nitrogen (N).

D. Testing Class T4:

Covers static head leak test and test inspection of piping systems after assembly and erection. Piping systems are to be tested and inspected for leak tightness while being subjected to the internal test pressure of a 10 foot static head. Water shall stand in the system without change in level for a period of not less than 5 hours.

2.05 REFERENCES:

- A. Piping tests shall comply with the provisions of the latest edition of ASME B31 .3 Process Piping, section 345, Testing. Any conflict between Code and Specification shall be referred to the Engineer for resolution.
- B. Piping cleaning/disinfecting of piping systems shall comply with the provisions of the current edition of the Uniform Plumbing Code, ANSI A40.8 Section 10.9 or AWWA C601. Any conflict between Code (5) and Specification shall be referred to the Engineer for resolution.
- C. The maximum test pressure for each line shall be as per ASME B31 .3 Process Piping, section 345, Testing.

2.06 PIPING SYSTEMS: CLEANING AND TESTING:

| Article II.<br><u>SYSTEM</u>  | <u>PIPE</u> | SYMBOL | PIPE<br>CLASS | CLEANING<br>CLASS | TESTING<br>CLASS | TEST<br>PRESSURE |
|-------------------------------|-------------|--------|---------------|-------------------|------------------|------------------|
| PLUMBING:                     |             |        |               |                   |                  |                  |
| Cold Water - Domestic Potable | CW          |        | U2            | C3                | T2               | 125 psig         |
| Hot Water - Domestic Potable  | HW          |        | U2            | C3                | T2               | 125 psig         |
| Hot Water Recirculating       | HWR         |        | U2            | C3                | T2               | 125 psig         |
| Sanitary Waste - PVC          | SAN         |        | P1            | C1                | T4               | 10ft wc          |
| Sanitary Vent - PVC           | V           |        | P1            | C1                | T4               | 10ft wc          |
| Water Service                 | W           |        | U4            | C3                | T2               | 1.5 x max        |

2.07 PRESSURE TESTING:

A. Pressure Test Blinds

Plain test blanks with 1/16 in flat non-asbestos gaskets shall be used for blanking fiat face, raised face, ring joint, male and female and tongue-and groove type flanges. Provide full face blanks and gaskets and 125#C1 connections. However, where permanent operational blinds are installed, they may be used for field pressure testing. A field procedure must be established and care taken to insure the installation and removal of material specified for testing. The following is one method for identifying test material.

Unless dictated otherwise by contract requirements, plate material, extra length bolts and gaskets for testing shall be furnished by field. The outer periphery (edge) of each test gasket shall be dabbed with a spot of fluorescent yellow paint in 4 spots (90 degree equidistant) prior to installation. End



points of studs and heads of bolts shall be dabbed with a spot of fluorescent yellow paint. Refer to Attachment 4 for maximum test pressure at various thicknesses for test blanks.

B. Cleaning Products

Liquid alkaline compound with emulsifying agents and detergents to remove grease and petroleum products.

**PART 3 - EXECUTION**

3.01 PRESSURE TESTING: GENERAL REQUIREMENTS FOR TESTING

- A. Leak testing shall be done in accordance with ANSI B31.3 Process Piping, section 345, Testing.
- B. Upon completion of system(s) erection work and cleaning, but prior to adjusting and balancing, all installed piping and/or tubing shall be pressure tested except where otherwise qualified in this specification.
- C. Piping that is to be chemically cleaned after installation shall be tested and all repairs made before cleaning.
- D. Contractor shall provide competent personnel to conduct all tests. System(s) shall not be considered complete until all tests have been concluded to the satisfaction of the Engineer. In the event of leakage or defects, tests must be repeated until all faults are corrected.
- E. Contractor shall furnish all instruments, ladders, test equipment, test tees, accessories, and personnel required for the tests.
- F. All successful tests shall be documented and certified by the General Contractor with the resulting data transmitted to the Architect, to be retained as a permanent record.
- G. Tests shall be considered satisfactory if no leakage is detected on the piping and any of the joints. After this initial period, pressure shall be maintained until system is inspected for leaks and thereafter, for specified time periods according to system tested.
- H. Areas requiring repairs shall be retested as originally specified.
- I. Following the completion and approval of the test, Contractor shall restore all components of the system to normal operating condition. This includes removing the temporary provisions installed for the test.
- J. Piping shall be tested at metal temperatures between 60°F and 100°F.
- K. Hydrotest equipment shall include at least one NIST standard calibrated pressure measuring device (to be installed at the highest point in the tested system) and a calibrated pressure relieving device.
- L. The following shall be excluded from all pressure tests:
  - Pumps, compressors, and turbines.
  - Equipment and vendor furnished piping specifically recommended by the manufacturer not to be tested.



