Project Manual

# NORTHWEST CHURCH OF CHRIST

New Hope, Minnesota

JLG architects

Minneapolis
322 First Avenue N, #600
Minneapolis, MN 55401
p 612.746.4260

Project Number: JLG 15143

Date: May 25, 2017

Project Manual # _____

# SECTION 00 0105 - CERTIFICATIONS PAGE

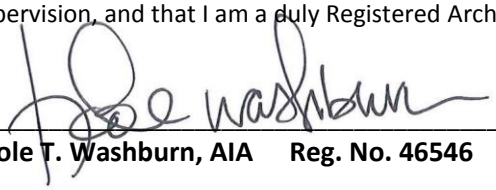
**NORTHWEST CHURCH OF CHRIST**

**NEW HOPE, MINNESOTA**

## CERTIFICATIONS

### Architectural

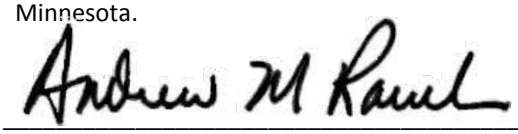
I hereby certify that this Plan, Specification, or Report was prepared by me or under my direct supervision, and that I am a duly Registered Architect under the laws of the State of Minnesota.



**Nicole T. Washburn, AIA Reg. No. 46546 May 25, 2017**

### Structural

I hereby certify that this Plan, Specification, or Report was prepared by me or under my direct supervision, and that I am a duly Registered Professional Engineer under the laws of the State of Minnesota.



**Andrew Rauch, P.E. Reg. No. 18518 May 25, 2017**

## END OF SECTION

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## PROCUREMENT AND CONTRACTING REQUIREMENTS



## SPECIFICATIONS

## END OF SECTION

# SECTION 01 3000 - ADMINISTRATIVE REQUIREMENTS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Preconstruction meeting.

B. Progress meetings.

C. Construction progress schedule.

D. Submittals for review, information, and project closeout.

E. Submittal procedures.

## PART 2 PRODUCTS - NOT USED

## PART 3 EXECUTION

### 3.01 PRECONSTRUCTION MEETING

A. Schedule meeting after Notice of Award.

B. Attendance Required:
   1. Owner.
   2. Architect.
   3. Contractor.
   4. Major subcontractors.

C. Agenda:
   1. Execution of Owner-Contractor Agreement.
   2. Submission of executed bonds and insurance certificates.
   3. Distribution of Contract Documents.
   4. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.
   5. Designation of personnel representing the parties to Contract and Architect.
   6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
   7. Scheduling.
      a. Contractor's schedule.
      b. Start of on-site work.
      c. Completion date.
      d. Coordination with on-site Owner's representatives.
      e. Sequence of work.
      f. Full or partial Owner occupancy as applicable.
   8. Shop drawings and sample distribution.
   9. Mockups.
   10. Critical products for the project timeline.
   11. Material deliveries.
   12. Procedures to be followed when working on site.
   13. Address items prior to on-site work.
      a. Parking.

b. Security.
c. Temporary Facilities including heat, electricity and water.
d. Noise and general safety.
e. Site fencing.
f. Use of the site.

D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

**3.02 PROGRESS MEETINGS**

A. Schedule and administer meetings throughout progress of the Work at maximum monthly intervals.

B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

C. Attendance Required:
1. Contractor.
2. Owner.
3. Architect.
4. Contractor's Superintendent.
5. Major Subcontractors.

D. Agenda:
1. Review minutes of previous meetings.
2. Review of Work progress.
3. Field observations, problems, and decisions.
4. Identification of problems that impede, or will impede, planned progress.
5. Review of submittals schedule and status of submittals.
6. Review of off-site fabrication and delivery schedules.
7. Maintenance of progress schedule.
8. Corrective measures to regain projected schedules.
9. Planned progress during succeeding work period.
10. Coordination of projected progress.
11. Maintenance of quality and work standards.
12. Effect of proposed changes on progress schedule and coordination.
13. Other business relating to Work.

E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

**3.03 CONSTRUCTION PROGRESS SCHEDULE**

A. If preliminary schedule requires revision after review, submit revised schedule within 10 days.

B. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
1. Include written certification that major contractors have reviewed and accepted proposed schedule.

C. Within 10 days after joint review, submit complete schedule.

D. Submit updated schedule with each Application for Payment.

**3.04 SUBMITTALS FOR REVIEW**

A. When the following are specified in individual sections, submit them for review:
   1. Product data.
   2. Shop drawings.
   3. Samples for selection.
   4. Samples for verification.

B. Submit to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.

C. Samples will be reviewed only for aesthetic, color, or finish selection.

D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 7800 - Closeout Submittals.

**3.05 SUBMITTALS FOR INFORMATION**

A. When the following are specified in individual sections, submit them for information:
   1. Design data.
   2. Certificates.
   3. Test reports.
   4. Inspection reports.
   5. Manufacturer's instructions.
   6. Manufacturer's field reports.
   7. Other types indicated.

B. Submit for Architect's knowledge as contract administrator or for Owner. No action will be taken.

**3.06 SUBMITTALS FOR PROJECT CLOSEOUT**

A. Submit Correction Punch List for Substantial Completion.

B. Submit Final Correction Punch List for Substantial Completion.

C. When the following are specified in individual sections, submit them at project closeout:
   1. Project record documents.
   2. Operation and maintenance data.
   3. Warranties.
   4. Bonds.
   5. Other types as indicated.

D. Submit for Owner's benefit during and after project completion.

**3.07 NUMBER OF COPIES OF SUBMITTALS**

A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.

B. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
   1. After review, produce duplicates.
   2. Retained samples will not be returned to Contractor unless specifically so stated.

**3.08 SUBMITTAL PROCEDURES**

A. Shop Drawing Procedures:
   1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the Contract Documents and coordinating related Work.
   2. Do not reproduce the Contract Documents to create shop drawings.
   3. Generic, non-project specific information submitted as shop drawings do not meet the requirements for shop drawings.

B. Transmit each submittal with a copy of approved submittal form.

C. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

D. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.

E. Apply Contractor's stamp, signed or initialed certifying that review, approval, 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.
   1. The Architect and Consultants will not begin review of submittals without review by the Contractor.

F. Schedule submittals to expedite the Project, and coordinate submission of related items.
   1. Color selections will not be reviewed or approved until all related products are submitted to ensure a cohesive palette.
   2. Products that make up a system, assembly, or that are directly related to each other often must be reviewed together. Review will not begin until all components are submitted.
   3. Coordinate with Architect and/or Construction Manager, as applicable, where schedule dictates an expedited review of products.

G. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.

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

I. Provide space for Contractor and Architect review stamps.

J. When revised for resubmission, identify all changes made since previous submission.

K. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.

L. Submittals not requested will not be recognized or processed.

M. Do not use shop drawings without an appropriate final stamp indicating action taken in connection with construction.

## END OF SECTION

# SECTION 01 4533 - STRUCTURAL TESTING AND SPECIAL INSPECTION

## PART 1 GENERAL

### 1.01 INTENT AND CONDITIONS

A. Intent
   1. Define and coordinate structural testing and special inspection services.
   2. Provide a greater level of confidence that the specified work is constructed in compliance with the contract documents and the intent of applicable codes including Sections 110 and 1704 of the 2012 International Building Code (IBC) as adopted by the current Minnesota State Building Code.
   3. Structural testing and special inspection services are intended to assist in determining probable compliance of the work with requirements specified. These services do not relieve the Contractor of responsibility for compliance with the requirements of the contract documents.

B. Conditions
   1. If inspection of a fabricator's work is required, the Owner's representative may require testing and inspection of the work at the plant, before shipment. Owner and Architect reserve the right to reject material not complying with the Contract Documents.
   2. Refer to individual technical specification sections for specific qualifications, inspections, tests, frequency and standards required. Testing and inspection shall be performed in accordance with the referenced standard for the specific material or procedure unless other criteria are specified. In the absence of a referenced standard, tests shall be performed in accordance with generally accepted industry standards.
   3. Work shall be checked as it progresses. Failure to detect any defective work or materials shall not prevent later rejection if defective work or materials are discovered, nor shall it obligate Owner to accept such work.
   4. Structural testing, special inspection, and periodic inspections by the Building Official do not preclude the normal field involvement and site observations by Architect or SER.
   5. Structural testing, special inspection, and periodic inspections by the Building Official do not relieve the Contractor of any responsibility to complete the work in accordance with the approved drawings and specifications.
   6. Testing agents and/or special inspectors may not waive or alter contract requirements, or approve or accept any portion of the work unless specifically authorized by the Architect or SER. They may not assume any duties of the Contractor, and they have no authority to stop or reject work.

### 1.02 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications apply to this section.

### 1.03 DEFINITIONS

A. Testing: Evaluation of systems, primarily requiring physical manipulation and analysis of materials, in accordance with approved standards.

B. Inspection: Evaluation of systems, primarily requiring observation and judgment.

C. Structural Special Inspections: Structural special inspections include inspections of structural items required by the 2012 IBC Section 1704, as adopted by the 2015 Minnesota State Building Code, and other items, which in the professional judgment of the Structural Engineer of Record, are critical to the integrity of the building structure and are indicated to be performed under the requirements of this

section. They do not include special inspections for non-structural items such as fireproofing, EIFS, and smoke control systems.

D. Structural Testing: Structural testing includes those tests of structural items required by the 2012 IBC, as adopted by the 2015 Minnesota State Building Code, or its referenced standards, and other tests, which in the professional judgment of the Structural Engineer of Record, are critical to the integrity of the building structure and are indicated to be performed under the requirements of this section.

E. Architect of Record: The prime consultant in charge of overall design and coordination of the project.

F. Structural Engineer of Record (SER): The licensed professional engineer in responsible charge of the structural design for the project.

G. Licensed Structural Engineer: A professional engineer with education and experience in the design of structures similar to this project licensed to practice in the State in which the Project is located.

H. Testing Agency (TA): The properly qualified firm performing testing services.

I. Special Inspector (SI): A properly qualified individual or firm performing special inspections.

J. Building Official: The officer or his duly authorized representative charged with the administration and enforcement of the building code for the project.

**1.04 REFERENCES**

A. ASTM C1077-13 - Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.

B. ASTM C1093-12 - Practice for the Accreditation of Testing Agencies for Unit Masonry.

C. ASTM D3740-12a - Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.

D. ASTM E329-14a - Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction.

E. International Building Code (IBC), 2012.

F. Minnesota State Building Code 2015.

**1.05 QUALIFICATIONS**

A. Testing Agency: An approved independent testing agency acceptable to the Owner, Architect, and SER and meeting the following:
   1. Authorized to operate in the State in which the project is located and experienced with the requirements and testing methods specified in the Contract Documents.
   2. Meet applicable requirements of references stated in paragraph 1.4.
   3. Have available testing equipment that is calibrated, at reasonable intervals, by devices of accuracy traceable to either the National Bureau of Standards, or to accepted values of natural physical constants.
   4. Provide individuals performing tests and taking samples with appropriate certifications for work performed.

B. Special Inspector: Either an appropriately certified inspector or a civil/structural engineer performing under the direct supervision of a licensed structural engineer (as defined earlier in this section) and acceptable to the SER and Building Official. Unique special inspector requirements, for specific materials and systems, are noted in related technical specification sections.

**1.06 RESPONSIBILITIES**

A. Special Inspectors:
   1. Inspect the work assigned for conformance with the building department approved plans, specifications, and applicable material and workmanship provisions of the code. Perform inspection in a timely manner to avoid delay of work.
   2. Bring nonconforming items to the immediate attention of the contractor for correction. If not corrected within 24 hours or if inspector will not be on site the following day, bring to the attention of the SER by the end of the business day. If uncorrected after a reasonable period of time, bring to the attention of the Building Official, and to the Architect. Notify SER immediately if non-conforming items are enclosed, embedded, or obscured prior to verification of correction.
   3. Submit inspection reports to the Building Official, Contractor, the Architect, the SER, and other designated persons in accordance with the structural testing and special inspection schedule.
   4. Submit a final signed report stating whether the work requiring special inspection was, to the best of his/her knowledge, in conformance with the approved plans, specifications and the applicable workmanship provisions of the code.
   5. Sign the structural testing and special inspection schedule in conjunction with other responsible parties.
   6. Attend preconstruction meeting to review scope of special inspection.

B. Testing Agency:
   1. Test the work assigned for conformance with the building department approved plans, specifications, and applicable material provisions of the documents. Perform tests in a timely manner to avoid delay of work.
   2. Submit test reports to the Building Official, Contractor, the Architect, the SER, and other designated persons in accordance with the structural testing and special inspection schedule.
   3. Sign the structural testing and special inspection schedule in conjunction with other responsible parties.
   4. Attend a preconstruction meeting to review scope of structural testing.

C. Contractor:
   1. Attend a preconstruction meeting to review scope of structural testing and special inspection.
   2. Post or make available the structural testing and special inspection schedule within its office at the job site. Also, provide adequate notification to those parties designated on the schedule so they may properly prepare for and schedule their work.
   3. Provide special inspectors access to the approved plans and specifications at the job site.
   4. Review all reports issued by special inspectors.
   5. Retain, at the job site, all reports submitted by the special inspectors for review on the Building Official's request.
   6. Correct deficiencies identified in inspection or testing reports in a timely manner.
   7. Provide safe access to the work requiring inspection or testing.
   8. Provide labor and facilities to provide access to the work, to obtain, handle and deliver samples, to facilitate testing and inspection and for storage and curing of test samples.
   9. Verify conformance of the work with specified construction tolerances.
   10. Inspections by Building Official: Provide adequate notice for inspections performed by the building official, as required by IBC Section 109, the Minnesota State Building Code, and local ordinances.

11. Sign the structural testing and special inspection schedule in conjunction with other responsible parties prior to commencing construction.

D. Fabricator:
   1. Submit a Certificate of Compliance to the Building Official, Special Inspector, and SER that the work was performed in accordance with the approved plans and specifications.
   2. Sign the structural testing and special inspection schedule in conjunction with other responsible parties prior to commencing construction.

E. Owner:
   1. Establish direct funding to provide for cost of structural testing and special inspection services.
   2. Provide special inspector with approved plans, specifications and approved shop drawings.
   3. Provide special inspectors and testing agencies with full access to the site at all times.
   4. Sign the Structural testing and special inspection schedule in conjunction with other responsible parties.

**1.07 PAYMENT**

A. Owner or Architect/SER, acting as the Owner's agent, will employ and pay for services of the special inspectors and testing agency to perform required structural testing and special inspection.

B. Unless noted otherwise, the Contractor shall provide and pay for all materials, samples, mock-ups, and assemblies required for testing and inspection and shall pay for shipping costs related to delivery of such items. Testing agency will pay for shipping costs of samples transported from site to lab.

C. If items requiring testing or inspection are enclosed, embedded or obscured prior to testing or inspection or if such items are placed without tests or inspections, the Contractor shall pay for the costs of any exploratory work deemed necessary by the Architect/SER to verify compliance with the Contract Documents.

D. Contractor shall pay for the costs of any retests or re-inspections caused by work that does not comply with the Contract Documents based on initial tests or inspections, or work that is later revised or replaced by the Contractor. This does not include revisions requested by the Owner.

**1.08 INSPECTION NOTICE**

A. Provide minimum of 24 hours notice for all items requiring testing or inspection. Items requiring testing and inspection services prior to or during placement shall not be placed until testing and inspection services are available. Items requiring testing and inspection services after placement shall not be enclosed or obscured until testing and inspection services are performed.

**1.09 REPORTS**

A. Testing agency and special inspectors shall submit reports for structural testing and special inspection in a timely manner to the Contractor, Building Official, SER, and Architect of Record. Provide reports of daily activities to the SER and Contractor. Submit reports to the Contractor on a daily basis and to the SER on a daily or weekly basis. Provide summary reports to the Building Official and Architect on a monthly basis unless they request otherwise.

B. Provide reports for ongoing work, containing the following information:
   1. Date issued.
   2. Project title and number.
   3. Firm name and address.

4. Name and signature of tester or inspector.
5. Date and time of sampling, test, or inspection.
6. Identification of product and specification section.
7. Location in project, including elevations, grid location and detail.
8. Type of test or inspection.
9. Whether test specimens, test results or observations indicate compliance with Contract Documents. Specifically state any discrepancies
10. Types and locations of discrepancies found in work
11. Work required performed to correct discrepancies and work performed to correct previously noted discrepancies. Discrepancies corrected during an inspection need not be reported
12. Submit certified final special inspection report stating that, to the best of the special inspector's knowledge, the work requiring special inspection conformed to the Construction Documents.

**1.10 FREQUENCY OF TESTING AND INSPECTION**

A. For detailed requirements, see individual technical specification sections and the structural testing and special inspection schedule.

**1.11 PROTECTION AND REPAIR**

A. Upon completion of testing, sample-taking, or inspection, the Contractor shall repair damaged work and restore substrates and finishes to eliminate deficiencies, including deficiencies in the visual qualities of exposed surfaces, as judged solely by the Architect/SER. Protect work exposed by or for testing and/or inspection and protect repaired work. Repair and protection is the Contractor's responsibility, regardless of the assignment of responsibility for testing and/or inspection.

**1.12 TESTS TO DEMONSTRATE QUALIFICATION**

A. Any tests required to qualify the Contractor or the workers for any phase of the work, shall be performed at no additional cost to the Owner.

B. If the Contractor proposes a product material, method, or other system that has not been pre-qualified, the Architect/SER may require applicable tests to establish a basis for acceptance or rejection. The Contractor shall pay for these tests.

C. The Architect/Engineer of Record reserves the right to require certification or other proof that the system proposed is in compliance with specified tests, criteria or standards. A representative of an independent testing agency shall sign the certificate.

**1.13 STRUCTURAL TESTING AND SPECIAL INSPECTION SCHEDULE**

A. The parties involved shall complete and sign the structural testing and special inspection schedule. Schedule to be complete at time of permit issuance.

B. The completed schedule is an element of the construction documents and after permit issuance, becomes part of the building department approved plans and specifications

## END OF SECTION

# SECTION 01 6000 - PRODUCT REQUIREMENTS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. General product requirements.

B. Transportation, handling, storage and protection.

C. Product option requirements.

D. Substitution limitations and procedures.

E. Procedures for Owner-supplied products.

F. Maintenance materials, including extra materials, spare parts, tools, and software.

### 1.02 RELATED REQUIREMENTS

A. Section 00 2600 - Procurement Substitution Requirements: Requests for substitution during the bidding process.

B. Section 01 4000 - Quality Requirements: Product quality monitoring.

C. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions: Requirements for VOC-restricted product categories.

### 1.03 DEFINITIONS

A. Definitions used in this Article are not intended to change the meaning of other terms used in the Contract Documents, such as "specialties," "systems," "structure," "finishes," "accessories," and similar terms. Such terms are self-explanatory and have well recognized meanings in the construction industry.
   1. "Products" are items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock. The term "product" includes the terms "material," " equipment," "system," and terms of similar intent.
   2. "Named Products" are items identified by manufacturer's product name, including make or model designation, indicated in the manufacturer's published product literature, that is current as of the date of the Contract Documents.
   3. "Materials" are products that are substantially shaped, cut, worked, mixed, finished, refined, or otherwise fabricated, processed, or installed to form a part of the Work.
   4. "Equipment" is a product with operational parts, whether motorized or manually operated, that requires service connections such as wiring or piping.

### 1.04 SUBMITTALS

A. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
   1. Submit within 30 days after date of Agreement.
   2. For products specified only by reference standards, list applicable reference standards.

B. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

C. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

D. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
   1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

### 1.05 QUALITY ASSURANCE

A. Source Limitations: To the fullest extent possible, provide products of the same kind, from a single source.

B. Compatibility of Options: When the Contractor is given the option of selecting between two or more products for use on the Project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.
   1. Each prime Contractor is responsible for providing products and construction methods that are compatible with products and construction methods of other prime or separate Contractors.
   2. If a dispute arises between prime Contractors over concurrently selectable, but incompatible products, the Architect will determine which products shall be retained and which are incompatible and must be replaced.

C. Nameplates: Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products which will be exposed to view in occupied spaces or on the exterior.

D. Labels: Locate required product labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface that is not conspicuous.

E. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on an easily accessible surface which is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data:
   1. Name of product and manufacturer.
   2. Model and serial number.
   3. Capacity.
   4. Speed.
   5. Ratings.

## PART 2 PRODUCTS

### 2.01 PRODUCT SELECTION

A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, unused at the time of installation.
   1. Provide products complete with all accessories, trim, finish, safety guards, and other devices and details needed for a complete installation and for the intended use and effect.

2. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.

B. Product Selection Procedures: Product selection is governed by the Contract Documents and governing regulations, not by previous Project experience. Procedures governing product selection include the following:
   1. Proprietary Specification Requirements: Where only a single product or manufacturer is named, provide the product indicated. No substitutions will be permitted.
   2. Semiproprietary Specification Requirements: Where two or more products or manufacturers are named, provide one of the products indicated. No substitutions will be permitted.
      a. Where products or manufacturers are specified by name, accompanied by the term "or equal," or "or approved equal" comply with the Contract Documents provisions concerning "substitutions" to obtain approval for use of an unnamed product.
   3. Descriptive Specification Requirements: Where specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements.
   4. Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products that comply with these requirements, and are recommended by the manufacturer for the application indicated. General overall performance of a product is implied where the product is specified for a specific application.
      a. Manufacturer's recommendations may be contained in published product literature, or by the manufacturer's certification of performance.
   5. Compliance with Standards, Codes, and Regulations: Where the Specifications only require compliance with an imposed code, standard, or regulation select a product that complies with the standards, codes, or regulations specified.
   6. Visual Matching: Where Specifications require matching an established Sample, the Architect's decision will be final on whether a proposed product matches satisfactorily.
   7. Visual Selection: Where specified product requirements include the phrase "...as selected from manufacturer's standard colors, patterns, textures..." or a similar phrase, select a product and manufacturer that complies with other specified requirements. The Architect will select the color, pattern, and texture from the product line selected.

**2.02 NEW PRODUCTS**

A. Provide new products unless specifically required or permitted by the Contract Documents.

B. DO NOT USE products having any of the following characteristics:
   1. Made using or containing CFC's or HCFC's.
   2. Made of wood from newly cut old growth timber.
   3. Containing lead, cadmium, asbestos.

C. Where all other criteria are met, Contractor shall give preference to products that:
   1. If used on interior, have lower emissions, as defined in Section 01 6116.
   2. If wet-applied, have lower VOC content, as defined in Section 01 6116.
   3. Are extracted, harvested, and/or manufactured closer to the location of the project.
   4. Have longer documented life span under normal use.
   5. Result in less construction waste.
   6. Are made of vegetable materials that are rapidly renewable.
   7. Are made of recycled materials.
   8. If made of wood, are made of sustainably harvested wood, wood chips, or wood fiber.
   9. Have a published GreenScreen Chemical Hazard Analysis.

### 2.03 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

### 2.04 MAINTENANCE MATERIALS

A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.

B. Deliver to Project site; obtain receipt prior to final payment.

## PART 3 EXECUTION

### 3.01 SUBSTITUTION PROCEDURES

A. See Section 00 2600 - Procurement Substitution Procedures for substitutions during the bidding period. Products submitted for substitution without following the specified procedures will not be reviewed or accepted.

B. Architect will consider requests for substitutions only within 30 days after date of Agreement. Requests for Substitutions after the bids have been received are done so at the risk of the Contractor. Substitutions may not be granted.

C. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor.

D. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.

E. A request for substitution constitutes a representation that the submitter:
   1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
   2. Agrees to provide the same warranty for the substitution as for the specified product.
   3. Agrees to coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
   4. Waives claims for additional costs or time extension that may subsequently become apparent.

F. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

G. Substitution Submittal Procedure (after contract award):
   1. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
   2. Architect will notify Contractor in writing of decision to accept or reject request.

**3.02 OWNER-SUPPLIED PRODUCTS**

A. Owner's Responsibilities:
   1. Arrange for and deliver Owner reviewed shop drawings, product data, and samples, to Contractor.
   2. Arrange and pay for product delivery to site.
   3. On delivery, inspect products jointly with Contractor.
   4. Submit claims for transportation damage and replace damaged, defective, or deficient items.
   5. Arrange for manufacturers' warranties, inspections, and service.

B. Contractor's Responsibilities:
   1. Review Owner reviewed shop drawings, product data, and samples.
   2. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
   3. Handle, store, install and finish products.
   4. Repair or replace items damaged after receipt.

**3.03 TRANSPORTATION AND HANDLING**

A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.

B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.

C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

D. Transport and handle products in accordance with manufacturer's instructions.

E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.

F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.

H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

**3.04 STORAGE AND PROTECTION**

A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.

B. Store and protect products in accordance with manufacturers' instructions.

C. Store with seals and labels intact and legible.

D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

E. For exterior storage of fabricated products, place on sloped supports above ground.

F. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.

G. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.

H. Comply with manufacturer's warranty conditions, if any.

I. Do not store products directly on the ground.

J. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

K. Prevent contact with material that may cause corrosion, discoloration, or staining.

L. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

M. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

**3.05 INSTALLATION OF PRODUCTS**

A. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other Work.

B. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

## END OF SECTION

# SECTION 01 6116 - VOLATILE ORGANIC COMPOUND (VOC) CONTENT RESTRICTIONS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Requirements for VOC-Content-Restricted products.

### 1.02 RELATED REQUIREMENTS

A. Section 01 3000 - Administrative Requirements: Submittal procedures.

B. Section 01 4000 - Quality Requirements: Procedures for testing and certifications.

C. Section 01 6000 - Product Requirements: Fundamental product requirements, substitutions and product options, delivery, storage, and handling.

### 1.03 DEFINITIONS

A. VOC-Content-Restricted Products: All products in the following product categories, whether specified or not:
   1. Interior paints and coatings.
   2. Interior adhesives and sealants, including flooring adhesives.
   3. Wet-applied roofing and waterproofing.
   4. Other products when specifically stated in the specifications.

B. Interior of Building: Anywhere inside the exterior weather barrier.

C. Adhesives: All gunnable, trowelable, liquid-applied, and aerosol adhesives, whether specified or not; including flooring adhesives, resilient base adhesives, and pipe jointing adhesives.

D. Sealants: All gunnable, trowelable, and liquid-applied joint sealants and sealant primers, whether specified or not; including firestopping sealants and duct joint sealers.

### 1.04 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.

B. ASTM D3960 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings; 2005 (Reapproved 2013).

C. CARB (ATCM) - Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products; California Air Resources Board; current edition.

D. CARB (SCM) - Suggested Control Measure for Architectural Coatings; California Air Resources Board; 2007.

E. SCAQMD 1113 - South Coast Air Quality Management District Rule No.1113; current edition.

F. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition.

G. SCS (CPD) - SCS Certified Products; current listings at www.scscertified.com.

### 1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: For each VOC-restricted product used in the project, submit evidence of compliance.

### 1.06 QUALITY ASSURANCE

A. VOC Content Test Method: 40 CFR 59, Subpart D (EPA Method 24), or ASTM D3960, unless otherwise indicated.
   1. Evidence of Compliance: Acceptable types of evidence are:
      a. Report of laboratory testing performed in accordance with requirements.
      b. Published product data showing compliance with requirements.

B. Composite Wood Emissions Standard: CARB (ATCM) for ultra-low emitting formaldehyde (ULEF) resins.
   1. Evidence of Compliance: Acceptable types of evidence are:
      a. Current SCS "No Added Formaldehyde (NAF)" certification; www.scscertified.com.
      b. Report of laboratory testing performed in accordance with requirements.
      c. Published product data showing compliance with requirements.

C. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

## PART 2 PRODUCTS

### 2.01 MATERIALS

A. All Products: Comply with the most stringent of federal, State, and local requirements, or these specifications.

B. VOC-Content-Restricted Products: VOC content not greater than required by the following:
   1. Adhesives, Including Flooring Adhesives: SCAQMD 1168 Rule.
   2. Joint Sealants: SCAQMD 1168 Rule.
   3. Paints and Coatings: Each color; most stringent of the following:
      a. 40 CFR 59, Subpart D.
      b. SCAQMD 1113 Rule.
      c. CARB (SCM).
   4. Wet-Applied Roofing and Waterproofing: Comply with requirements for paints and coatings.

## PART 3 EXECUTION

### 3.01 FIELD QUALITY CONTROL

A. Owner reserves the right to reject non-compliant products, whether installed or not, and require their removal and replacement with compliant products at no extra cost to Owner.

B. Additional costs to restore indoor air quality due to installation of non-compliant products will be borne by Contractor.

## END OF SECTION

# SECTION 01 7000 - EXECUTION AND CLOSEOUT REQUIREMENTS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Examination, preparation, and general installation procedures.

B. Requirements for alterations work, including selective demolition, except removal, disposal, and/or remediation of hazardous materials and toxic substances.

C. Pre-installation meetings.

D. Cutting and patching.

E. Surveying for laying out the work.

F. Cleaning and protection.

G. Starting of systems and equipment.

H. Demonstration and instruction of Owner personnel.

I. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.

J. General requirements for maintenance service.

### 1.02 RELATED REQUIREMENTS

A. Section 01 1000 - Summary: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.

B. Section 01 3000 - Administrative Requirements: Submittals procedures.

C. Section 01 5000 - Temporary Facilities and Controls: Temporary exterior enclosures.

D. Section 01 5000 - Temporary Facilities and Controls: Temporary interior partitions.

E. Section 01 7419 - Construction Waste Management and Disposal: Additional procedures for trash/waste removal, recycling, salvage, and reuse.

F. Section 01 7800 - Closeout Submittals: Project record documents, operation and maintenance data, warranties and bonds.

G. Section 07 8400 - Firestopping.

### 1.03 REFERENCE STANDARDS

A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2013.

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
   1. On request, submit documentation verifying accuracy of survey work.
   2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in conformance with Contract Documents.
   3. Submit surveys and survey logs for the project record.

C. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
   1. Structural 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.

D. Project Record Documents: Accurately record actual locations of capped and active utilities.

**1.05 QUALIFICATIONS**

A. For survey work, employ a land surveyor registered in the State in which the Project is located and acceptable to Architect. Submit evidence of Surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate.

B. For design of temporary shoring and bracing, employ a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

**1.06 PROJECT CONDITIONS**

A. Use of explosives is not permitted.

B. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

C. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
   1. Minimize amount of bare soil exposed at one time.
   2. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

D. Pest and Rodent Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.

E. Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises.

**1.07 COORDINATION**

A. See Section 01 1000 for occupancy-related requirements.

B. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

C. Notify affected utility companies and comply with their requirements.

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

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

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

G. Coordinate completion and clean-up of work of separate sections.

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

## PART 2 PRODUCTS

### 2.01 PATCHING MATERIALS

A. New Materials: As specified in product sections; match existing products and work for patching and extending work.

B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.

C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 6000 - Product Requirements.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.

E. Verify that utility services are available, of the correct characteristics, and in the correct locations.

F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

**3.02 PREPARATION**

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

**3.03 PREINSTALLATION MEETINGS**

A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.

B. Require attendance of parties directly affecting, or affected by, work of the specific section.

C. Notify Architect four days in advance of meeting date.

D. Prepare agenda and preside at meeting:
   1. Review conditions of examination, preparation and installation procedures.
   2. Review coordination with related work.

E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

**3.04 LAYING OUT THE WORK**

A. Verify locations of survey control points prior to starting work.

B. Promptly notify Architect of any discrepancies discovered.

C. Protect survey control points prior to starting site work; preserve permanent reference points during construction.

D. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

E. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.

F. Utilize recognized engineering survey practices.

G. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
   1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
   2. Grid or axis for structures.
   3. Building foundation, column locations, ground floor elevations.

H. Periodically verify layouts by same means.

I. Maintain a complete and accurate log of control and survey work as it progresses.

## 3.05 GENERAL INSTALLATION REQUIREMENTS

A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.

B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.

D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.

E. Make neat transitions between different surfaces, maintaining texture and appearance.

## 3.06 ALTERATIONS

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
   1. Verify that construction and utility arrangements are as shown.
   2. Report discrepancies to Architect before disturbing existing installation.
   3. Beginning of alterations work constitutes acceptance of existing conditions.

B. Keep areas in which alterations are being conducted separated from other areas that are still occupied.
   1. Provide, erect, and maintain temporary dustproof partitions of construction indicated on drawings .

C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
   1. Where openings in exterior enclosure exist, provide construction to make exterior enclosure weatherproof.
   2. Insulate existing ducts or pipes that are exposed to outdoor ambient temperatures by alterations work.

D. Remove existing work as indicated and as required to accomplish new work.
   1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.
   2. Remove items indicated on drawings.
   3. Relocate items indicated on drawings.
   4. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
   5. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.

E. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove, relocate, and extend existing systems to accommodate new construction.
   1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
   2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.

3. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
    a. Disable existing systems only to make switchovers and connections; minimize duration of outages.
    b. See Section 01 1000 for other limitations on outages and required notifications.
    c. Provide temporary connections as required to maintain existing systems in service.
4. Verify that abandoned services serve only abandoned facilities.
5. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.

F. Protect existing work to remain.
1. Prevent movement of structure; provide shoring and bracing if necessary.
2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
3. Repair adjacent construction and finishes damaged during removal work.

G. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
1. When existing finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Architect.
2. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.
3. Where a change of plane of 1/4 inch (6 mm) or more occurs in existing work, submit recommendation for providing a smooth transition for Architect review and request instructions.
4. Trim existing wood doors as necessary to clear new floor finish. Refinish trim as required.

H. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.

I. Refinish existing surfaces as indicated:
1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
2. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.

J. Clean existing systems and equipment.

K. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.

L. Do not begin new construction in alterations areas before demolition is complete.

M. Comply with all other applicable requirements of this section.

**3.07 CUTTING AND PATCHING**

A. Whenever possible, execute the work by methods that avoid cutting or patching.

B. See Alterations article above for additional requirements.

C. Perform whatever cutting and patching is necessary to:
1. Complete the work.

2. Fit products together to integrate with other work.
3. Provide openings for penetration of mechanical, electrical, and other services.
4. Match work that has been cut to adjacent work.
5. Repair areas adjacent to cuts to required condition.
6. Repair new work damaged by subsequent work.
7. Remove samples of installed work for testing when requested.
8. Remove and replace defective and non-conforming work.

D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.

E. Employ skilled and experienced installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.

F. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

G. Restore work with new products in accordance with requirements of Contract Documents.

H. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 8400, to full thickness of the penetrated element.

J. Patching:
1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
2. Match color, texture, and appearance.
3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

**3.08 PROGRESS CLEANING**

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

**3.09 PROTECTION OF INSTALLED WORK**

A. Protect installed work from damage by construction operations.

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

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

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

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

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

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

**3.10 SYSTEM STARTUP**

A. Coordinate schedule for start-up of various equipment and systems.

B. Notify Architect and owner seven days prior to start-up of each item.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.

D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

E. Verify that wiring and support components for equipment are complete and tested.

F. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.

G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

H. Submit a written report that equipment or system has been properly installed and is functioning correctly.

**3.11 DEMONSTRATION AND INSTRUCTION**

A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of Substantial Completion.

B. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.

C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

D. Provide a qualified person who is knowledgeable about the Project to perform demonstration and instruction of owner personnel.

E. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.

F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

**3.12 ADJUSTING**

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

**3.13 FINAL CLEANING**

A. Use cleaning materials that are nonhazardous.

B. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

C. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.

D. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

E. Clean filters of operating equipment.

F. Clean debris from roofs and drainage systems.

G. Clean site; sweep paved areas, rake clean landscaped surfaces.

H. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

**3.14 CLOSEOUT PROCEDURES**

A. Make submittals that are required by governing or other authorities.

B. Accompany Project Coordinator on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.

C. Notify Architect when work is considered ready for Architect's Substantial Completion inspection.

D. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's Substantial Completion inspection.

E. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.

F. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.

G. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.

H. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

### 3.15 MAINTENANCE

A. Provide service and maintenance of components indicated in specification sections.

B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.

C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

## END OF SECTION

# SECTION 01 7800 - CLOSEOUT SUBMITTALS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Project Record Documents.

B. Operation and Maintenance Data.

C. Warranties and bonds.

### 1.02 RELATED REQUIREMENTS

A. Section 01 3000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.

B. Section 01 7000 - Execution and Closeout Requirements: Contract closeout procedures.

C. Individual Product Sections: Specific requirements for operation and maintenance data.

D. Individual Product Sections: Warranties required for specific products or Work.

### 1.03 SUBMITTALS

A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.

B. Operation and Maintenance Data:
   1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with comments.
   2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
   3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
   4. Submit two sets of revised final documents in final form within 10 days after final inspection.

C. Warranties and Bonds:
   1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
   2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
   3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

## PART 2 PRODUCTS - NOT USED

## PART 3 EXECUTION

### 3.01 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:

1. Drawings.
2. Specifications.
3. Addenda.
4. Change Orders and other modifications to the Contract.
5. Reviewed shop drawings, product data, and samples.
6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress.

E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
1. Manufacturer's name and product model and number.
2. Product substitutions or alternates utilized.
3. Changes made by Addenda and modifications.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
1. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
2. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
3. Field changes of dimension and detail.
4. Details not on original Contract drawings.

**3.02 OPERATION AND MAINTENANCE DATA**

A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

**3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES**

A. For Each Product, Applied Material, and Finish:
1. Product data, with catalog number, size, composition, and color and texture designations.
2. Information for re-ordering custom manufactured products.

B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.

C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.

D. Additional information as specified in individual product specification sections.

E. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

**3.04 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS**

A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.

B. Where systems involve more than one specification section, provide separate tabbed divider for each system.

C. Binders: Commercial quality, 8-1/2 by 11 inch (216 by 280 mm) three D side ring binders with durable plastic covers; 2 inch (50 mm) maximum ring size. When multiple binders are used, correlate data into related consistent groupings.

D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.

E. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants,Contractorand subcontractors, with names of responsible parties.

F. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.

G. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.