### 3.02 APPLICATION: TEST METHODS AND PRESSURES

#### A. Hydrostatic Testing of Piping Designed for Internal Pressure

The hydrostatic test pressure shall not be less than 1.5 times the design pressure.

If the design conditions of piping attached to a vessel are the same as those of the vessel, then the piping and vessel may be tested together at the test pressure of the vessel. However, if the piping should be subject to higher design conditions and requires a higher test than the connected equipment, or if the piping is designed for lesser operating conditions than the connected equipment and could be overstressed by a system test, then it shall be isolated and tested separately.

#### B. Pneumatic Testing

If the piping is tested pneumatically, the minimum test pressure shall be 110 percent of the design pressure.

#### C. Static Head Test

This test covers leak testing of all non-pressure plumbing and drainage systems, including sanitary sewer, storm drainage, etc. All piping in this test shall be subjected to an internal test pressure not less than 10-foot static head of water.

### 3.03 PRESSURE TESTING: PREPARATION FOR FIELD PRESSURE TEST

- A. Restrictions to flow, such as orifice plates and flow or mixing nozzles, shall not be installed or shall be removed. When necessary, items shall be replaced with temporary spool pieces.
- B. All valves (except vents, drains, and hydro boundary valves) within the system to be tested shall be in open position; control valves shall be specifically checked to assure that they are in an open position or they shall be bypassed or removed during testing.
- C. Shut-off valves at instruments on process lines or equipment shall be closed.
- D. Equipment that is not to be hydrostatically tested shall be isolated or removed from the system. If valves are used for isolation, Contractor shall verify that valves can withstand the test pressure in the closed position without any damaging effect.
- E. System relief and safety valves shall be blanked off at the inlet flange of the valves. Screwed relief and safety valves shall be removed and replaced with plugs, or capped.
- F. All flanges, threaded joints and welds shall be left bare of insulation and unpainted. All underground pipe joints shall be bare and exposed for a distance of two feet on each side of joints and shall not be backfilled or encased in concrete until final testing approval.
- G. All joints, including welds, shall be left uninsulated and exposed for examination during the test; however, joints previously tested in accordance with this specification may be insulated or covered. If a sensitive test is required, all joints mentioned above shall be left unprimed and unpainted.
- H. Underground portions of piping systems may be tested and covered before testing aboveground portions.
- I. Before testing:



Piping systems shall have been completely checked (Punched Out).

All lines, vessels, and equipment shall be checked to ensure that the entire system can be completely drained after testing.

Vents or other high point connections shall be opened to eliminate air from lines that receive a hydrostatic test.

System shall be purged of air before hydrostatic test pressure is applied.

System shall be thoroughly vented to remove all air pockets before the hydrostatic test pressure is applied.

Field personnel shall review all vessels and internals in order to determine best method to prevent air entrapment when filling and to prevent vacuum when draining.

Short pieces of piping that must be removed to permit installation of a blind or blank shall be tested separately.

Lines containing check valves shall have the source of pressure located in the piping upstream of the check valve so that the pressure is applied under the seat. If this is not possible, remove or jack up the check valve closure mechanism or remove check valve completely, and provide necessary filler piece or blinds.

When conducting tests at freezing temperatures, the test shall not take more than 4 hours, and special precautions (such as warming the line test water, or both) shall be observed to avoid freezing damage.

Systems that include expansion joints shall be investigated to see that any required temporary restraints, anchors, or guides are installed before test.

When a pressure test is required to be maintained for a period of time during which the testing medium in the system would be subject to thermal expansion, provision shall be made for relief of any pressure greater than the maximum test pressure.

### 3.04 FIELD PRESSURE TEST PROCEDURES

#### A. General:

Pressure Testing and Cleaning Procedure Index:

Pressure testing procedures shall be selected based on service and line class according to the table as included herein under the heading PIPING SYSTEMS: CLEANING AND TESTING.

The testing of piping and/or tubing, and equipment shall be performed on a system basis, in preference to the testing of individual lines or single components if at all possible. Breaking joints to insert blinds for hydrostatic testing shall be avoided wherever possible.

Special equipment shall be tested only as per instructions by the Engineer and/or Owner.

#### B. Hydrostatic Pressure Test:

In order to hydrostatic test as much piping as possible at one time, a systems test may be employed. This test shall include 1 or more lines and if possible connected vessels and equipment.