H. Text: Manufacturer's printed data, or typewritten data on 20 pound paper.

I. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

J. Arrangement of Contents: Organize each volume in parts as follows:
   1. Project Directory.
   2. Table of Contents, of all volumes, and of this volume.
   3. Operation and Maintenance Data: Arranged by system, then by product category.
      a. Source data.
      b. Product data, shop drawings, and other submittals.
      c. Operation and maintenance data.
      d. Field quality control data.
      e. Photocopies of warranties and bonds.
   4. Design Data: To allow for addition of design data furnished by Architect or others, provide a tab labeled "Design Data" and provide a binder large enough to allow for insertion of at least 20 pages of typed text.

**3.05 WARRANTIES AND BONDS**

A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.

B. Verify that documents are in proper form, contain full information, and are notarized.

C. Co-execute submittals when required.

D. Retain warranties and bonds until time specified for submittal.

E. Manual: Bind in commercial quality 8-1/2 by 11 inch (216 by 279 mm) three D side ring binders with durable plastic covers.

F. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.

G. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.

H. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

## END OF SECTION

# SECTION 02 4100 - DEMOLITION

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Selective demolition of building elements for alteration purposes.

### 1.02 RELATED REQUIREMENTS

A. Section 01 1000 - Summary: Limitations on Contractor's use of site and premises.

B. Section 01 7000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.

C. Section 31 2323 - Fill: Filling holes, pits, and excavations generated as a result of removal operations.

### 1.03 REFERENCE STANDARDS

A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.

B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2013.

## PART 2 PRODUCTS -- NOT USED

## PART 3 EXECUTION

### 3.01 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with other requirements specified in Section 01 7000.

B. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
   1. Obtain required permits.
   2. Comply with applicable requirements of NFPA 241.
   3. Use of explosives is not permitted.
   4. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
   5. Provide, erect, and maintain temporary barriers and security devices.
   6. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
   7. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
   8. Do not close or obstruct roadways or sidewalks without permit.
   9. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
   10. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.

C. Do not begin removal until receipt of notification to proceed from Owner.

D. Do not begin removal until built elements to be salvaged or relocated have been removed.

E. Protect existing structures and other elements that are not to be removed.
   1. Provide bracing and shoring.
   2. Prevent movement or settlement of adjacent structures.
   3. Stop work immediately if adjacent structures appear to be in danger.

F. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

G. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.

H. Perform demolition in a manner that maximizes salvage and recycling of materials.
   1. Comply with requirements of Section 01 7419 - Waste Management.
   2. Dismantle existing construction and separate materials.
   3. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.

**3.02 EXISTING UTILITIES**

A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.

E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.

F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

**3.03 SELECTIVE DEMOLITION FOR ALTERATIONS**

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
   1. Verify that construction and utility arrangements are as shown.
   2. Report discrepancies to Architect before disturbing existing installation.
   3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.

B. Separate areas in which demolition is being conducted from other areas that are still occupied.
   1. Provide, erect, and maintain temporary dustproof partitions of construction indicated on drawings .

C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.

D. Remove existing work as indicated and as required to accomplish new work.
   1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.
   2. Remove items indicated on drawings.

E. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.
   1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
   2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
   3. See Section 01 1000 for other limitations on outages and required notifications.
   4. Verify that abandoned services serve only abandoned facilities before removal.
   5. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification.

F. Protect existing work to remain.
   1. Prevent movement of structure; provide shoring and bracing if necessary.
   2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
   3. Repair adjacent construction and finishes damaged during removal work.
   4. Patch as specified for patching new work.

**3.04 DEBRIS AND WASTE REMOVAL**

A. Remove debris, junk, and trash from site.

B. Remove from site all materials not to be reused on site; do not burn or bury.

C. Leave site in clean condition, ready for subsequent work.

D. Clean up spillage and wind-blown debris from public and private lands.

## END OF SECTION

# SECTION 03 1510 - POST-INSTALLED ANCHORS

## PART 1 GENERAL

### 1.01 CONTRACT CONDITIONS

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

### 1.02 SECTION INCLUDES

A. Requirements pertaining to post-installed anchors for materials and equipment. This section pertains to Divisions 3, 4, and 6 of these specifications that require post-installed anchors, unless specified otherwise.

### 1.03 RELATED REQUIREMENTS

A. Division 1 - General Requirements

B. Division 3 - Concrete

C. Division 4 - Masonry

D. Division 6 - Wood, Plastics, and Composites

### 1.04 REFERENCES

A. ASTM A 36 - Standard Specification for Carbon Structural Steel; 2005

B. ASTM A 193 - Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service

C. ASTM A 307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength; 2007b

D. ASTM A 510 - Standard Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel; 2007

E. ASTM A 615 - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement; 2007

F. ASTM A 706/A 706M - Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement; 2006a.

G. ASTM B 633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2007

H. ASTM B 695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel; 2004

I. ASTM C 881- Standard Specification Epoxy-Resin-Based Bonding Systems for Concrete; 2002

J. ASTM F 1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength; 2007a.

K. ICC-ES AC58 - Acceptance Criteria for Adhesive Anchors in Masonry Elements; 2006

L. ICC-ES AC70 - Acceptance Criteria for Fasteners Power-Driven into Concrete, Steel and Masonry Elements; 2006

M. ICC-ES AC106 - Acceptance Criteria for Predrilled Fasteners (Screw Anchors) in Concrete or Masonry Elements; 2006

N. ICC-ES AC193 - Acceptance Criteria for Mechanical Anchors in Concrete Elements; 2008

O. ICC-ES AC308 - Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements; 2008

**1.05 QUALITY ASSURANCE**

A. Post-Installed anchors and related materials shall be listed by one or more of the following agencies, as applicable unless specifically included in this section:
   1. ICC Evaluation Service
   2. Underwriters Laboratories (UL) and/or Factory Mutual (FM)
   3. IAPMO Evaluation Service

**1.06 SUBMITTALS**

A. Product Data: Submit data for proprietary materials, manufacturer's specifications (including finishes and/or materials), Material Safety Data Sheets (MSDS) and installation procedures.

B. Test Reports: ICC-ES or IAPMO-UES listings.

**1.07 SUBSTITUTIONS**

A. Only manufacturers with an ICC-ES or IAPMO listing will be considered for substitution requests.

B. The contractor shall submit for Engineer-of-Record's review, calculations that are prepared & sealed by a registered Professional Engineer demonstrating that the substituted product is capable of achieving the pertinent equivalent performance values of the specified product using the appropriate design procedure and/or standard(s) as required by the Building Code. In addition, the calculations shall specify the diameter and embedment depth of the substituted product.

C. Any increase in material costs for such submittal shall be the responsibility of the contractor.

## PART 2 PRODUCTS

**2.01 MATERIALS**

A. Adhesive Anchors
   1. Adhesive anchors consist of an insert and an adhesive.
   2. Inserts
      a. Threaded Rod Inserts: Provide preparation or configuration as recommended by manufacturer.
         1) Interior Exposure: ASTM A 307, ASTM A 36, ASTM A 193 Grade B7, or ASTM F 1554.
      b. Reinforcing Bar Inserts: ASTM A 615 or ASTM A 706. Provide preparation or configuration as recommended by manufacturer.
   3. Adhesives for Concrete:
      a. Evaluation report issued by ICC-ES or IAPMO required.
      b. Tested and qualified for use in cracked and uncracked concrete in accordance with ICC-ES AC308 for all mandatory and optional seismic tests including creep tests.

c. Acrylic: Cartridge type, two-component, acrylic based system dispensed and mixed through a static mixing nozzle supplied by the manufacturer. Minimum physical requirements of ASTM C 881 Type IV, Grade 3, Class A, B and C.
    1) Acceptable products include:
        (a) Hilti: HY-200 (ICC-ES ESR-3187).
        (b) DeWalt/Powers Fasteners: AC100+ (ICC-ES ESR-2582).
        (c) Simpson Strong-Tie: AT-XP (IAPMO ER-263).
        (d) ITW Red Head: Red Head A7+ (ICC-ES ESR-3903).

4. Adhesives for Solid Concrete Masonry:
    a. Evaluation report issued by ICC-ES or IAPMO required.
    b. Tested in accordance with ICC-ES AC58 for all mandatory tests and the following optional tests:
        1) Seismic tests
        2) Creep tests
        3) Dampness tests
        4) Freeze-thaw tests
    c. Epoxy: ASTM C 881 Type IV, Grade 3, Class B and C.
        1) Acceptable products include:
            (a) Simpson Strong-Tie: ET-HP Epoxy (ICC-ES ESR-3638).
    d. Acrylic: Cartridge type, two-component, acrylic based system dispensed and mixed through a static mixing nozzle supplied by the manufacturer. Minimum physical requirements of ASTM C 881 Type IV, Grade 3, Class A, B and C.
        1) Acceptable products include:
            (a) Simpson Strong-Tie: AT-XP (IAPMO ER-281).
            (b) Hilti: HY-200 (ICC-ES ER-3963)
            (c) Hilti: HY-70 (ICC-ES ER-2682)
            (d) ITW Red Head: Red Head A7+ (ICC-ES ESR-3951)

5. Adhesives for Hollow Concrete Masonry:
    a. Evaluation report issued by ICC-ES or IAPMO required.
    b. Tested in accordance with ICC-ES AC58 for all mandatory tests and the following optional tests:.
        1) Seismic tests
        2) Creep tests
        3) Dampness tests
        4) Freeze-thaw tests
    c. Epoxy: ASTM C881 Type IV, Grade 3, Class B and C.
        1) Acceptable products include:
            (a) Simpson Strong-Tie: SET Epoxy-Tie High-Strength Adhesive (ICC-ES ESR-1772).
            (b) Hilti: HY-70 (ICC-ES ESR-2682).

B. Concrete and Masonry Screw Anchors
    1. Concrete Screw Anchors:
        a. Carbon steel heat-treated or hardened.
        b. Zinc-plated in accordance with ASTM B 633, Class SC1, Type I or equivalent coating.
        c. Evaluation report issued by ICC-ES or IAPMO required.
        d. Tested and qualified for use per ICC-ES AC193 for all mandatory tests .
        e. Acceptable products include:
            1) Simpson Strong-Tie: Titen HD (ICC-ES ESR-2713).
            2) Hilti: HUS-EZ (ICC-ES ESR 3027).
            3) Powers Fasteners: Wedge-Bolt+ (ICC-ES ESR-2526).
            4) ITW Red Head: Tapcon+/Sammy (ICC-ES ESR-3699).

2. Masonry Screw Anchors: (Grouted Masonry Only)
    a. Carbon steel heat-treated or hardened.
    b. Zinc-plated per ASTM B 633, Class SC1, Type I, or equivalent coating.
    c. Mechanically galvanized (where noted): ASTM B 695, Class 55, Type 1.
    d. Evaluation report issued by ICC-ES or IAPMO required.
    e. Tested per ICC-ES AC106 for all mandatory tests (and seismic tests):
    f. Acceptable products include:
        1) Simpson Strong-Tie: Titen HD (ICC-ES ESR-1056).
        2) Hilti: HUS-EZ (ICC-ES ESR-3056).
        3) Powers Fasteners: Wedge-Bolt+ (ICC-ES ESR-1678).
        4) ITW Red Head: Tapcon (ICC-ES ESR-1671).

C. Power Driven Fasteners
1. Drive pin and threaded stud types, as applicable for each condition.
2. Manufactured from ASTM A 510, Grade 1060 to1070 or AISI 1060 to 1070 steel
3. Rockwell “C” Hardness of 49-56.
4. Mechanically galvanized or zinc-plated finish.
5. Minimum diameter 0.145"
6. Smooth shank for concrete and masonry, knurled shank for steel.
7. Evaluation report issued by ICC-ES required.
8. Tested in accordance with ICC-ES AC70.
9. Acceptable products include:
    a. Simpson Strong-Tie: Power Driven Fasteners (ICC-ES ESR-2138).
    b. Hilti: Low Velocity Power-Driven Fasteners (ICC-ES ESR-1663).
    c. ITW Ramset: Ramset Power-Driven Fasteners (ICC-ES ESR-1799).

## PART 3 EXECUTION

### 3.01 INSTALLATION

A. Install anchors in strict accordance with manufacturer's printed instructions and, where required, requirements of ICC-ES evaluation reports.

B. Conform to manufacturer's requirements for, but not limited to, hole drilling methods, hole size, hole cleaning, substrate and adhesive temperatures, moisture presence in holes, and required edge distance and spacing.

C. Use special tools when recommended by manufacturer for installation of anchors unless otherwise permitted specifically by the Engineer or Architect of Record.

D. Drill holes in concrete, in accordance with the manufacturer’s recommendations.

### 3.02 FIELD QUALITY CONTROL

A. Manufacturer shall, on request, provide the services of a field representative to demonstrate to and train installers in proper installation techniques.

B. Structural Testing and Special Inspection
1. Structural Special Inspection shall be performed by qualified parties as specified herein, and in accordance with the provision of Section 01 4533.
2. Special Inspection, periodic or continuous, of post-installed anchors shall be provided as specified herein, but not less than as required by ICC-ES evaluation reports.
3. Definitions: ASNT - American Society for Non-Destructive Testing

4. Personnel Qualifications
    a. Special Inspector Technical I: ASNT Level I, employed by a testing agency and supervised by an ASNT Level III with a minimum of 10 years experience.
    b. Special Inspector Technical II: ASNT Level II, employed by a testing agency and supervised by an ASNT Level III with a minimum of 10 years experience.
    c. Special Inspector - Structural I: Graduate civil/structural engineer, or other personnel acceptable to the SER, with experience in design of structural systems of the project type. Inspections shall be performed under the direct supervision of a licensed structural engineer, as defined in Section 01 4533. The licensed engineer shall review and approve all inspection reports.
5. The Owner will provide the following tests and inspections:
    a. Continuous special inspection during installation to verify materials delivered to site comply with contract documents, bolt type and dimensions, concrete type and compressive strength, pre-drilled hole dimensions and cleaning, embedment, spacing, edge distances, slab thickness, tightening torque, and any other items requiring inspection by product's ICC approval report. Qualifications: Technical II or Structural I.

## END OF SECTION

# SECTION 03 3000 - CAST-IN-PLACE CONCRETE

## PART 1 GENERAL

### 1.01 CONTRACT CONDITIONS

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

### 1.02 SECTION INCLUDES

A. Section Includes: Providing all items, articles and materials listed, mentioned, or scheduled on the Drawings or herein, including all labor, materials, equipment, and incidentals necessary and required for the installation of all cast-in-place concrete indicated on the Drawings or specified herein.

B. Concrete formwork.

C. Concrete footings

D. Floors and slabs on grade.
   1. Including vapor barrier.

E. Concrete fill for masonry lintels, bond beams and cores.

F. Concrete topping.

G. Joint devices associated with concrete work.

H. Concrete curing.

### 1.03 RELATED REQUIREMENTS

A. Section 01 4533 - Structural Testing and Special Inspection

B. Section 07 9200 - Joint Sealants: Products and installation for sealants for saw cut joints and isolation joints in slabs.

C. Section 05 1200 - Embedded Structural Steel, Anchor Bolts

### 1.04 REFERENCE STANDARDS

A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials; 2010.

B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; 1991 (Reapproved 2009).

C. ACI 301 - Specifications for Structural Concrete; 2010 (Errata 2012).

D. ACI 302.1R - Guide for Concrete Floor and Slab Construction; 2004 (Errata 2007).

E. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000.

F. ACI 305R - Hot Weather Concreting; 2010.

G. ACI 306R - Cold Weather Concreting; 2010.

H. ACI 306.1 - Standard Specification for Cold Weather Concreting, American Concrete Institute; 1990

I. ACI 308R - Guide to Curing Concrete; 2001 (Reapproved 2008).

J. ACI 308.1 - Standard Specification for Curing Concrete, American Concrete Institute; 1998

K. ACI 309R - Guide for Consolidation of Concrete, American Concrete Institute; 1996

L. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2011.

M. ACI 347R - Guide to Formwork for Concrete; 2014.

N. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement; 2015.

O. ASTM A767/A767M - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement; 2009.

P. ASTM A775/A775M - Standard Specification for Epoxy-Coated Steel Reinforcing Bars; 2007b (Reapproved 2014).

Q. ASTM C 31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field; 2003

R. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2015a.

S. ASTM C150/C150M - Standard Specification for Portland Cement; 2015.

T. ASTM C 157 - Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete; 2006.

U. ASTM C 231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method; 1997

V. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a.

W. ASTM C330/C330M - Standard Specification for Lightweight Aggregates for Structural Concrete; 2014.

X. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2013.

Y. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2015.

Z. ASTM C 1116 - Standard Specification for Fiber-Reinforced Concrete; 2006.

AA. ASTM C 1260 - Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method); 2007.

AB. ASTM C 1399 - Standard Test Method for Obtaining Average Residual Strength of Fiber-Reinforced Concrete; 1998.

AC. ASTM C 1609 - Standard Test Method for Flexural Performance of Fiber-Reinforced Concrete (Using Beam With Third-Point Loading); 2005.

AD. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types); 2004 (Reapproved 2013).

**1.05 SUBMITTALS**

A. See Division 1 for submittal procedures.

B. Concrete mix designs for each mix used. On request, include field test data used to determine required average strength (if that method was used) and field test or trial mix data used to document required average compressive strength.

C. Product data for admixtures, curing materials and compounds, joint fillers, fiber reinforcing, vapor retarders, non-shrink grout, and slab construction joint devices.

D. Samples: Submit samples of underslab vapor retarder to be used.

E. Cold weather concreting procedures.

F. Drawings showing construction and control joint locations and details for interior supported floor slabs and slabs on grade.

G. Certification of admixture conformance to chloride ion requirements.

H. Field quality control test results.

**1.06 QUALITY ASSURANCE**

A. Perform work of this section in accordance with ACI 301 and ACI 318.

B. Follow recommendations of ACI 305R when concreting during hot weather.

C. Follow recommendations of ACI 306R when concreting during cold weather.

D. Fiber reinforcing supplier shall have no less than five (5) years of satisfactory product performance experience with the approved product.

**1.07 MATERIAL DELIVERY, HANDLING, AND STORAGE**

A. Materials shall be delivered in the Manufacturer's undamaged, unopened containers. Each container shall be clearly marked with the product name, manufacturer's name, batch number, component designation, and ratio of component mixtures.

B. Provide equipment and personnel to handle the materials by methods that prevent damage.

C. Promptly inspect shipments to assure that materials comply with requirements, quantities are correct, and materials are undamaged.

D. Store materials in accordance with the Manufacturer's instructions, with seals and label intact and legible. Maintain temperatures within the Manufacturer's recommended ranges.

E. Furnish delivery tickets with each load of concrete delivered to the Project. Information on each ticket shall be as required by ASTM C94 and shall also include: type of concrete (mix number), weights of all ingredients, maximum aggregate size, type, brand, and amount of admixture, total water in the batch, maximum amount of water that can be added at the site without exceeding design mix proportions, and amount of water added at site and initials of person adding water. Retain tickets until substantial completion unless directed otherwise.

### 1.08 NATIONAL VOLATILE ORGANIC COMPOUND (VOC) EMISSION STANDARDS

A. All products shall comply with the E.P.A. rulings establishing national v.o.c. emission standards for architectural coatings as listed in the Federal Register: September 11,1998 (Volume 63, Number 176), [Rules and Regulations] [Page 48848-48887].

## PART 2 PRODUCTS

### 2.01 FORMWORK

A. Formwork Design and Construction: Comply with guidelines of ACI 347R to provide formwork that will produce concrete complying with tolerances of ACI 117.

B. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.

### 2.02 REINFORCEMENT

A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).
   1. Type: Deformed billet-steel bars.
   2. Finish: Unfinished, unless otherwise indicated.
   3. Finish: Epoxy coated in accordance with ASTM A775/A775M for exterior exposures.

B. Reinforcement Accessories:
   1. Tie Wire: Annealed, minimum 16 gage, 0.0508 inch.
   2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
   3. Provide stainless steel, galvanized, plastic, or plastic coated steel components for placement within 1-1/2 inches of weathering surfaces.

### 2.03 CONCRETE MATERIALS

A. Cement: ASTM C150/C150M, Type I - Normal Portland type.

B. Fine and Coarse Aggregates: ASTM C 33.
   1. Maximum aggregate size is specified in mix design schedule.
   2. Alkali Silicate Reactivity: Expansion of fine aggregate tested per ASTM C1260 shall not exceed 0.15%. If fly ash or other pozzolans are used to reduce shrinkage to meet this requirement, expansion of fine aggregate tested per ASTM C1260 without fly ash or other pozzolans shall not exceed 0.25%.

C. Fly Ash: ASTM C618, Class C or F.

D. Water: Clean and not detrimental to concrete.

E. Synthetic Micro Fiber Reinforcing: 100% virgin polyolefin (polypropylene or polyethylene), fibrillated, graded or minimum ¾" uniform length, ASTM C1116, Type III. Fibermesh 300: Propex Concrete Systems, Grace Fibers: W.R. Grace, Ultra-Net: Forta Fibers, and approved equal.

**2.04 ADMIXTURES**

A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.

B. Air Entrainment Admixture: ASTM C260/C260M.

C. High Range Water Reducing Admixture: ASTM C494/C494M Type F.

D. Accelerating Admixture: ASTM C494/C494M Type C.

E. Water Reducing Admixture: ASTM C494/C494M Type A.

F. Prohibited Admixtures: Calcium chloride, thiocyanates or admixtures containing more than .05% chloride ions.

G. Do not use accelerating or retarding admixtures without written approval of the Architect.

**2.05 ACCESSORY MATERIALS**

A. Underslab Vapor Retarder <VPR RET-4>: Multi-layer, fabric-, cord-, grid-, or aluminum-reinforced polyethylene or equivalent, complying with ASTM E 1745, Class A; maximum water vapor permeance 0.04 perm; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. Include manufacturer's recommended joint sealing tape and mastic. Tape and mastic to have maximum permeance of 0.3 perm.
   1. Subject to specification requirements provide one of the following or approved equal:
      a. Stego Industries: Stego Wrap 15 mil.(www.stegoindustries.com)
      b. Reef Industries: Griffolyn T-105 (www.reefindustries.com.
      c. W. R. Meadows: Perminator 15 mil (www.wrmeadows.com).

**2.06 BONDING AND JOINTING PRODUCTS**

A. Slab Isolation Joint Filler: 1/4 inch thick, height equal to slab thickness, with removable top section that will form 1/2 inch deep sealant pocket after removal.
   1. Material: ASTM D1751, cellulose fiber.

**2.07 CURING MATERIALS**

A. All curing agents and sealers shall have no adverse affect on finishes, traffic topping, or other sealers. Coordinate with the appropriate finish manufacturer and receive written confirmation before applying.

B. Moisture-Retaining Cover: ASTM C 171; regular curing paper, white curing paper, white polyethylene film at temperatures above 60 degrees F., black polyethylene film at temperatures below 80 degrees F., clear polyethylene, or white burlap-polyethylene sheet at temperatures above 60 degrees F.

C. Exterior Concrete Curing Compound: Wax base, membrane forming curing compound, ASTM C309, Type II, white pigmented.

D. Curing Compound, Naturally Dissipating: Clear, water-based, liquid membrane-forming compound; complying with ASTM C309.

E. Curing and Sealing Compound, Low Gloss: Liquid, membrane-forming, clear, non-yellowing acrylic; complying with ASTM C1315 Type 1 Class A.
   1. Solids by Mass: 25 percent, minimum.

**2.08 CONCRETE MIX DESIGN REQUIREMENTS**

A. Submit concrete mix design for each type of concrete at least 30 days prior to the proposed start of placement. Mix designs must be reviewed prior to pouring concrete. Review is for conformance with specification requirements only. Contractor is responsible for performance.

B. Concrete shall conform to the requirements of ASTM C94 (Option A) unless other requirements of this project specification are more stringent.

C. Provide concrete with workability such that it will fill the forms, without voids or honeycombs, when properly vibrated, without permitting materials to separate or excess water to collect on the surface.

D. Slump at point of discharge: 5" max. for concrete without superplasticizer and 9" max. for concrete with superplasticizer .

E. Proportioning Normal Weight Concrete: ACI 301. Establish proportions based on the standard practices contained in ACI 211.1.

F. Determine required average strength as required by ACI 301.

G. Concrete Strength: Document that mixes produce required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
   1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.

H. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.

**2.09 CONCRETE MIX DESIGN SCHEDULE**

A. Normal Weight Concrete: Footings
   1. Minimum Compressive Strength, when tested in accordance with ASTM C 39/C 39M at 28 days: 3,000 psi.
   2. Water-Cement Ratio: Maximum 0.55 by weight.
   3. Maximum Aggregate Size: 1-1/2" Class 1S.
   4. Maximum Chloride Ion Content: 0.30 percent by weight of cement.

B. Normal Weight Concrete: Exterior Concrete
   1. Exterior concrete includes: exterior aprons and stoop slabs and other similar conditions.
   2. Minimum Compressive Strength, when tested in accordance with ASTM C 39/C 39M at 28 days: 4,500 psi.
   3. Fly Ash Content: Maximum 25 percent of cementitious materials by weight.
   4. Synthetic Micro Fiber Reinforcement: Add to mix as recommended by manufacturer for specific project conditions. Minimum rate of 1.5 pounds per cubic yard. Minimum residual strength per ASTM C1399 or C1609: 45 psi. Required at slabs only.
   5. Water-Cement Ratio: Maximum 0.40 by weight.

6. Total Air Content: 4-1/2% to 7-1/2% percent, determined in accordance with ASTM C231.
7. Maximum Aggregate Size: 3/4" Class 4S.
8. Maximum Chloride Ion Content: 0.15 percent by weight of cement.

C. Normal Weight Concrete: Slabs on grade
1. Minimum Compressive Strength, when tested in accordance with ASTM C 39/C 39M at 28 days: 4,000 psi.
2. Synthetic Micro Fiber Reinforcement: Add to mix as recommended by manufacturer for specific project conditions. Minimum rate of 1.5 pounds per cubic yard. Minimum residual strength per ASTM C1399 or C1609: 45 psi.
3. Water-Cement Ratio: Maximum 0.45 by weight.
4. Maximum Aggregate Size: 3/4" Class 2S, well graded to achieve shrinkage limits specified.
5. Maximum 28-day shrinkage per ASTM C157: 0.05%
6. Maximum Chloride Ion Content: .30 percent by weight of cement.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section.

### 3.02 PREPARATION

A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.

B. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with concrete placement.

C. Do not embed pipes other than non-aluminum electrical conduit or snow melting pipes in any structural concrete.
1. Any pipes embedded in concrete, even those meeting the guidelines given herein, are subject to acceptance by Architect. Remove any unacceptable pipes.
2. Outside diameter of pipes placed in slabs and walls shall not exceed 25% of the thickness of the slab or wall and shall be placed in groups of not more than 3. Space pipes within a group at not less than 4 diameters clear. Space groups of pipes at not less than 48 diameters clear.

D. Protect existing concrete work to be exposed to view and other finished materials from damage and staining resulting from concreting operations. Cover sills, ledges and other surfaces with protective coverings as necessary to protect the work.

E. Slabs on Grade:
1. Verify subgrade compaction tests have been performed and are accepted.
2. Verify subgrade is level and within acceptable tolerances.
3. Verify subgrade is substantially dry with no freestanding water, muddy spots, or soft spots and is free from snow or ice.
4. Verify completion of all underfloor mechanical and electrical work.
5. Provide 3 inch minimum cover bottom and 3 inch minimum cover sides at electrical conduits and other embedded items.
6. Lay vapor retarder directly below slab per ASTM E1643 and manufacturer's written instructions for interior slabs on grade. Lap joints 6" minimum and seal. Provide boots and seal at all penetrations. Adhere to perimeter walls. Repair damaged vapor retarder prior to placing slab on grade.

**3.03 CONCRETE MIXING**

A. Transit Mixers: Comply with ASTM C 94/C 94M.

B. Use cooled or heated water in accordance with ACI 306 and 305.

C. Air-entraining and chemical admixtures, if approved, shall be charged into mixer as a solution and dispensed by an automatic dispenser or similar metering device. Powdered admixtures shall be weighted or measured by volume as recommended by the manufacturer. Superplasticizer may be added at the job site to maintain slump.

D. Two or more admixtures may be used in same concrete, provided such admixtures are added separately during batching sequence. Admixtures used in combination shall retain full efficiency and have no deleterious effect on concrete or on properties of each other.

E. Ready mixed concrete shall be transported to the site in watertight agitator or mixer trucks loaded not in excess of rated capacities. Schedule and dispatch trucks from the batching point so that they shall arrive at the site of the work just before the concrete is required to avoid excessive mixing of concrete while waiting.

F. Discharge at the site shall begin within one (1) hour after charging. Concrete may be used as long as it is of such slump that it can be placed and properly consolidated without the addition of water to the batch (other than water added prior to the start of discharge as given below). If elapsed time since batching exceeds 90 minutes, or if drum has revolved more than 300 revolutions since batching, test air content, slump, and temperature for conformance to this specification prior to placing. In no case shall the time between batching and complete discharge exceed 120 minutes. Do not permit retempering of concrete. Discard concrete that has obtained its initial set.

G. Do not add water after the initial introduction of the mixing water for the batch, except at the start of discharge, subject to the conditions below. In this case, the producer may add water in an amount not exceeding that allowed to achieve the design water/cement ratio. The drum blades shall then be turned an additional 30 revolutions minimum at mixing speed. Water shall not be added to the batch at any later time. Reject concrete if water is added and these conditions are not met.
   1. The measured slump of the concrete is less than that specified in the mix design.
   2. No more than 60 minutes have elapsed from the time of batching.
   3. The ready-mix plant is notified and approves.
   4. Truck tickets indicate maximum amount of water to be added.
   5. Water is added in a manner to control volume.
   6. Special Inspector is notified, if concrete placement requires inspection.

H. Maximum concrete temperature delivered to Project site shall be 85 degrees F.

I. To use materials other than those accepted originally, or if the materials from the source originally accepted change in characteristics, make additional tests with proposed new materials that will verify production of concrete meeting with the stated requirements without causing objectionable change in the color or appearance of the structure. Pay the testing agency for these additional tests. Do not use concrete made from such different materials until the Architect has given his approval.

J. If, during the progress of the work, it is impossible to secure concrete of the required workability and strength with the materials being furnished by the Vendor, the Architect may order such changes in the proportions or materials, or both, as may be necessary to secure the desired properties, subject to the stated requirements. Make any changes so ordered without extra compensation.

**3.04 PLACING CONCRETE**

A. Place concrete in accordance with ACI 301. Follow recommended practice of ACI 304R.

B. Place concrete for floor slabs following recommended practices of ACI 302.1R.

C. Do not place in rain, sleet or snow unless exposed concrete surface is protected from moisture.

D. If, for any reason, the concrete pour is delayed for more than 45 minutes, bulkhead pour at last acceptable construction joint. Immediately remove excess concrete and clean all forms and in situ concrete surfaces.

E. Place concrete as near as possible to its final position to prevent segregation. Do not use vibrators to transport concrete.

F. Do not interrupt successive placement; do not permit cold joints to occur.

G. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

H. Immediately remove concrete spilled on existing surfaces.

I. Place slabs on grade according to submitted, approved joint location plan.

J. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

**3.05 SLAB JOINTING**

A. Locate slab on grade construction and control joints as given on Drawings and submit drawings showing proposed locations. Cut joints as soon as concrete has hardened sufficiently to prevent aggregate dislodgement. Use a "Soff Cut" saw to cut to a depth of 1 1/4" immediately after final finishing. Use a conventional saw to cut to a depth of one-fourth the slab thickness or as shown on the drawings. Complete sawing within 12 hours of placement.

B. Anchor joint fillers and devices to prevent movement during concrete placement.

C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.
   1. Install wherever necessary to separate slab from other building members, including columns, walls, equipment foundations, footings, stairs, manholes, sumps, and drains.

**3.06 CONSOLIDATION**

A. Consolidation of concrete shall conform to ACI 301, unless modified herein.

B. Follow recommended practices of ACI 309, unless modified herein.

C. Consolidate concrete using internal vibrators.

D. Maintain a spare vibrator at the Project Site during all placing operations.

**3.07 CONCRETE FINISHING**

A. Concrete Finish Schedule

1. Tops of footings: After consolidation, strike off and level top surface to ACI 117 foundation tolerance.
2. Exposed interior concrete floors and floors to receive carpeting: Troweled finish.
3. Exterior aprons and stoops: Broom finish.
4. Floors to receive thin-set ceramic tile, resilient flooring, and vinyl tile: Flat troweled finish.

B. Unformed Surfaces
1. Provide finishes per ACI 301 as scheduled herein or noted on Drawings and to the following tolerances.
   a. Troweled Finish: Moderately flat tolerance per ACI 117. Slope slab to floor drains.
   b. Flat Troweled Finish: Flat tolerance per ACI 117
   c. Broom Finish: Moderately flat tolerance per ACI 117.
2. Clean exposed concrete to remove laitance, efflorescence and stains.

**3.08 CURING AND PROTECTION**

A. Comply with requirements of ACI 308.1 as amended by this section. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature above 55° F for the period necessary for hydration of cement and hardening of concrete as follows:
1. Normal concrete: Not less than 7 days.

C. Curing may be terminated earlier than the minimum time above if at least one of the following conditions is met:
1. At least 4 field cylinders for each pour, prepared and cured according to ASTM C31 alongside the concrete they represent, reach 70% of the specified 28-day strength.
2. The concrete temperature is maintained above 50°F and laboratory cylinders reach 85% of the specified 28-day strength.

D. Formed Surfaces: Cure by moist curing with forms in place for full curing period. If forms are removed during the curing period, cure by one of the methods specified for unformed surfaces.
1. Keep all wood forms wet during the curing period.

E. Unformed Surfaces: Apply curing materials as soon as finishing operations are complete and the concrete's sufficiently hard to be undamaged by the curing process.
1. Waterproof paper or polyethylene film: Use appropriate color of film based on ambient temperature. Sprinkle concrete with water as necessary during application of covering. Lap edges and ends at least 6 inches, and seal laps. Weight down covering to prevent movement. Patch holes and tears that occur during the curing period.
2. Curing Compounds: Apply strictly according to the manufacturer's instructions using low pressure spray equipment.
   a. Maximum 200 square feet per gallon for strippable curing compound.
3. Use the following methods:
   a. Interior floors and stairs exposed in the finished work: Cure using a curing and sealing compound.
      1) For surfaces exposed in the finished work, provide a second coat of acrylic curing and sealing compound immediately prior to substantial completion. Clean floors, and apply sealer strictly according to manufacturer's instructions.
   b. Interior surfaces receiving adhesive applied finishes: Cure using wet curing methods or by covering with waterproof paper or polyethylene film.
      1) Strippable curing compound may be used provided it is completely removed prior to installation of adhesive.

c. Exterior concrete: Cure using exterior concrete curing compound.
d. All other unformed surfaces: Cure using a strippable curing compound, by wet curing methods, or by covering with waterproof paper or polyethylene film.

4. Protect concrete from excessive changes in temperature during the curing period and at the termination of the curing process. Changes in the temperature of the concrete shall be as uniform as possible and shall not exceed 5° F in any one hour or 50° F in any 24 hour period.

**3.09 HOT WEATHER CONCRETING**

A. Apply recommended practices of ACI 305R when wind, temperature and humidity conditions cause evaporation rates (using Figure 2.1.5 of ACI 305R) exceeding the following:
1. 0.2 lb/sq ft/hr for concrete with Portland cement only.
2. 0.1 lb/sq ft/hr for concrete with Portland cement and fly ash.
3. 0.05 lb/sq ft/hr for concrete with Portland cement and silica fume.

B. Determine and document expected evaporation rate for the duration of concrete pour.

C. Wet or fog forms and reinforcing immediately prior to placement to bring temperature to ambient conditions.

D. Maintain surface moisture during the period immediately after placement and before final finishing by using wind breaks, fog sprayers, evaporation retarders, or shade (individually or in combination) to prevent plastic shrinkage cracking.
1. Use evaporation retarders according to manufacturer's instructions. Do not use as a finishing aid.

**3.10 COLD WEATHER CONCRETING**

A. Concrete placed during cold weather shall conform to the requirements of ACI 306.1.

B. Cold weather is defined as 3 or more successive days when the average daily outdoor temperature is less than 40 degrees F.

C. All surfaces, including subgrade and reinforcing larger than a #8 bar shall be above 35 degrees F. prior to placing concrete. All reinforcing bars #8 and smaller shall be above 10 degrees F. prior to placing concrete. Surfaces shall not be more than 10 degrees warmer than the minimum concrete temperatures required by ACI 306.1.

D. Maintain cold weather protection for the following duration but not less than the duration specified in "Curing and Protection" above:
1. Maintain protection for a minimum of 48 hours after placement of concrete.

E. Submit detailed procedures for cold weather concreting for engineer's information only.

F. Follow recommended practices of ACI 306R. Subject to other requirements of this section, a non-chloride accelerator may be used to normalize initial set and for early strength gain.

**3.11 FIELD QUALITY CONTROL**

A. Provide free access to concrete operations at project site and cooperate with appointed firm.

B. Structural Testing and Special Inspection
1. Structural Testing and Special Inspection shall be performed by qualified parties as specified herein, and in accordance with the provisions of Section 01 4533.
2. Personnel Qualifications

a. Testing Technician: Technical I - ACI Certified Concrete Field Testing Technician, Grade I, employed by a testing laboratory with C.C.R.L. certification at the National Bureau of Standards, under the direct supervision of a licensed civil/structural engineer. The licensed engineer shall review and approve all reports.
b. Special Inspector - Structural I: ICC Certified Concrete Inspector, ACI Concrete Construction Inspector, or a graduate civil/structural engineer, or other personnel acceptable to the Structural Engineer of Record (SER), with experience in the design of structural systems of this type. Inspections shall be performed under the direct supervision of a licensed structural engineer, as defined in Section 01 4533. The licensed engineer shall review and approve all inspection reports.