The minimum test pressure for a system test shall be such that each line in the system is subjected to a test pressure in accordance with the table as included herein under the heading PIPING SYSTEMS: CLEANING AND TESTING.

The maximum system test pressure shall not exceed the pressure test rating of any piping component or the shop test pressure of any vessels or equipment included in the test system. (Maximum test pressure for flanges and valves conforming to ASME B16.5 are given in the table as included herein under the heading PIPING SYSTEMS: CLEANING AND TESTING.

Systems or sections of systems to be tested may be isolated by closed valves, provided the valve body and seat are suitable for the test pressure. Do not use closed diaphragm valves for isolation.

Where a suitable valve is not available, vessels, equipment, or other piping not included in the system pressure test shall be either disconnected from the a system or isolated by blinds or other means during the test.

The normal locations for the pressure test gauge are at grade near the pressure test pump. Readings may be made at higher points providing the gauge pressure reading and the static head (0.433 psi/ft) between grade and the point of measurement do not exceed the maximum

test pressure. Pressure test gauges shall be calibrated once a month, using a dead weight tester. Gauges shall be tagged with the date last calibrated, and this activity shall be recorded.

Hydrostatic test pressure shall not be applied until the vessel or equipment and its contents are at approximately the same temperature. To minimize the risk of brittle fracture, pressure tests through vessels and equipment shall not be conducted when the test liquid or metal temperature is below 60°F.

Hydrostatic test pressure shall be maintained for a sufficient length of time to visually determine whether there are any leaks, but not less than 1 hour. Contractor shall not be required to maintain test pressure in excess of 2 hours after notification of the client's authorized inspector.

C. Pneumatic Test Procedure:

Minimum Metal Temperature

At time of testing the minimum pipe metal temperature shall be as follows:

All ferric piping: 60°F  
All copper: 40°F

Minimum temperatures for materials not listed above, shall be determined by the Engineer of Record and the Owner when required by field construction.

Clear the test area of all nonessential personnel before bringing the line up to test pressure. It may be desirable to conduct pneumatic tests during weekends when fewer personnel are deemed necessary to protect workers during such tests.

A pressure relief device shall be provided, having a set pressure not higher than the test pressure plus the lesser of 50 psi or 10 percent of the test pressure.

When pneumatic testing at over 25 psig, a preliminary check at 25 psig shall be made to locate major leaks. The pressure shall be increased in gradual steps of 5 psig, or 10 percent of the test pressure, whichever is greater.

A double block and bleed valve arrangement shall be included in the pressurizing line to the system



being tested. A test pressure gauge shall be downstream of the double block. After each pressure step has been reached, close the block valve and open the bleeder to atmosphere. If after a 5-minute period the step pressure is held, proceed to the next step pressure. If not, examine the entire system for leakage.

Before soaping the joints, the entire line should be walked to determine whether there is any audible evidence of leakage. Any leaks found at the time shall be marked, and repaired after first de-pressuring the line.

When the system has been brought up to the test pressure shown on the line list, all joints and welds shall be covered with soap solution in order to detect any leakage.

Soap solutions are to be low chloride and designed specifically for use in pneumatic testing of stainless steel systems.

Bolting shall not be tightened while systems being tested are pressured above 30 psig.

Pneumatic test pressure shall be maintained for a sufficient length of time to permit thorough visual inspection of all joints and weld seams but not less than 2 hour. Pressure shall be reduced gradually when de-pressuring.

#### D. Static Head Test Procedure

Underground pipe joints shall be exposed for a distance of two feet on each side of joints and shall not be backfilled until piping has been tested and approved.

Piping which connects to or is continuous with lines installed by others shall be isolated from these lines by a valve or line blind.

All openings will be provided with temporary plugs except the highest (fill opening)

Piping system shall be filled with clean water to the top vent stack. Systems without a vent stack shall be provided a temporary vertical stack. Stack shall be at least 10 feet in length.

Water shall stand in the system without change in level for a time period of not less than 5 hours.

Joints having leaks shall be repaired and retested for a time period of 1 hour.

#### E. Test Completion

In the event that repairs or additions are made following the pressure test, the affected piping shall be retested at the pressures originally specified for the test

After completion of testing, all temporary blanks and blinds shall be removed, all operating blinds returned to proper position, and all lines and piping components shall be completely drained. Valves, orifice plates, expansion joints, and short pieces of piping that have been removed shall be reinstalled with as specified proper new gaskets in place. All valves that were closed during hydrotest shall be opened to ensure drainage of the bonnet cavity. Lines being drained after testing shall have all vents open. Piping systems downstream of check valves should be inspected to ensure complete drainage.