3. The Owner will provide the following tests and inspections:
   a. Tests for cast in place concrete. Qualifications: Technical I.
      1) Compression test specimens: ASTM C31. One set of four standard cylinders of concrete for each compressive strength test. Mold and store cylinders for laboratory cured specimens.
      2) Compressive strength tests: ASTM C39. One set of four cylinders for each day's pour between one and 25 cubic yards. If a day's pour exceeds 25 cubic yards, one set of four cylinders for each additional 50 cubic yards, or fraction thereof. One specimen tested at 7 days for information, two at 28 days for acceptance, and one specimen retained in reserve for later testing if required. (When frequency of testing will provide less than five strength tests for a given class of concrete, conduct at least five strength tests from randomly selected batches. If fewer than five batches are used, conduct one test from each batch.)
      3) Slump: ASTM C143. One test at point of discharge for each set of compression test specimens; additional tests when concrete consistency appears to have changed.
      4) Air entrainment: ASTM C231. Test the first batch of air entrained concrete and one additional test for each set of compression test specimens.
      5) Concrete temperature: Test hourly when air temperature is below 40°F or above 80°F and each time a set of compression test specimens is made.
   b. Concrete mix verification. Qualifications: Technical I. Verify the following:
      1) Mixer truck trip ticket conforms to approved mix design.
      2) Total water added to mix on site does not exceed that allowed by concrete mix design.
      3) Concrete quality is indicative of adequate mixing time, consistency, and relevant time limits.
   c. Observe preparation for and placement of all concrete, excluding slabs on grade and strip footings without transverse reinforcement. Additional exclusions may be noted on the structural drawings. Special Inspector must be present during entire concrete pour. Qualifications: Structural I. Verify the following:
      1) Acceptable general condition of concrete base prior to placement.
      2) Concrete conveyance and depositing avoids segregation and contamination.
      3) Concrete is properly consolidated.
      4) Reinforcement remains at proper location.
   d. Observe protection and curing methods for all concrete, excluding slabs on grade and strip footings without transverse reinforcement Additional exclusions may be noted on the structural drawings. Observations to be made periodically during the curing period. Qualifications: Structural I. Verify the following:
      1) Specified curing procedures are followed.
      2) Specified hot and cold weather procedures are followed.
   e. Observe all bolts installed in concrete. Qualifications: Structural I. Verify the following:
      1) Specified size, type, spacing, configuration, embedment, and quantity.
      2) Proper concrete placement and consolidation around all bolts.

### 3.12 DEFECTIVE CONCRETE

A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.

B. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

C. Acceptance criteria for concrete strength tests shall be as outlined in section 5.6 of ACI 318. If concrete does not meet acceptance criteria, investigation generally following the provisions of section 5.6.5 of ACI 318 will be used at the discretion of the Structural Engineer of Record. Contractor shall reimburse Owner for all costs associated with this investigation. If, in the judgment of the Structural Engineer of Record, the structural adequacy cannot be shown by this investigation, the Contractor shall remove and replace the concrete in question.

### 3.13 CLEAN-UP

A. Perform concrete washout only in designated area as required by either Division 31 section Erosion Control or the project NPDES permit.

## END OF SECTION

# SECTION 03 5400 - CAST UNDERLAYMENT

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Liquid-applied self-leveling floor underlayment.

### 1.02 REFERENCE STANDARDS

A. ASTM C472 - Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters and Gypsum Concrete; 1999 (Reapproved 2014).

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

### 1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's data sheets documenting physical characteristics and product limitations of underlayment materials. Include information on surface preparation, mixing instructions, environmental limitations, storage and handling requirements, and installation instructions.

### 1.04 QUALITY ASSURANCE

A. Applicator Qualifications: Company specializing in performing the work of this section, and approved by manufacturer.

### 1.05 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Keep dry and protect from direct sun exposure, freezing, and ambient temperature greater than 105 degrees F (41 degrees C).

### 1.06 FIELD CONDITIONS

A. Do not install underlayment until floor penetrations and peripheral work are complete.

B. Maintain minimum ambient temperatures of 50 degrees F (10 degrees C) 24 hours before, during and 72 hours after installation of underlayment.

C. During the curing process, ventilate spaces to remove excess moisture.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

A. Gypsum Underlayment:
   1. ARDEX Engineered Cements: www.ardexamericas.com.
   2. Dependable Chemical Co., Inc: www.floorprep.com.
   3. Hacker Industries, Inc: www.hackerindustries.com.
   4. Maxxon Corporation: www.maxxon.com.
   5. Substitutions: See Section 01 6000 - Product Requirements.

### 2.02 MATERIALS

A. Gypsum-Based Underlayment <CAST UNDLMNT-1>: Gypsum based mix, that when mixed with water in accordance with manufacturer's directions will produce self-leveling underlayment with the following properties:
   1. Basis of Design: Gyp-Crete by Maxxon Corporation.
   2. Application: All areas indicated to receive carpet or other soft flooring materials.
   3. Compressive Strength: Minimum 2200 psi (15 MPa), tested per ASTM C472.
   4. Density: Maximum 115 lb/cu ft (1842 kg/cu m).
   5. Final Set Time: 1 to 2 hours, maximum.
   6. Thickness: 3/4 inch (19 mm) to maximum 3-1/2 inch (89 mm).
   7. Surface Burning Characteristics: Flame spread/Smoke developed index of 0/0 in accordance with ASTM E84.

B. Gypsum-Based Underlayment <CAST UNDLMNT-1>: Gypsum based mix, that when mixed with water in accordance with manufacturer's directions will produce self-leveling underlayment with the following properties:
   1. Basis of Design: Dura-Cap by Maxxon Corporation.
   2. Application: All areas indicated to receive linoleum, tile, or other resilient flooring materials.
   3. Compressive Strength: Minimum 3500 psi (24.13 MPa), tested per ASTM C472.
   4. Density: Maximum 115 lb/cu ft (1842 kg/cu m).
   5. Final Set Time: 1 to 2 hours, maximum.
   6. Thickness: 1/2 inch (13 mm) to maximum 3-1/2 inch (89 mm).
   7. Surface Burning Characteristics: Flame spread/Smoke developed index of 0/0 in accordance with ASTM E84.

C. Aggregate: Dry, well graded, washed silica aggregate, approximately 1/8 inch (3 mm) in size and acceptable to underlayment manufacturer.

D. Water: Potable and not detrimental to underlayment mix materials.

E. Primer: Manufacturer's recommended type.

F. Joint and Crack Filler: Latex based filler, as recommended by manufacturer.

### 2.03 MIXING

A. Site mix materials in accordance with manufacturer's instructions.

B. Add aggregate for areas where thickness will exceed 1/2 inch (12.7 mm). Mix underlayment and water for at least two minutes before adding aggregate, and continue mixing to assure that aggregate has been thoroughly coated.

C. Mix to self-leveling consistency without over-watering.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify that substrate surfaces are clean, dry, unfrozen, do not contain petroleum byproducts, or other compounds detrimental to underlayment material bond to substrate.

### 3.02 PREPARATION

A. Concrete: Mechanically prepare steel troweled concrete to create a textured surface necessary to achieve the best bond; acceptable methods include bead blasting and scarifying. Do not use acid etching.

B. Remove substrate surface irregularities. Fill voids and deck joints with filler. Finish smooth.

C. Vacuum clean surfaces.

D. Prime substrate in accordance with manufacturer's instructions. Allow to dry.

E. Close floor openings.

### 3.03 APPLICATION

A. Install underlayment in accordance with manufacturer's instructions.

B. Pump or pour material onto substrate. Do not retemper or add water.
   1. Pump, move, and screed while the material is still highly flowable.
   2. Be careful not to create cold joints.
   3. Wear spiked shoes while working in the wet material to avoid leaving marks.

C. Place to indicated thickness, with top surface level to 1/8 inch in 10 ft (1:1000).

### 3.04 CURING

A. Once underlayment starts to set, prohibit foot traffic until final set has been reached.

B. Air cure in accordance with manufacturer's instructions.

### 3.05 PROTECTION

A. Protect against direct sunlight, heat, and wind; prevent rapid drying to avoid shrinkage and cracking.

B. Do not permit traffic over unprotected floor underlayment surfaces.

## END OF SECTION

# SECTION 04 2731 - REINFORCED UNIT MASONRY

## PART 1 GENERAL

### 1.01 CONTRACT CONDITIONS

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

### 1.02 SECTION INCLUDES

A. Concrete Block.

B. Mortar and Grout.

C. Reinforcement and Anchorage.

D. Accessories.

### 1.03 RELATED REQUIREMENTS

A. Section 01 4533 - Structural Testing and Special Inspection

B. Section 03 1510 - Post-Installed Anchors.

C. Section 03 3000 - Cast-in-Place Concrete.

D. Section 05 1200 - Structural Steel Framing: Bearing plates embedded in masonry.

### 1.04 REFERENCE STANDARDS

A. ACI 530/530.1/ERTA - Building Code Requirements and Specification for Masonry Structures and Related Commentaries; 2011.

B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.

C. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement; 2015.

D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.

E. ASTM C67 - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile; 2014.

F. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units; 2014.

G. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2015.

H. ASTM C140/C140M - Standard Test Methods of Sampling and Testing Concrete Masonry Units and Related Units; 2014.

I. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2011.

J. ASTM C150/C150M - Standard Specification for Portland Cement; 2015.

K. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2006 (Reapproved 2011).

L. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2014a.

M. ASTM C 387 - Standard Specification for Packaged, Dry, Combined Materials for Mortar and Concrete; 2006.

N. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2011.

O. ASTM C476 - Standard Specification for Grout for Masonry; 2010.

P. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2009.

**1.05 SUBMITTALS**

A. See Division 1 for submittal procedures.

B. Product Data: Provide data for masonry units, fabricated wire reinforcement, and mortar and grout.

C. Product Data: Include mortar and grout design mix and indicate whether the Proportion or Property specification of ASTM C 270 is to be used. Also include required environmental conditions and admixture limitations. Provide mix designs not less than 14 days prior to beginning masonry work.

D. Reports: Submit reports of masonry unit strength tests prior to starting work.

E. Reports: Submit reports on mortar indicating conformance of component mortar materials to requirements of ASTM C 270 .

F. Reports: Submit reports on grout indicating conformance of component grout materials to requirements of ASTM C 476 and test and evaluation reports to requirements of ASTM C 1019.

G. Shop Drawings: Indicate bar sizes, spacings, reinforcement quantities, bending and cutting schedules, reinforcement supporting and spacing devices, and accessories.

H. Shop Drawings: Provide drawing showing location of all proposed block control joints.

I. Manufacturer's Instructions: Submit packaged dry mortar manufacturer's installation instructions.

J. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.

**1.06 QUALITY ASSURANCE**

A. Comply with provisions of IBC and ACI 530/ASCE 5/TMS 402 and ACI 530.1/ASCE 6/TMS 602, except where exceeded by requirements of the contract documents.

**1.07 DELIVERY, STORAGE, AND HANDLING**

A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

B. Maintain packaged materials clean, dry, and protected against dampness, freezing, and foreign matter.

### 1.08 FIELD CONDITIONS

A. Cold and Hot Weather Requirements: Comply with requirements of ACI 530.1/ASCE 6/TMS 602 this section or applicable building code, whichever is more stringent.

## PART 2 PRODUCTS

### 2.01 CONCRETE MASONRY UNITS

A. Concrete Block <CMU-1>: Comply with referenced standards and as follows:
   1. Size: Standard units with nominal face dimensions of 16 by 8 inches and nominal depths as indicated on the drawings for specific locations.
   2. Strength: Minimum unit strength as required by ACI 530.1 to achieve prism strengths shown on drawings.
   3. Special Shapes: Provide non-standard blocks configured for corners, lintels, headers, and control joint edges.
   4. Load-Bearing Units: ASTM C90, normal weight.
      a. Hollow block.
      b. Exposed Faces: Manufacturer's standard color and texture where indicated.

### 2.02 MORTAR AND GROUT MATERIALS

A. Materials Not Permitted: Masonry cement, anti-freeze, salts.

B. Packaged Dry Mortar: ASTM C 387, Type as given below for location in structure, using gray color cement.

C. Portland Cement: ASTM C 150, Type I.

D. Hydrated Lime: ASTM C207, Type S.

E. Mortar Aggregate: ASTM C144.

F. Grout Aggregate: ASTM C404.

G. Water: Clean and potable.

H. Accelerating Admixture: Nonchloride type for use in cold weather. Obtain Architect's approval prior to use.

### 2.03 REINFORCEMENT AND ANCHORAGE

A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi) yield strength.
   1. Deformed billet-steel bars.
   2. Unfinished.

B. Single Wythe Joint Reinforcement: Ladder type; ASTM A 82/A 82M steel wire, hot dip galvanized after fabrication to ASTM A 153/A 153M, Class B; 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage on each exposure.

C. Rigid Anchors for Intersecting Bearing Walls: 1-1/2" wide by 24" long by 1/4" thick with ends turned up 2". Hot-dip galvanized, ASTM A153, Class B.

**2.04 ACCESSORIES**

A. Post-installed anchors and reinforcing: See Section 03 1510

B. Preformed Control Joints: Polyvinyl chloride material. Provide with corner and tee accessories, fused joints. Minimum Shore Durometer hardness of 80, 5/8" thick shear section with 1/4" thick flanges, total width not less than 2-3/8".

C. Building Paper: ASTM D226/D226M, Type I ("No. 15") asphalt felt.

D. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

**2.05 MORTAR MIXES**

A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.
   1. Engineered masonry: Type S.
   2. Masonry below grade and in contact with earth; Type S.
   3. Exterior, loadbearing masonry; Type S.
   4. Interior, loadbearing masonry; Type S.

**2.06 MORTAR MIXING**

A. Control and accurately maintain specified proportions of the mortar materials during the entire progress of the work.

B. Thoroughly mix mortar ingredients using mechanical batch mixer, in accordance with ASTM C270 and in quantities needed for immediate use.
   1. Mix prepackaged dry mortar in accordance with manufacturer's written instructions.

C. Maintain sand uniformly damp immediately before the mixing process.

D. Do not use anti-freeze compounds to lower the freezing point of mortar.

E. If water is lost by evaporation, re-temper only within two hours of mixing.

**2.07 GROUT MIXES**

A. Bond Beams, Lintels, and Grouted Cores: 2,000 psi strength at 28 days; 8-10 inches slump; provide premixed type according to ASTM C94/C94M or mix according to ASTM C476.
   1. Fine grout for spaces with smallest horizontal dimension of 2 inches or less.
   2. Coarse grout for spaces with smallest horizontal dimension greater than 2 inches.

**2.08 GROUT MIXING**

A. Mix premixed grout in accordance with ASTM C 94/C 94M.

B. Thoroughly mix site mixed grout ingredients in quantities needed for immediate use in accordance with ASTM C 476 for fine and coarse grout.

C. Add admixtures in accordance with manufacturer's instructions; mix uniformly.

D. Do not use anti-freeze compounds to lower the freezing point of grout.

### 2.09 PRECONSTRUCTION TESTING

A. Testing will be conducted by an independent test agency, in accordance with provisions of Section 01 4533.

B. Concrete Masonry: Test each type, class, and grade of concrete masonry unit in accordance with ASTM C140/C140M for conformance to requirements of this specification.
   1. Provide test for each different masonry unit width, face shell thickness, and concrete unit weight.
   2. Supplier production test results may be used if tests are not more than 90 days old and supplier furnishes a certification that the units meet the requirements of this section.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify that preconstruction testing has been completed.

B. Verify that field conditions are acceptable and are ready to receive masonry. Resolve out-of-tolerance conditions prior to starting work.

C. Verify that reinforcing dowels are positioned in accordance with the drawings.

D. Verify that related items provided under other sections are properly sized and located.

E. Verify that built-in items are in proper location, and ready for roughing into masonry work.

### 3.02 PREPARATION

A. Direct and coordinate placement of metal anchors supplied for installation under other sections.

B. Clean reinforcement of loose rust.

C. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

D. For areas where high-lift grouting will be employed and grout pour height exceeds 5 feet, provide cleanout openings as follows:
   1. Hollow Masonry: Not less than 8 inches high at the bottom of each cell to be grouted, formed by cutting out face shell of masonry unit.

### 3.03 COURSING

A. Establish lines, levels, and coursing indicated. Protect from displacement.

B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

C. Concrete Masonry Units:
   1. Bond: Running.
   2. Coursing: One unit and one mortar joint to equal 8 inches.
   3. Mortar Joints: Concave.

**3.04 PLACING AND BONDING**

A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.

B. Lay hollow masonry units with face shell bedding on head and bed joints. Provide full mortar bed at footings, grouted cores, foundations, and slabs.

C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.

D. Remove excess mortar as work progresses.

E. Interlock intersections and external corners.

F. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

G. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

H. Build all chases and recesses as shown on the Drawings or required by all trades. Cut all masonry units to fit neatly around conduit or piping, outlet boxes, etc. Set grilles and other equipment furnished by others as required in masonry.

I. Provide cleanouts in the bottom course of each grout pour at each grouted core when the grout pour height exceeds 5 feet. .

J. Do not enclose mechanical, electrical or work specified in other sections until such work has been inspected and approved by the proper local code authority and by the Engineer if required.

K. Install loose lintels, anchors, bolts, dowels, grounds, angles, plates, grilles, or similar items required for anchorage of other work. Refer to Drawings for specific bearing conditions.

L. Discard all mortar that has begun to stiffen or is not used within 2-1/2 hours of initial mixing. Maintain workability of mortar within the 2-1/2 hour period by retempering or remixing.

**3.05 REINFORCEMENT AND ANCHORAGE**

A. Reinforcement Bars: Secure at locations indicated and to avoid displacement during grouting. Minimum spacing between bars or to masonry surfaces shall be one bar diameter.

B. Joint Reinforcement: Install horizontal joint reinforcement 16 inches on center.
   1. Place masonry joint reinforcing in first joint above bottom of wall.
   2. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
   3. Place continuous joint reinforcement in first and second joint below top of walls.
   4. Lap joint reinforcement ends minimum 6 inches.
   5. Provide prefabricated corner or tee sections at intersecting walls.

C. Anchors: Reinforce intersections between interior and exterior walls with rigid wall anchors 16 inches on center.

D. Reinforced Hollow Unit Masonry: Keep vertical cores to be grouted clear of mortar, including bed area of first course.

1. Grouted Cores: Construct masonry walls to provide continuous vertical cores with a clear area not less than 3"x4" and sufficient to provide a minimum 8" long solid section.

E. Concrete Block Lintels and Bond Beams
1. Provide reinforced concrete block lintels and bond beams as indicated on the Drawings or specified herein. Use reinforced concrete block lintels at all openings in concrete block walls, including openings for mechanical and electrical work not specifically indicated to have other types of lintels. Do not use concrete block bond beams with breakout webs as lintel beams at masonry wall openings.
2. Support and tie reinforcing in place with a minimum clearance of 3/4" between reinforcing and block shells. Build in anchors and other accessories.

**3.06 GROUTING**

A. Definitions
1. Grout Pour: The total height of masonry to be grouted prior to the construction of additional masonry. A grout pour consists of one or more grout lifts.
2. Grout Lift: An increment of grout height within a total grout pour. If a lift of grout is permitted to set prior to placing the subsequent lift, then the constructed grout height is the pour height.

B. Use either high-lift or low-lift grouting techniques, at Contractor's option, subject to other limitations of contract documents.

C. Consolidate grout by mechanical vibration.

D. Low-Lift Grouting:
1. Limit height of lifts to 12 inches.
2. Limit height of masonry to 16 inches above each pour.
3. Limit grout pours to maximum 5 feet.
4. Pour grout only after vertical reinforcing is in place; place horizontal reinforcing as grout is poured. Prevent displacement of bars as grout is poured.
5. Place grout for each pour continuously and consolidate immediately; do not interrupt pours for more than 1-1/2 hours.

E. High-Lift Grouting:
1. Verify that horizontal and vertical reinforcement is in proper position and adequately secured before beginning pours.
2. Clean out masonry cells and other cavities to be grouted by high pressure water spray or compressed air. Remove debris, allow to dry, and inspect before sealing cleanout openings.
3. Hollow Masonry: Limit lifts to maximum 5 feet and pours to maximum height of 12 feet.
4. Reconsolidate grout between lifts by mechanical vibration after initial water loss and settlement has occurred.
5. Place grout for spanning elements in single, continuous pour.

F. Concrete Block Lintels and Bond Beams: Fill block lintels and bond beams with grout and consolidate.
1. Fill lintels and bond beams more than one course high in a single continuous pour.

**3.07 COLD WEATHER CONSTRUCTION**

A. These procedures apply when the ambient temperature falls below 40° F, or the temperature of masonry units is below 40° F.

B. Construction

1. Minimum masonry unit temperature of 20° F when laid in the wall. Remove visible ice on masonry units before the unit is laid in the masonry.
2. Heat mortar sand or mixing water to produce mortar temperatures between 40° F and 120° F at the time of mixing. Maintain mortar above freezing until installed.
3. When ambient temperatures are between 25° F and 20° F, use heat sources on both sides of the masonry under construction and install windbreaks when wind velocity exceeds 15 mph.
4. When ambient temperatures are below 20° F, provide an enclosure for the masonry under construction and use heat sources to maintain temperatures above 32° F within the enclosure.

C. Protection
1. When mean daily temperatures are between 40° F and 32° F protect completed masonry from rain or snow by covering with a weather resistive membrane for 24 hours after construction.
2. When mean daily temperatures are between 32° F, and 25° F completely cover completed masonry with a weather resistive membrane for 24 hours after construction.
3. When mean daily temperatures are between 25° F and 20° F, completely cover completed masonry with insulating blankets or equal protection for 48 hours after construction. Protection time may be reduced to 24 hours for ungrouted masonry.
4. When mean daily temperatures are below 20° F, maintain masonry temperature above 32° F for 48 hours after construction by enclosure with supplementary heat, by electric heating blankets, by infrared heat lamps, or by other acceptable methods. Protection time may be reduced to 24 hours for ungrouted masonry.

**3.08 HOT WEATHER CONSTRUCTION**

A. Employ the requirements of this section when the ambient temperature exceeds 100°F or exceeds 90°F with a wind velocity greater than 8 mph.

B. Construction
1. Maintain the temperature of mortar and grout below 120°F.
2. Flush mixers, mortar transport containers and mortar boards with cool water before they come into contact with mortar ingredients or mortar.
3. Maintain mortar consistency by retempering with cool water.
4. Use mortar within 2 hours of initial mixing.

C. Protection: Fog spray newly constructed masonry until damp at least three times a day until the masonry is three days old.

**3.09 CONTROL AND EXPANSION JOINTS**

A. Provide control joints as indicated on drawings, but not to exceed 24 feet on center.

B. Do not continue horizontal joint reinforcement through control joints.

C. Top of wall bond beam reinforcement extends through control joints.

D. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

E. Keep expansion joint voids clear of mortar.

**3.10 BUILT-IN WORK**

A. As work progresses, install built-in anchor bolts and plates and other items to be built into the work and furnished under other sections.

B. Install built-in items plumb, level, and true to line.

C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.

D. Do not build into masonry construction organic materials that are subject to deterioration.

**3.11 TOLERANCES**

A. Erection tolerances for masonry work shall be as specified in ACI 530.1.

**3.12 CUTTING AND FITTING**

A. Cut and fit for chases. Coordinate with other sections of work to provide correct size, shape, and location.

B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

**3.13 FIELD QUALITY CONTROL**

A. Structural Testing and Special Inspection
   1. Structural Testing and Special Inspection shall be performed by qualified parties as specified herein, and in accordance with the provisions of Section 01 4533.
   2. For items indicated below to be performed on a periodic basis, provide inspections at least once per 500 square feet, and for 100% of all shear walls, masonry beams, and masonry columns.
   3. Personnel Qualifications
      a. Testing Technician: Technical I - NCMA Concrete Masonry Testing Technician (or equivalent), employed by a testing laboratory with C.C.R.L. certification at the National Bureau of Standards, under the direct supervision of a licensed civil/structural engineer. The licensed engineer shall review and approve all reports.
      b. Special Inspector - Structural I: ICC certified masonry inspector, or a graduate civil/structural engineer or other personnel acceptable to the Structural Engineer of Record (SER) with experience in the design of structural systems of this type. Inspections shall be performed under the direct supervision of a licensed structural engineer, as defined in Section 01 4533. The licensed engineer shall review and approve all inspection reports
   4. The Owner will provide the following tests:
      a. Concrete masonry unit compressive strength according to ASTM C140. One set of tests of each size block for the first 500 square feet installed and for each additional 5,000 square feet or portion thereof.
      b. Test mortar for consistency, water content, and compressive strength according to ASTM C780. Conduct one test for each 2,500 square feet of wall area. Qualifications: Technical I.
      c. Test and evaluate grout according to ASTM C 1019 procedures. Test with same frequency as specified for masonry units. Qualifications: Technical I
      d. Observe preparation of masonry wall prisms or selection of masonry units for strength tests and preparation of grout specimens and mortar specimens. Qualifications: Structural I.
      e. At the beginning of masonry construction, observe proportions of site-prepared mortar, construction of mortar joints, and location of reinforcement and connectors. Qualifications: Structural I.
      f. On a periodic basis, verify size and location of structural elements; type, size and location of anchors including anchors to structural members or other construction, grade, size, and type

of reinforcing; welding of reinforcing bars; and hot and cold weather protection. Qualifications: Structural I.

g. On a periodic basis prior to grouting, verify that grout space is clean, placement of reinforcing and connectors, proportions of site-prepared grout, and construction of mortar joints. Qualifications: Structural I.

h. On a periodic basis, observe grout placement to verify compliance with code and construction documents. Grouting of shear walls, columns, and beams deeper than 24" to be performed on a continuous basis. Qualifications: Structural I.

**3.14 MORTAR ACCEPTANCE CRITERIA**

A. Mortar aggregate ratio tests shall show component proportions within requirements of ASTM C270 where mortar mix proportions are determined by ASTM C270 proportion specification.

**3.15 CLEANING**

A. Remove excess mortar and mortar smears as work progresses.

B. At completion clean all exposed masonry surfaces. Remove all excess mortar, mortar stains, efflorescence, etc., to provide a uniform appearance. Materials and methods of cleaning shall be as recommended by masonry material manufacturer. Cut out and repoint defective joints. Protect other work to prevent staining and damage.

C. Clean soiled surfaces with cleaning solution.

D. Use non-metallic tools in cleaning operations.

**3.16 PROTECTION**

A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

B. Adequately brace all work to prevent damage of any kind. Mask, barricade or similarly protect work as required from damage during building operations. Protect installed material as necessary to prevent staining or damage from the elements.

C. Provide temporary bracing of masonry during erection. Do not remove bracing until building structure provides permanent bracing.

D. During erection, keep all walls dry by covering the top with a strong, waterproof membrane at each shutdown and the end of each day. Cover partially completed walls at all times when work is not in progress. Extend cover a minimum of 2 feet down both sides, and securely hold in place.

## END OF SECTION

# SECTION 06 1000 - ROUGH CARPENTRY

## PART 1 GENERAL

### 1.01 CONTRACT CONDITIONS

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

### 1.02 SECTION INCLUDES

A. Structural dimension lumber framing.

B. Non-structural dimension lumber framing.

C. Rough opening framing for doors, windows, and roof openings.

D. Sheathing.

E. Subflooring.

F. Preservative treated wood materials.

G. Miscellaneous framing and sheathing.

H. Concealed wood blocking, nailers, and supports.

### 1.03 RELATED REQUIREMENTS

A. Section 03 1510 - Post-Installed Anchors.

B. Section 03 3000 - Cast in Place Concrete: Setting anchors in concrete.

C. Section 06 1753 - Shop-Fabricated Wood Trusses.

D. Section 07 6200 - Sheet Metal Flashing and Trim: Sill flashings.

### 1.04 REFERENCE STANDARDS

A. ANSI/ASME Standard B18.2.1 - Square and Hex Bolts and Screws (Inch Series); 1981

B. ANSI/ASME Standard B18.6.1 - Wood Screws (Inch Series); 1981

C. APA - The Engineered Wood Association, (APA-PRL-501), Performance Standard for APA EWS Laminated Veneer Lumber; 2000.

D. ASTM A123-02 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2002

E. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.

F. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength; 2002

G. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.

H. ASTM F1667 - Standard Specification for Driven Fasteners: Nails, Spikes and Staples; 2003

I. AWPA U1 - Use Category System: User Specification for Treated Wood; 2012.

J. PS 2 - Performance Standard for Wood-Based Structural-Use Panels; 2010.

K. PS 20 - American Softwood Lumber Standard; 2010.

### 1.05 SUBMITTALS

A. See Division 1 for submittal procedures.

B. Product Data: Provide technical data on metal framing connectors, power-driven fasteners, laminated veneer lumber, paralell strand lumber, and lamnated strand lumber.

C. Panelized stud walls shop drawings: If panelized walls are used, submit layout drawings of panels in plan and elevation of each wall panel indicating all members and dimensions. Include size, species, and grade of each member. If sheathing is shop applied, indicate sheathing type, thickness, and fastening information.

### 1.06 DELIVERY, STORAGE, AND HANDLING

A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

## PART 2 PRODUCTS

### 2.01 GENERAL REQUIREMENTS

A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
   1. Species as indicated below for each use.
   2. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

B. Lumber fabricated from old growth timber is not permitted.

### 2.02 DIMENSION LUMBER

A. Sizes: Nominal sizes as indicated on drawings, S4S.

B. Moisture Content: S-dry or MC19.

C. Stud Framing (2x4 and 2x6) used in a vertical position in bearing walls:
   1. Species: Spruce-Pine-Fir.
   2. Grade: No. 2.

D. Joist and Rafter Framing (2x6 through 4x16 ):
   1. Species: Hem-Fir.
   2. Grade: No. 2.

E. Preservative Treated Subsill Plates:
   1. Species: Southern Pine.
   2. Grade: No. 2.

F. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
   1. Lumber: S4S, No. 2 or Standard Grade.
   2. Boards: Standard or No. 3.

**2.03 ENGINEERED WOOD PRODUCTS**

A. Laminated Veneer Lumber (LVL): APA PRL-501, Stress Class 1.9E-2600F. Parallel Strand Lumber (PSL) with matching or better properties may be substituted.
   1. Acceptable manufacturers include Weyerhauser, Boise Cascade, Louisiana-Pacific, Georgia-Pacific, Willamette Industries, and RedBuilt.
   2. Minimum design properties:
      a. Bending = 2,600 psi
      b. Horizontal shear perpendicular to glue line = 285 psi
      c. Compression parallel to grain = 2,510 psi
      d. Compression perpendicular to grain parallel to glue line = 750 psi
      e. Modulus of elasticity = 1,900,000 psi
      f. Tension parallel to grain = 1,555 psi

B. Laminated Strand Lumber (LSL):
   1. Acceptable manufacturers include: Trus Joist
   2. 1.3E Minimum design properties:
      a. Bending = 1,700 psi
      b. Horizontal shear (plates) = 150 psi
      c. Horizontal shear perpendicular to glue line (beams/columns) = 400 psi
      d. Compression parallel to grain = 1,400psi
      e. Compression perpendicular to grain (plates) = 435 psi
      f. Compression perpendicular to grain (beams/columns) = 680 psi
      g. Modulus of elasticity = 1,300,000 psi
   3. 1.55E Minimum design properties (beams):
      a. Bending = 2,325 psi
      b. Horizontal shear perpendicular to glue line = 310 psi
      c. Compression parallel to grain = 2,050psi
      d. Compression perpendicular to grain = 800 psi
      e. Modulus of elasticity = 1,550,000 psi
      f. Tension parallel to grain = 1,070 psi

C. Parallel Strand Lumber (PSL):
   1. Acceptable manufacturers include: Trus Joist
   2. 2.0E Minimum design properties (beams):
      a. Bending = 2,900 psi
      b. Horizontal shear perpendicular to glue line = 290 psi
      c. Compression parallel to grain = 2,900 psi
      d. Compression perpendicular to grain parallel to glue line = 750 psi
      e. Modulus of elasticity = 2,000,000 psi
      f. Tension parallel to grain = 2,025 psi
   3. 1.8E Minimum design properties (columns):
      a. Bending = 2,400 psi

b. Horizontal shear perpendicular to glue line = 190 psi
c. Compression parallel to grain = 2,500psi
d. Compression perpendicular to grain parallel to glue line = 425 psi
e. Modulus of elasticity = 1,800,000 psi
f. Tension parallel to grain = 1,755 psi

**2.04 CONSTRUCTION PANELS**

A. Subflooring <WD SHTG-1>: Any PS 2 type, rated Sheathing.
1. Bond Classification: Exposure 1.
2. Span Rating: 24.
3. Performance Category: 3/4 PERF CAT.
4. Edges: square or tongue and groove. Square edge may be used if underlayment is used.

B. Roof Sheathing <WD SHTG-10>: PS-2; APA Rated Sheathing.
1. Exposure Class: Exposure 1.
2. Span Rating: 48/24.
3. Thickness: 3/4 inch, nominal.
4. Edges: Square.

C. Wall Sheathing <WD SHTG-20>: PS-2; APA Rated Sheathing.
1. Exposure Class: Exposure 1.
2. Span Rating: 16/0 or wall-16oc.
3. Thickness: 1/2 inch, nominal.
4. Edges: Square.

**2.05 ACCESSORIES**

A. Fasteners and Anchors:
1. Metal and Finish: Hot-dipped galvanized steel per ASTM A 153/A 153M or stainless steel for high humidity and treated wood locations and to match finish on metal connectors, uncoated steel elsewhere.
2. Nails: ASTM F1667, common wire nails, unless otherwise specified.
3. Bolts: ASTM A307.
4. Lag Screws: ANSI/ASME Standard B18.2.1
5. Wood Screws: ANSI/ASME Standard B18.6.1.

B. Post-installed anchors and power driven fasteners: See Section 03 1510

C. Metal Framing Connectors: Includes hangers, post bases, post caps, tension ties, hold-downs, and framing angles. Hot dipped galvanized steel, sized to suit framing conditions.
1. Drawings show Simpson Strong-Tie products. Alternate products shall have equal or greater strength.
2. All products to have current ICC approval.
3. For contact with treated wood, provide minimum G185 galvanizing per ASTM A 653/A 653M, hot-dipped galvanizing per ASTM A123, or stainless steel, grade 316L.

D. Sill Gasket on Top of Foundation Wall: 1/4 inch thick, plate width, closed cell plastic foam from continuous rolls.

E. Sill Flashing: As specified in Division 07.

F. Building Paper: Water resistant Kraft paper.

### 2.06 FACTORY WOOD TREATMENT

A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
   1. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

B. Preservative Pressure Treatment of Lumber Above Grade: 1, Use Category UC3B, Commodity Specification A using waterborne preservative to 0.25 lb/cu ft retention.
   1. Treat lumber exposed to weather.
   2. Treat lumber in contact with roofing, flashing, or waterproofing.
   3. Treat lumber in contact with masonry or concrete.
   4. Treat lumber less than 18 inches above grade.
   5. Treat lumber in other locations as indicated.

C. Preservative Pressure Treatment of Plywood Above Grade: 1, Use Category UC2 and UC3B, Commodity Specification F using waterborne preservative to 0.25 lb/cu ft retention.
   1. Treat plywood in contact with roofing, flashing, or waterproofing.
   2. Treat plywood in contact with masonry or concrete.
   3. Treat plywood less than 18 inches above grade.
   4. Treat plywood in other locations as indicated.

D. Preservative Pressure Treatment of Lumber in Contact with Soil: 1, Use Category UC4A, Commodity Specification A using waterborne preservative to 0.4 lb/cu ft retention.

### 2.07 SOURCE QUALITY CONTROL

A. Provide dimension lumber with each piece factory marked with grade stamp of an accredited grading agency identifying grade, species, and moisture content at time of surfacing.

B. Provide APA-rated panels with each piece factory marked with grade stamp of APA identifying type, exposure durability classification, span rating, and thickness.

C. Provide APA-rated rim boards and LVL with APA EWS trademark.

## PART 3 EXECUTION

### 3.01 PREPARATION

A. Where wood framing bears on cementitious foundations, install full width sill flashing continuous over top of foundation, lap ends of flashing minimum of 4 inches and seal.

B. Install sill gasket under sill plate of framed walls bearing on foundations; puncture gasket cleanly to fit tightly around protruding anchor bolts.

C. Coordinate installation of rough carpentry members specified in other sections.

### 3.02 INSTALLATION - GENERAL

A. Select material sizes to minimize waste.

B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

**3.03 FRAMING INSTALLATION**

A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.

B. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.

C. Install structural members full length without splices unless otherwise specifically detailed.

D. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by AFPA Wood Frame Construction Manual and [IBC Table 2304.9.1].

E. Strictly comply with manufacturer's installation instructions for product installation. Install all bolts and nails in metal framing connectors.

F. Install horizontal spanning members with crown edge up and not less than 1-1/2 inches of bearing at each end.

G. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed.

H. Provide bridging at joists in excess of 8 feet span at mid-span. Fit solid blocking at ends of members.

I. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.

**3.04 BLOCKING, NAILERS, AND SUPPORTS**

A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.

B. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.

C. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.

D. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

**3.05 INSTALLATION OF CONSTRUCTION PANELS**

A. General

1. Install sheathing with panel continuous over two or more spans.
2. Provide 1/8" space at ends and edges of panels unless otherwise indicated by the panel supplier.
3. Apply adhesives in strict accordance with manufacturer's instructions. Apply continuous glue line on joists and a spaced glue line in groove of tongue and groove panels.

B. Underlayment: Secure to subflooring with nails and glue.
1. At locations where resilient flooring will be installed, fill and sand splits, gaps, and rough areas.
2. Place building paper between floor underlayment and subflooring.

C. Roof Sheathing: Secure panels with long dimension perpendicular to framing members, with ends staggered and over firm bearing.
1. At long edges provide solid edge blocking where joints occur between roof framing members.
2. Nail panels to framing; staples are not permitted.

D. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails or screws.

**3.06 TOLERANCES**

A. Framing Members: 1/4 inch from true position, maximum.

B. Surface Flatness of Floor: 1/4 inch in 10 feet maximum, and 1/2 inch in 30 feet maximum.

C. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

**3.07 CLEANING**

A. After erection and attachment of lumber, remove clay, mud, or other foreign materials from all members.

B. Waste Disposal: Comply with the requirements of Section 01 7419.
1. Comply with applicable regulations.
2. Do not burn scrap on project site.
3. Do not burn scraps that have been pressure treated.
4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or “waste-to-energy” facilities.

C. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.