Care shall be exercised in controlling the rate of drainage from vessels with respect to the inflow of air through the vent to ensure that the vessel is not subjected to vacuum. After vessels have been completely drained, vents, cyclones, and other internal closures that were opened before testing shall be closed.



## 3.05 CLEANING; GENERAL PREPARATION

- A. General Contractor shall schedule testing so that sanitizing and passivation of tubing system(s) immediately follows testing of system.
- B. Schedule field cleaning as close to the commissioning of the equipment as possible.
- C. Protect threaded connections, flange faces, and valves to prevent damage by abrasion.
- D. Block off, disconnect or remove the following items from the piping system to be cleaned:
  - Exposed instruments, gauges
  - Relief valves, and plug cocks
  - Materials that may become damaged by cleaning solutions or procedures
- E. Do not allow aluminum, copper, galvanized steel, magnesium, or zinc surfaces to come in contact with solutions having a pH of less than 4.0 or a pH more than 10.
- F. Do not introduce chemical solution into equipment unless high point vents and low point drains (supplied by piping contractor) are available to ensure proper filing and complete removal of solutions.
- G. Do not apply heat directly to equipment containing acid solutions. Boilers may be fired for
- H. degreasing, but acid solutions must be diluted and heated externally to the equipment.

**END OF SECTION 23 04 40**



**SECTION 23 10 00 - PLUMBING****PART 1 - GENERAL****1.01 RELATED DOCUMENTS:**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 01 and the following listed sections as a minimum, apply fully to work in this section.
- B. Refer to all construction documents including all of the Sections of Division 23 for a complete understanding of the electrical components required. Coordinate with all trades.

Section 23 00 00            MECHANICAL GENERAL REQUIREMENTS

- C. Refer to and coordinate all work with the work of the following listed Sections:

Section 23 00 50            MECHANICAL: ELECTRICAL COMPONENTS

Section 23 01 50            MECHANICAL: VIBRATION ISOLATION

Section 23 02 50            MECHANICAL: PIPE HANGERS AND SUPPORTS

Section 23 03 00            MECHANICAL: FIRE SAFING / FIRESTOPPING

Section 23 04 00            MECHANICAL: INSULATION

Section 23 04 40            MECHANICAL: PIPE CLEANING TESTING

Section 23 15 00            PLUMBING: FIXTURES

**1.02 SCOPE:**

- A. Provide labor, equipment and materials to complete the work indicated on drawings and herein specified.
- B. Work specified within this Section is limited to 5'-0" beyond building limit.
- C. Work required beyond 5 ft from building limit is specified within Division 2.
- D. Work in conjunction with this section shall be as designated below:

General Contractor:

Cutting, Patching, and Painting  
Openings in roofs / Flashing  
Openings in walls  
Equipment foundations and bases  
All temporary heating

Electrical Contractor:



- E. Power wiring for electrical equipment provided within this section.

1.03 PROJECT ADMINISTRATION:

- A. Transmit questions, submissions, notices, and correspondence through the general contractor for transmittal to the Architect.
- B. Prepare and transmit to the Architect all submittal requirements within the time period allowed. See Schedule of Submissions.

1.04 SUBMITTALS:

- A. See SUBMITTAL GENERAL REQUIREMENTS within Section 23 00 00.
- B. The following shop drawings shall be prepared and submitted for approval within the time period stated (see SCHEDULE OF SUBMISSIONS in Section 23 00 00): (The list is not intended to be all inclusive. Provide submittals for all materials and equipment proposed for use on this project.)

- Pipe and fittings
  - Hangers / Supports
  - Valves
  - Insulation
  - Clean outs
  - Floor drains
  - Backflow preventers
  - Fixtures and Fixture carriers (See Section 23 15 00)
  - Automated Shower Systems
  - Hot Water Heaters
  - Potable Water Expansion Tanks
  - Vacuum breakers
  - Wall Hydrants

1.05 INSPECTION AND TESTING: BY AUTHORITIES / AGENCIES

- A. Inspections, examinations and tests required by authorities/agencies shall be coordinated and paid for as necessary by the Plumbing Contractor to obtain complete and final acceptance of the systems. Transmit certificates of inspection, acceptance to the Architect.

1.06 QUALITY ASSURANCE:

- A. All cast iron soil pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute (CISPI) and be listed by NSF International.

1.07 FLUSHING, CLEANING AND TESTING: BY CONTRACTOR

- A. Provide all labor, equipment and expertise to flush, clean and test all piping systems installed. Isolate all sections and equipment as necessary to complete the flushing, cleaning and testing according to the requirements of SECTION 23 04 40 MECHANICAL: PIPE CLEANING - TESTING.