D. Prevent sawdust and wood shavings from entering the storm drainage system.

## END OF SECTION

# SECTION 06 1753 - SHOP-FABRICATED WOOD TRUSSES

## PART 1 GENERAL

### 1.01 CONTRACT CONDITIONS

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

### 1.02 SECTION INCLUDES

A. Shop fabricated wood trusses for roof and floor framing.

B. Bridging, bracing, and anchorage.

### 1.03 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Installation requirements for miscellaneous framing.

### 1.04 REFERENCE STANDARDS

A. AFPA - National Design Specification (NDS) for Wood Construction with 2012 Supplement; 2012 Edition.

B. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.

C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.

D. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.

E. IBC - International Building Code; International Code Council; 2012.

F. MSBC - Minnesota State Building Code; 2015

G. TPI 1 - National Design Standard for Metal-Plate-Connected Wood Truss Construction; 2007 and errata.

H. TPI BCSI 1 - Building Component Safety Information Booklet: The Guide to Good Practice for Handling, Installing & Bracing of Metal Plate Connected Wood Trusses; 2011.

I. TPI DSB-89 - Recommended Design Specification for Temporary Bracing of Metal Plate Connected Wood Trusses; 1989.

### 1.05 DESIGN REQUIREMENTS

A. Comply with applicable code for structural loading criteria None - N/A.

B. Design for superimposed dead, live/snow, and wind loads shown on drawings .

C. Deflection Limitations
   1. Roof total load deflection limited to 1/240 of span.
   2. Roof live load deflection limited to 1/360 of span.

**1.06 SUBMITTALS**

A. See Division 1 for submittal procedures.

B. Certification: Provide certification that truss fabricator meets quality assurance requirements of this section.

C. Product Data: Manufacturer's data sheets on plate connectors, manufactured bracing components, truss hangers, and manufactured anchorage connectors.

D. Shop Drawings: Include individual truss design drawings for each truss, truss index/cover sheet, if used, the project truss placement diagram, and truss member permanent bracing specification.
   1. Truss Design Drawings: Certified. Include the following information:
      a. Truss slope or depth, span, and spacing; location of joints; required bearing widths.
      b. Design loads including: Top chord live load (including any snow load), top chord dead load, bottom chord live load, bottom chord dead load, concentrated loads and their point of application, and controlling wind and earthquake loads.
      c. Maximum axial tension and compression forces in each member.
      d. Maximum horizontal and vertical reactions for live and dead load and corresponding deflection ratio.
      e. Each reaction force and direction.
      f. Lumber size, species, and grade for each member including any adjustments to design values for conditions of use.
      g. Metal connector plate type, size, thickness, and dimensioned location except those plates placed symmetrically on joint face. Include any adjustments to design values for conditions of use.
      h. Connection requirements for: truss hangers on supporting beams, truss to truss, truss ply to truss ply, and field splices.
      i. Permanent individual truss member bracing requirements and method of bracing as outlined in the truss member permanent bracing specification.
   2. Truss Index/Cover Sheet: Certified. May be used in lieu of certifying each individual truss design drawing.
   3. Project Truss Placement Diagram: Include proposed, dimensioned location of each individually designated truss and reference to the corresponding truss design drawing.
   4. Truss Member Permanent Bracing Specification: Include individual truss member buckling reinforcement or permanent bracing details to transmit individual truss member buckling loads to the floor/roof diaphragm. Individual truss member buckling reinforcement can be shown on the truss design drawings or on supplemental truss member buckling reinforcement diagrams.
      a. In lieu of the above, provide a certified specific truss member permanent bracing plan and associated details for each floor/roof system.

**1.07 QUALITY ASSURANCE**

A. Truss Design, Fabrication, and Installation: In accordance with TPI 1, TPI DSB-89, AFPA NDS, MSBC, and IBC.

B. Designer Qualifications: Perform design by or under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State in which the Project is located. Where submittals are required to be certified, this engineer shall sign and seal submittal.

C. Fabricator Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience. Licensee of the Truss Plate Institute Quality Assurance Program, or an ICC-approved fabricator.

### 1.08 DELIVERY, STORAGE, AND HANDLING

A. Handle and store prefabricated wood members in accordance with manufacturer's instructions. Avoid loads due to bending, overturning, or other cause for which member is not designed to resist or endure.

B. Handle and erect trusses in accordance with TPI BCSI 1.

C. Store trusses in vertical position resting on bearing ends. Do not lay trusses flat.

D. Store materials in dry, well-ventilated areas free of extremely high or low temperatures and humidities, and extreme variations in temperature and humidity.

E. Protect all material from damage due to moisture, weather, and construction work.

### 1.09 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

A. Truss Plate Connectors:
   1. Alpine Engineered Products, Inc: www.alpeng.com.
   2. MiTek Industries, Inc: www.mii.com.
   3. Truswal Systems: www.truswal.com.

### 2.02 MATERIALS

A. Lumber:
   1. Species: Douglas Fir-Larch, Hem-Fir, Spruce-Pine-Fir, Southern Pine, or other species, at fabricator's discretion, as needed for specified loadings. Grade as required for specified loadings.
   2. Moisture Content: Between 7 and 19 percent.
   3. Lumber fabricated from old growth timber is not permitted.

B. Steel Connectors: Hot-dipped galvanized steel sheet, ASTM A653/A653M Structural Steel (SS) Grade 33/230, with G60/Z180 coating; die stamped with integral teeth; thickness as indicated.

C. Truss Bridging: Type, size and spacing recommended by truss manufacturer.

### 2.03 ACCESSORIES

A. Wood Blocking, Bridging, Plates, and Miscellaneous Framing: As specified in Section 06 1000.

B. Fasteners: Electrogalvanized steel, type to suit application.

C. Metal Framing Connectors
   1. Truss hangers, tension ties, and hold-downs to support the service loads specified and developed by truss designer.

2. Acceptable manufacturers: Simpson Strong-Tie, USP Lumber Connectors, or approved equal.
3. Galvanize metal framing connectors exposed to moisture in accordance with ASTM A153.
4. Provide fasteners needed per manufacturer's recommendations for complete installation of all connectors.

### 2.04 FABRICATION

A. Fabricate trusses to achieve structural requirements specified.

B. Fabricate metal plate connected wood trusses as required by the TPI Quality Assurance Plan.
1. Cut members accurately to provide close fitting joints with proper wood-to-wood bearing in assembled unit.
2. Fabricate and locate metal connector plates to meet requirements of truss design.
3. Fasten connector plates to both sides of wood members according to industry standard practice.
4. Indicate required location of bridging or secondary bracing with a tag. Show requirements on tag.

C. Brace wood trusses in accordance with TPI DSB-89 and BCSI 1.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify that supports and openings are ready to receive trusses and do not have defects that will affect erection or quality of workmanship. Do not erect members until unsatisfactory conditions have been corrected.

### 3.02 ERECTION

A. Install trusses in accordance with manufacturer's instructions and TPI DSB-89 and TPI BCSI 1; maintain a copy of each TPI document on site until installation is complete.

B. Hoist units at lift points recommended by the fabricator exercising care not to damage truss members or joints by out-of-plane bending or other causes.

C. Set members level and plumb, in correct position.

D. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure plumb, and in true alignment until completion of erection and installation of permanent bracing.

E. Do not field cut or alter structural members without approval of Architect.

F. Install permanent bridging and bracing to withstand dead, live, and lateral loads and to comply with design and manufacturer's requirements.

G. Install headers and supports to frame openings required.

H. Frame openings between trusses with lumber in accordance with Section 06 1000.

I. Provide special framing as shown on drawings or shop drawings for eaves, overhangs, dormers, and similar conditions, if any

J. Coordinate placement of decking with work of this section.

**3.03 TOLERANCES**

A. Framing Members: 1/2 inch maximum, from true position.

**3.04 CLEANING**

A. After erection and attachment of prefabricated structural wood, remove clay, mud, or other foreign materials from all members.

## END OF SECTION

# SECTION 06 2000 - FINISH CARPENTRY

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Finish carpentry items.

### 1.02 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Support framing, grounds, and concealed blocking.

B. Section 06 4100 - Architectural Wood Casework: Shop fabricated custom cabinet work.

C. Section 09 9123 - Interior Painting: Painting and finishing of finish carpentry items.

### 1.03 REFERENCE STANDARDS

A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014.

B. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.0; 2016.

C. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood; 2009.

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Samples: Submit two samples of wood trim 6 inch (152 mm) long.

### 1.05 QUALITY ASSURANCE

A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.

### 1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect work from moisture damage.

## PART 2 PRODUCTS

### 2.01 FINISH CARPENTRY ITEMS

A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

### 2.02 WOOD-BASED COMPONENTS

A. Wood fabricated from old growth timber is not permitted.

### 2.03 LUMBER MATERIALS

A. Hardwood Lumber <WD TRIM-1>: Maple species, plain sawn, maximum moisture content of 6 percent; with vertical grain, of quality suitable for transparent finish.

### 2.04 SHEET MATERIALS

A. Hardwood Plywood: Face species maple, plain sawn, book matched, medium density fiberboard core; HPVA HP-1, Front Face Grade AA, Back Face Grade 1, glue type as recommended for application.
   1. <WD SHTG-36>: Non perforated.
   2. <WD SHTG-37>: 3/8 inch perforations 2 inches on center, staggered.
   3. Basis of Design: Selex wood boards.

### 2.05 ACCESSORIES

A. Primer: Alkyd primer sealer.

B. Wood Filler: Solvent base, tinted to match surface finish color.

### 2.06 FABRICATION

A. Shop assemble work for delivery to site, permitting passage through building openings.

B. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify adequacy of backing and support framing.

### 3.02 INSTALLATION

A. Set and secure materials and components in place, plumb and level.

B. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch (0.79 mm). Do not use additional overlay trim to conceal larger gaps.

C. Install components with finish nails.

### 3.03 PREPARATION FOR SITE FINISHING

A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.

B. Site Finishing: See Section 09 9123.

C. Before installation, prime paint surfaces of items or assemblies to be in contact with cementitious materials.

### 3.04 TOLERANCES

A. Maximum Variation from True Position: 1/16 inch (1.6 mm).

B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch (0.79 mm).

# END OF SECTION

# SECTION 06 4100 - ARCHITECTURAL WOOD CASEWORK

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Specially fabricated cabinet units.

B. Cabinet hardware.

### 1.02 RELATED REQUIREMENTS

A. Section 12 3600 - Countertops.

### 1.03 REFERENCE STANDARDS

A. BHMA A156.9 - American National Standard for Cabinet Hardware; 2010.

B. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
   1. Scale of Drawings: 1-1/2 inch to 1 foot (125 mm to 1 m), minimum.

C. Product Data: Provide data for hardware accessories.

D. Samples: Submit actual samples of architectural cabinet construction, minimum 12 inches (300 mm) square, illustrating proposed cabinet substrate and finish.

### 1.05 QUALITY ASSURANCE

A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.

### 1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect units from moisture damage.

### 1.07 FIELD CONDITIONS

A. During and after installation of custom cabinets, maintain temperature and humidity conditions in building spaces at same levels planned for occupancy.

## PART 2 PRODUCTS

### 2.01 CABINETS

A. Cabinets <PLAM CASE-1>:
   1. Finish - Exposed Exterior Surfaces: Decorative laminate.
   2. Finish - Exposed Interior Surfaces: Decorative laminate.

3. Finish - Concealed Surfaces: Manufacturer's option.
4. Door and Drawer Front Edge Profiles: Square edge with thick applied band.
5. Casework Construction Type: Type A - Frameless.
6. Interface Style for Cabinet and Door: Style 1 - Overlay; flush overlay.
7. Layout for Cabinet and Door Fronts: Flush panel.
8. Adjustable Shelf Loading: 50 lbs. per sq. ft.
    a. Deflection: L/144.

**2.02 WOOD-BASED COMPONENTS**

A. Wood fabricated from old growth timber is not permitted.

**2.03 LAMINATE MATERIALS**

A. Manufacturers:
1. Formica Corporation: www.formica.com.
2. Panolam Industries International, Inc\Nevamar: www.nevamar.com.
3. Wilsonart: www.wilsonart.com.
4. Substitutions: See Section 01 6000 - Product Requirements.

B. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications.

C. Provide specific types as scheduled.
1. Horizontal Surfaces: HGS, 0.048 inch (1.22 mm) nominal thickness, colors as scheduled, finish as scheduled.
2. Vertical Surfaces: VGS, 0.028 inch (0.71 mm) nominal thickness, colors as scheduled, finish as scheduled.
3. Cabinet Liner: CLS, 0.020 inch (0.51 mm) nominal thickness, colors as scheduled, finish as scheduled.

**2.04 ACCESSORIES**

A. Adhesive: Type recommended by fabricator to suit application.

B. Plastic Edge Banding: Extruded 3 mm PVC, convex shaped; smooth finish; of width to match component thickness.
1. Color: As selected by Architect from manufacturer's standard range.

C. Fasteners: Size and type to suit application.

D. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; galvanized or chrome-plated finish in concealed locations and stainless steel or chrome-plated finish in exposed locations.

E. Grommets: Standard plastic grommets for cut-outs, in color to match adjacent surface. Provide one grommet for every 5 linear feet of countertop (excluding toilet rooms). Coordinate locations with Owner.

**2.05 HARDWARE**

A. Hardware: BHMA A156.9, types as recommended by fabricator for quality grade specified.

B. Adjustable Shelf Supports: Standard side-mounted system using recessed metal shelf standards or multiple holes for pin supports and coordinated self rests, polished chrome finish, for nominal 1 inch (25 mm) spacing adjustments.

C. Drawer and Door Pulls: "U" shaped wire pull, steel with chrome finish, 4 inch centers ("U" shaped wire pull, steel with chrome finish, 100 mm centers).

D. Drawer Slides:
   1. Type: Full extension with overtravel.
   2. Static Load Capacity: Heavy Duty grade.
   3. Mounting: Side mounted.
   4. Stops: Integral type.
   5. Features: Provide self closing/stay closed type.
   6. Manufacturers:
      a. Accuride International, Inc: www.accuride.com.
      b. Grass America Inc: www.grassusa.com.
      c. Knape & Vogt Manufacturing Company: www.knapeandvogt.com.
      d. Substitutions: See Section 01 6000 - Product Requirements.

E. Hinges: European style concealed self-closing type, steel with polished finish.
   1. Manufacturers:
      a. Grass America Inc: www.grassusa.com.
      b. Hardware Resources: www.hardwareresources.com.
      c. Julius Blum, Inc: www.blum.com.
      d. Substitutions: See Section 01 6000 - Product Requirements.

### 2.06 FABRICATION

A. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.

B. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.

C. Matching Wood Grain: Comply with requirements of quality standard for specified Grade exclusively.

D. Provide cutouts for plumbing fixtures. Verify locations of cutouts from on-site dimensions. Prime paint cut edges.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify adequacy of backing and support framing.

B. Verify location and sizes of utility rough-in associated with work of this section.

### 3.02 INSTALLATION

A. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.

B. Use fixture attachments in concealed locations for wall mounted components.

C. Use concealed joint fasteners to align and secure adjoining cabinet units.

D. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch (0.79 mm). Do not use additional overlay trim for this purpose.

E. Secure cabinets to floor using appropriate angles and anchorages.

F. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

**3.03 ADJUSTING**

A. Adjust installed work.

B. Adjust moving or operating parts to function smoothly and correctly.

**3.04 CLEANING**

A. Clean casework, counters, shelves, hardware, fittings, and fixtures.

## END OF SECTION

# SECTION 07 1300 - SHEET WATERPROOFING

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Sheet membrane waterproofing.

### 1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete: Concrete substrate.

B. Section 07 2100 - Thermal Insulation: Insulation used for protective cover.

### 1.03 ABBREVIATIONS

### 1.04 REFERENCE STANDARDS

A. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2006a (Reapproved 2013).

B. ASTM D570 - Standard Test Method for Water Absorption of Plastics; 1998 (Reapproved 2010).

C. ASTM D882 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting; 2012.

D. ASTM D903 - Standard Test Method for Peel or Stripping Strength of Adhesive Bonds; 1998 (Reapproved 2010).

E. ASTM D1876 - Standard Test Method for Peel Resistance of Adhesives (T-Peel Test); 2008 (Reapproved 2015).

F. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2013.

G. ASTM D5295/D5295M - Standard Guide for Preparation of Concrete Surfaces for Adhered (Bonded) Membrane Waterproofing Systems; 2014.

H. ASTM D5385/D5385M - Standard Test Method for Hydrostatic Pressure Resistance of Waterproofing Membranes; 1993 (Reapproved 2014).

I. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.

J. ASTM E154/E154M - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover; 2008a (Reapproved 2013).

### 1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data for membrane.

C. Shop Drawings: Indicate special joint or termination conditions and conditions of interface with other materials.

D. Manufacturer's Installation Instructions: Indicate special procedures.

### 1.06 QUALITY ASSURANCE

A. Membrane Manufacturer Qualifications: Company specializing in waterproofing sheet membranes with three years experience.

## PART 2 PRODUCTS

### 2.01 MEMBRANE MATERIALS

A. Self-Adhered Modified Bituminous Membrane <WTR PRF-2>: Self-adhesive, cold-applied composite sheet consisting of rubberized asphalt and cross-laminated, high density polyethylene film.
   1. Thickness: 60 mil (0.060 inch) (1.5 mm).
   2. Tensile Strength:
      a. Film: 5000 pounds per square inch (34.57 MPa), minimum, measured according to ASTM D882 and at grip-separation rate of 2 inches (50 mm) per minute.
      b. Membrane: 325 pounds per square inch (2.24 MPa), minimum, measured according to ASTM D412 Method A, using die C and at spindle-separation rate of 2 inches (50 mm) per minute.
   3. Elongation at Break: 300 percent, minimum, measured according to ASTM D412.
   4. Water Vapor Permeance: 0.05 perm (2.9 ng/(Pa s sq m)), maximum, measured in accordance with ASTM E96/E96M.
   5. Low Temperature Flexibility: Unaffected when tested according to ASTM D1970/D1970M at minus 20 degrees F (minus 11 C), 180 degree bend on 1 inch (25 mm) mandrel.
   6. Low Temperature Installation: Installation air and surface temperature between 25 and 60 degrees F or lower.
   7. Peel Strength: 9 pounds per inch (1576 N/m), minimum, when tested according to ASTM D903.
   8. Lap Adhesion Strength: 5 pounds per inch (875.6 N/m), minimum, when tested according to ASTM D1876.
   9. Puncture Resistance: 50 pounds (22.67 kg), minimum, measured in accordance with ASTM E154/E154M.
   10. Water Absorption: 0.1 percent increase in weight, maximum, measured in accordance with ASTM D570, 24 hour immersion.
   11. Hydrostatic Resistance: Resists the weight of 200 feet (61 m) when tested according to ASTM D5385/D5385M.
   12. Adhesives, Sealants, Tapes, and Accessories: As recommended by membrane manufacturer.
   13. Basis of Design Products:
      a. Carlisle Coatings & Waterproofing Incorporated; MiraDRI 860/861: www.carlisleccw.com/sle.
      b. GCP Applied Technologies; Bituthene 3000/Low Temperature Membrane: www.gcpat.com/sle.
      c. W.R. Meadows, Inc; MEL-ROL Low Temp: www.wrmeadows.com/sle.
      d. Substitutions: See Section 01 6000 - Product Requirements.

### 2.02 ACCESSORIES

A. Sealant for Cracks and Joints In Substrates: Resilient elastomeric joint sealant compatible with substrates and waterproofing materials.