**1.08 UTILITY CONNECTIONS / COORDINATION / METERS**

- A. Review all contract documents with the proper utility companies prior to the start of any work to insure that meters, testing, inspections, acceptances will all be properly completed in a timely manner.
- B. Report any alterations required to insure utility company coordination.

**1.09 ENERGY CONSERVATION:**

- A. All work shall be in compliance with the energy conservation requirements of the IECC.
- B. Work indicated in excess of the minimum shall be provided as shown.
- C. Provide proper insulation, heat traps, controls and equipment such that systems are energy conserving and efficient.

**1.10 PROJECT CLOSEOUT:**

- A. Review and provide closeout requirements of this section and Section 23 00 00 Mechanical General Requirements, including:
  - Testing and Adjusting
  - Operating, Maintenance Instructions
  - Lubrication
  - Cleaning
  - Sterilization
  - Record Drawings
  - Written Guarantee
  - Operating, Maintenance Manuals
  - Test Log
  - Letters of compliance

**PART 2 - PIPING: PRODUCTS AND INSTALLATION****2.01 PIPING: INSTALLATION, GENERAL:**

- A. Provide new, standard products, materials and equipment which comply with the specification; are undamaged and unused at the time of installation; are complete with accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use.
- B. Arrange and install piping approximately as indicated, straight, plumb, and as direct as possible. Form right angles or parallel lines with building wall. Keep pipe close to walls, partitions and ceilings. Offset only where necessary to follow walls. Where so indicated and wherever possible, conceal piping in building construction before erection of closing construction. When furred spaces are indicated, keep pipes as close to structural members as possible. Piping shall not interfere with openings, doors and windows. Allow for proper clearance at windows, doors, equipment and other building parts such that pipes do not interfere with access and building use.
- C. Piping shall be cut accurately to measurements established at the site and shall be installed without springing, forcing and excessive cutting or weakening of building structure. Pipes shall be installed



in a manner permitting proper drainage, venting and free expansion and contraction. Changes in direction shall be made with factory-manufactured fittings.

- D. Install pipe to allow for expansion without excessive stress on pipe, hangers and building.
- E. Welding, brazing, soldering shall be with proper regard for fire prevention and safety. See Fire Watch requirements.
- F. Arrange piping passing through floors, walls and other partitions of building construction so that piping is centered in openings/sleeves and is rigidly supported on both sides of openings/sleeves.
- G. Clean pipe, pipe fittings, and valves before erection. Cap or plug open ends of piping and equipment during construction to keep dirt and foreign material out of system.
- H. As specified elsewhere, certain service piping and associated fittings. Valves and accessories will be furnished factory-cleaned and sealed.
- I. Provide concrete thrust blocks for certain underground piping as shown on the Drawings. Provide concrete support pads under valves as shown on the Drawings.
- J. Unions or flanges shall be used to facilitate piping installation, and shall be installed between shut-off valves and equipment to facilitate removal of equipment for repair.
- K. Provide dielectric unions where pipes of dissimilar metals are joined together.
- L. Isolate and drain existing systems as required to complete the Work. Fill, circulate and vent both new and existing systems as required for proper operation.
- M. Copper tube, of annealed or bending temper quality, where indicated to be installed without joints or fittings, shall be bent to accomplish changes of direction. Bending shall not collapse outside nor buckle inside of bend. Proper radius, method and tools required shall comply with Copper Tube Handbook.
- N. Do not route pipelines over switchboards, panels, motor control centers, individual motor starters and other electrical equipment.
- O. Avoid routing pipelines over electrical raceways and bus ducts. If these locations cannot be avoided, provide drip pans under pipelines. Also provide drip pans where indicated on the Drawings. Drip pans shall be constructed of minimum 22 gauge stainless sheet metal with waterproof mastic applied to interior seams and joints. Pan width shall be minimum 2 times pipe diameter and with sides turned up minimum of 4" high and fitted with hemmed edge. Do not hang drip pans from pipe. Pitch pans minimum 1/8" per foot and provide 3/4" drain connection at low points. Pipe drains to nearest floor drain or as shown on the Drawings.

## 2.02 CROSS AND INTER-CONNECTIONS:

- A. No piping for fixtures, equipment, devices or internal connections shall be installed which will provide a cross or interconnection, under any circumstance of operation, between a distributing supply for drinking or domestic purposes and a not-potable supply. A non potable supply would include a drainage system or a soil or sanitary waste pipe which would permit or make possible the backflow of sewage, polluted water or waste into the domestic water supply system.