B. Protection Board: Rigid insulation specified in Section 07 2100.

C. Drainage Panel <DRAIN BRD-1>: Drainage layer with geotextile filter fabric on earth side.
   1. Also provide at locations where <INSUL-1> is not installed over <WTR PRF-2>.
   2. Composition: Dimpled polystyrene core; polypropylene filter fabric.
      a. Products:
         1) Grace Construction Products; Hydroduct 200: www.na.graceconstruction.com.
         2) Carlisle Coatings & Waterproofing Incorporated; MiraDRAIN 2000: www.carlisle-ccw.com.
         3) W.R. Meadows, Inc; Mel-Drain: www.wrmeadows.com.
         4) Substitutions: See Section 01 6000 - Product Requirements.

D. Flexible Flashings: Type recommended by membrane manufacturer.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify substrate surfaces are durable; free of matter detrimental to adhesion or application of waterproofing system.

C. Verify that items that penetrate surfaces to receive waterproofing are securely installed.

### 3.02 PREPARATION

A. Protect adjacent surfaces not designated to receive waterproofing.

B. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions. Vacuum substrate clean.

C. Do not apply waterproofing to surfaces unacceptable to membrane manufacturer.

D. Fill non-moving joints and cracks with a filler compatible with waterproofing materials.

E. Seal moving cracks with sealant, not rigid filler, using procedures recommended by sealant and waterproofing manufacturers.

F. Surfaces for Adhesive Bonding: Apply surface conditioner at a rate recommended by manufacturer. Protect conditioner from rain or frost until dry.

G. Concrete Surfaces for Adhesive Bonding: Prepare concrete substrate according to ASTM D5295/D5295M.
   1. Remove substances that inhibit adhesion including form release agents, curing compounds admixtures, laitance, moisture, dust, dirt, grease and oil.
   2. Repair surface defects including honeycombs, fins, tie holes, bug holes, sharp offsets, rutted cracks, ragged corners, deviations in surface plane, spalling and delaminations, as described in the reference standard.
   3. Remove and replace areas of defective concrete as specified in Section 03 3000.
   4. Prepare concrete for adhesive bonded waterproofing using mechanical or chemical methods described in the referenced standard.
   5. Test concrete surfaces as described in the referenced standards. Verify surfaces are ready to receive adhesive bonded waterproofing membrane system.

### 3.03 INSTALLATION - MEMBRANE

A. Install membrane waterproofing in accordance with manufacturer's instructions.

B. Roll out membrane. Minimize wrinkles and bubbles.

C. Self-Adhering Membrane: Remove release paper layer. Roll out on substrate with a mechanical roller to encourage full contact bond.

D. Overlap edges and ends and seal by method recommended by manufacturer, minimum 3 inches (75 mm). Seal permanently waterproof.

E. Reinforce membrane with multiple thickness of membrane material over joints, whether joints are static or dynamic.

F. Weather lap joints on sloped substrate in direction of drainage. Seal joints and seams.

G. Install flexible flashings. Seal items penetrating through membrane with flexible flashings. Seal watertight to membrane.

H. Seal membrane and flashings to adjoining surfaces. Install termination bar at all edges. Install counterflashing over all exposed edges.

### 3.04 INSTALLATION - DRAINAGE PANEL

A. Place drainage panel directly against membrane, butt joints, place to encourage drainage downward. Scribe and cut boards around projections, penetrations, and interruptions.

B. Adhere drainage panel to substrate with compatible adhesive.

### 3.05 PROTECTION

A. Do not permit traffic over unprotected or uncovered membrane.

## END OF SECTION

# SECTION 07 2100 - THERMAL INSULATION

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Board insulation at perimeter foundation wall and exterior wall behind exterior wall finish.

B. Batt insulation in exterior wall construction.

C. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.

### 1.02 RELATED REQUIREMENTS

A. Section 07 2500 - Weather Barriers: Separate air barrier and vapor retarder materials.

B. Section 07 8400 - Firestopping: Insulation as part of fire-rated through-penetration assemblies.

### 1.03 REFERENCE STANDARDS

A. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2015b.

B. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2012.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

D. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace At 750 Degrees C; 2012.

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.

C. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.

### 1.05 FIELD CONDITIONS

A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

## PART 2 PRODUCTS

### 2.01 FOAM BOARD INSULATION MATERIALS

A. Extruded Polystyrene Board Insulation <INSUL-1, 2>: Extruded polystyrene board; ASTM C578; with either natural skin or cut cell surfaces, and the following characteristics:
   1. Type: ASTM C578, Type IV.
   2. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
   3. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
   4. R-value (RSI-value); 1 inch (25 mm) of material at 72 degrees F (22 C): 5 (0.88), minimum.

5. Drainage Channels: Provide for <INSUL-1> locations.
6. Board Edges: Square.
7. Manufacturers:
    a. Dow Chemical Company: www.dow.com.
    b. Owens Corning Corporation; FOAMULAR Extruded Polystyrene (XPS) Insulation: www.ocbuildingspec.com/sle.
    c. Kingspan Insulation LLC; GreenGuard XPS TYPE IV 25 PSI: www.trustgreenguard.com.
    d. Diversifoam Products: www.diversifoam.com.
8. Substitutions: See Section 01 6000 - Product Requirements.

**2.02 BATT INSULATION MATERIALS**

A. Where batt insulation is indicated, either glass fiber or mineral fiber batt insulation may be used, at Contractor's option.

B. Glass Fiber Batt Insulation <INSUL-20>: Flexible preformed batt or blanket, complying with ASTM C665; friction fit.
1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
3. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
4. Formaldehyde Content: Zero.
5. Facing: Unfaced.
6. Manufacturers:
    a. CertainTeed Corporation: www.certainteed.com.
    b. Johns Manville: www.jm.com.
    c. Owens Corning Corporation; EcoTouch PINK FIBERGLAS Insulation: www.ocbuildingspec.com/sle.
    d. Knauf Insulation: www.knaufinsulation.us.
7. Substitutions: See Section 01 6000 - Product Requirements.

C. Mineral Fiber Batt Insulation <INSUL-20>: Flexible or semi-rigid preformed batt or blanket, complying with ASTM C665; friction fit; unfaced flame spread index of 0 (zero) when tested in accordance with ASTM E84.
1. Where indicated, provide foil facing on one side; with flame spread index of 25 or less, when tested in accordance with ASTM E84.
2. Smoke Developed Index: 0 (zero), when tested in accordance with ASTM E84.
3. Manufacturers:
    a. Johns Manville; MinWool Sound Attenuation Fire Batts: www.jm.com/sle.
    b. Thermafiber, Inc; SAFB: www.thermafiber.com.
    c. ROXUL, Inc; ComfortBatt: www.roxul.com/sle.
    d. Substitutions: See Section 01 6000 - Product Requirements.

**2.03 ACCESSORIES**

A. Sheet Vapor Retarder: Specified in Section 07 2500.

B. Tape: Bright aluminum self-adhering type, mesh reinforced, 2 inch (50 mm) wide.

C. Insulation Fasteners: Impaling clip of unfinished steel with washer retainer and clips, to be adhered to surface to receive insulation, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place.

D. Adhesive: Type recommended by insulation manufacturer for application.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation and adhesive.

B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

### 3.02 BOARD INSTALLATION AT FOUNDATION PERIMETER

A. Apply adhesive to back of boards in accordance with manufacturer's written instructions.

B. Install boards horizontally on foundation perimeter.
   1. Place boards to maximize adhesive contact.
   2. Install in running bond pattern.
   3. Butt edges and ends tightly to adjacent boards and to protrusions.

C. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

### 3.03 BOARD INSTALLATION AT EXTERIOR WALLS

A. Install boards horizontally on walls.
   1. Place boards to maximize adhesive contact.
   2. Install in running bond pattern.
   3. Butt edges and ends tightly to adjacent boards and to protrusions.

B. Extend boards over expansion joints, unbonded to wall on one side of joint.

C. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

D. Tape insulation board joints.

### 3.04 BATT INSTALLATION

A. Install insulation and vapor retarder in accordance with manufacturer's instructions.

B. Install in exterior wall spaces without gaps or voids. Do not compress insulation.

C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.

E. Coordinate work of this section with requirements for vapor retarder specified in Section 07 2500.

F. Coordinate work of this section with construction of air barrier seal specified in Section 07 2500.

**3.05 PROTECTION**

A. Do not permit installed insulation to be damaged prior to its concealment.

## END OF SECTION

# SECTION 07 2126 - BLOWN INSULATION

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Ceiling: Loose insulation pneumatically placed .

### 1.02 RELATED REQUIREMENTS

A. Section 07 2100 - Thermal Insulation.

### 1.03 REFERENCE STANDARDS

A. ASTM C739 - Standard Specification for Cellulosic Fiber Loose-Fill Thermal Insulation; 2011.

B. ASTM C1015 - Standard Practice for Installation of Cellulosic and Mineral Fiber Loose-Fill Thermal Insulation; 2006 (Reapproved 2011).

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on product characteristics, performance criteria, limitations .

C. Manufacturer's Installation Instructions: Indicate procedure for preparation and installation.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

A. Blown Insulation:
   1. CertainTeed Corporation: www.certainteed.com.
   2. GreenFiber: www.greenfiber.com.
   3. Johns Manville: www.jm.com.
   4. Substitutions: See Section 01 6000 - Product Requirements.

### 2.02 MATERIALS

A. Loose Fill Insulation <INSUL-34>: ASTM C739, cellulose fiber type, bulk for pneumatic placement.
   1. Installed Thickness: As indicated on drawings.

B. Ventilation Baffles: Formed plastic or cardboard.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify that substrate, adjacent materials, and insulation are dry and ready to receive insulation.

B. Verify that light fixtures have thermal cut-out device to restrict over-heating in soffit or ceiling spaces.

C. Verify spaces are unobstructed to allow placement of insulation.

**3.02 INSTALLATION**

A. Install insulation and ventilation baffle in accordance with ASTM C1015 and manufacturer's instructions.

B. Place insulation pneumatically to completely fill joist and rafter spaces.

C. Place insulation against baffles. Do not impede natural attic ventilation to soffit.

D. Completely fill intended spaces. Leave no gaps or voids.

**3.03 CLEANING**

A. Remove loose insulation residue.

## END OF SECTION

# SECTION 07 2500 - WEATHER BARRIERS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Vapor Retarders: Materials to make exterior walls, joints between exterior walls and roof, and joints around frames of openings in exterior walls water vapor resistant and air tight.

B. Air Barriers: Materials that form a system to stop passage of air through exterior walls, joints between exterior walls and roof, and joints around frames of openings in exterior walls.

### 1.02 RELATED REQUIREMENTS

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

B. Section 07 5300 - Elastomeric Membrane Roofing: Vapor retarder installed as part of roofing system.

C. Section 07 6200 - Sheet Metal Flashing and Trim: Metal flashings installed in conjunction with weather barriers.

D. Section 07 9200 - Joint Sealants: Sealing building expansion joints.

### 1.03 DEFINITIONS

A. Weather Barrier: Assemblies that form either water-resistive barriers, air barriers, or vapor retarders.

B. Air Barrier: Air tight barrier made of material that is relatively air impermeable but water vapor permeable, both to the degree specified, with sealed seams and with sealed joints to adjacent surfaces. Note: For the purposes of this specification, vapor impermeable air barriers are classified as vapor retarders.

C. Vapor Retarder: Air tight barrier made of material that is relatively water vapor impermeable, to the degree specified, with sealed seams and with sealed joints to adjacent surfaces.
   1. Water Vapor Permeance: For purposes of conversion, 57.2 ng/(Pa s sq m) = 1 perm.

### 1.04 REFERENCE STANDARDS

A. AATCC Test Method 127 - Water Resistance: Hydrostatic Pressure Test; 2014.

B. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2013.

C. ASTM D4397 - Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications; 2010.

D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

E. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.

F. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials; 2013.

### 1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on material characteristics, performance criteria, and limitations.

C. Shop Drawings: Provide drawings of special joint conditions.

D. Manufacturer's Installation Instructions: Indicate preparation, installation methods, and storage and handling criteria.

### 1.06 FIELD CONDITIONS

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

## PART 2 PRODUCTS

### 2.01 AIR BARRIER MATERIALS (WATER VAPOR PERMEABLE AND WATER-RESISTIVE)

A. Air Barrier Sheet, Mechanically Fastened:
   1. <AIR BAR-1>: Mechanically fastened air barrier.
   2. Air Permeance: 0.004 cubic feet per minute per square foot (0.02 L/s/sq m), maximum, when tested in accordance with ASTM E2178.
   3. Water Vapor Permeance: 10 perms (574 ng/(Pa s sq m)), minimum, when tested in accordance with ASTM E96/E96M Procedure A (desiccant procedure).
   4. Water Penetration Resistance: Withstand a water head of 21 inches (55 cm), minimum, for minimum of 5 hours, when tested in accordance with AATCC Test Method 127.
   5. Ultraviolet and Weathering Resistance: Approved in writing by manufacturer for minimum of 180 days weather exposure.
   6. Surface Burning Characteristics: Flame spread index of 25 or less, and smoke developed index of 50 or less, when tested in accordance with ASTM E84.
   7. Seam and Perimeter Tape: Polyethylene self adhering type, mesh reinforced, 2 inches (50 mm) wide, compatible with sheet material; unless otherwise specified.
   8. Products:
      a. DuPont Building Innovations; Tyvek Commercial Wrap with approved accessory products: www.dupont.com.
      b. Kingspan Insulation LLC; GreenGuard MAX Building Wrap: www.trustgreenguard.com.
      c. VaproShield, LLC; WrapShield: www.vaproshield.com.
      d. Substitutions: See Section 01 6000 - Product Requirements.

### 2.02 VAPOR RETARDER MATERIALS (AIR BARRIER AND WATER-RESISTIVE)

A. Vapor Retarder Sheet <VPR RET-1>: ASTM D4397 polyethylene film , clear.
   1. Thickness: 6 mil (0.15 mm).
   2. Water Vapor Permeance: As required by referenced standard for thickness specified.

### 2.03 ACCESSORIES

A. Sealants, Tapes, and Accessories for Sealing Weather Barrier and Sealing Weather Barrier to Adjacent Substrates: As specified or as recommended by weather barrier manufacturer.

B. Flexible Flashing: Self-adhesive sheet flashing complying with ASTM D1970/D1970M, except slip resistance requirement is waived if not installed on a roof.
   1. Composition: Any material that meets physical requirements of ASTM D1970/D1970M with exceptions indicated.
   2. All flashing materials shall be compatible with, and approved by, the membrane manufacturer.

C. Thinners and Cleaners: As recommended by material manufacturer.

## 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.

B. Clean and prime substrate surfaces to receive adhesives and sealants in accordance with manufacturer's instructions.

### 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. Vapor Retarders: Install continuous air tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.

D. Apply sealants and adhesives within recommended application temperature ranges. Consult manufacturer if temperature is out of this range.

E. Mechanically Fastened Sheets - On Exterior:
   1. Install sheets shingle-fashion to shed water, with seams generally horizontal.
   2. Overlap seams as recommended by manufacturer but at least 6 inches.
   3. Overlap at outside and inside corners as recommended by manufacturer but at least 12 inches (305 mm).
   4. For applications specified to be air tight, seal seams, laps, penetrations, tears, and cuts with self-adhesive tape; use only large-headed, gasketed fasteners recommended by the manufacturer.
   5. Where stud framing rests on concrete or masonry, extend lower edge of sheet at least 4 inches (100 mm) below bottom of framing and seal to foundation with sealant.
   6. Install air barrier and vapor retarder UNDER jamb flashings.
   7. Install head flashings under weather barrier.
   8. At openings to be filled with frames having nailing flanges, wrap excess sheet into opening; at head, seal sheet over flange and flashing.

F. Mechanically Fastened Sheets - Vapor Retarder On Interior:
   1. When insulation is to be installed in assembly, install vapor retarder over insulation.

2. Anchor to wood framing using large-headed nails or staples at 12 to 18 inches (305 to 460 mm) on center along each framing member covered; cover fasteners with seam tape.
3. Anchor to metal framing using seam tape, adhering at least one-half of tape width to substrate.
4. Seal seams, laps, perimeter edges, penetrations, tears, and cuts with self-adhesive tape, making air tight seal.
5. Locate laps at a framing member; at laps fasten one sheet to framing member then tape overlapping sheet to first sheet.
6. Seal entire perimeter to structure, window and door frames, and other penetrations.
7. Where conduit, pipes, wires, ducts, outlet boxes, and other items are installed in insulation cavity, pass vapor retarder sheet behind item but over insulation and maintain air tight seal.

G. 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 jambs; 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. See Section 01 4000 - Quality Requirements, for additional requirements.

B. Obtain approval of installation procedures by the weather barrier manufacturer based on a mock-up installed in place, prior to proceeding with remainder of installation.

C. Take digital photographs of each portion of the installation prior to covering up.

**3.05 PROTECTION**

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

B. Do not leave paper- or felt-based barriers exposed to weather for longer than one week.

## END OF SECTION

# SECTION 07 3113 - ASPHALT SHINGLES

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Asphalt shingle roofing.

B. Flexible sheet membranes for eave protection, underlayment, and valley protection.

C. Associated metal flashings and accessories.

### 1.02 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Roof sheathing.

B. Section 07 2100 - Thermal Insulation: Nailable rigid insulation.

C. Section 07 6200 - Sheet Metal Flashing and Trim: Edge and cap flashings.

D. Divisions 22 and 23: Mechanical work projecting through roof.

### 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 D4869/D4869M - Standard Specification for Asphalt-Saturated Organic Felt Underlayment Used in Steep Slope Roofing; 2015.

C. ASTM E108 - Standard Test Methods for Fire Tests of Roof Coverings; 2011.

D. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating material characteristics and performance criteria.

C. Shop Drawings: For metal flashings, indicate specially configured metal flashings.

D. Samples: Submit two samples of each shingle color indicating color range and finish texture/pattern .

E. Manufacturer's Installation Instructions: Indicate installation criteria and procedures.

F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.
   2. Extra Shingles: 150 sq ft (11.6 sq m) of each type and color.

### 1.05 FIELD CONDITIONS

A. Do not install shingles or eave protection membrane when surface temperatures are below 45 degrees F (7 degrees C).

### 1.06 WARRANTY

A. Provide Manufacturer's standard 30 year warranty.

## PART 2 PRODUCTS

### 2.01 SHINGLES

A. Manufacturers:
   1. GAF; Timberline Cool Series: www.gaf.com/sle.
   2. Certainteed; Landmark: www.certainteed.com.
   3. Owens Corning Corp; Oakridge: www.owenscorning.com.
   4. Substitutions: See Section 01 6000 - Product Requirements.

### 2.02 ASPHALT SHINGLES

A. Asphalt Shingles <SHINGLE-1>: Asphalt-coated glass felt, mineral granule surfaced, complying with 1; Class A fire resistance.
   1. Warranted Wind Speed: Not less than tested wind resistance.
   2. Algae Resistant.
   3. Weight: 235-245 lb/100 sq ft (107-111 kg/sq m).
   4. Self-sealing type.
   5. Style: Square, Three tab.

### 2.03 SHEET MATERIALS

A. Eave Protection Membrane <RF UNDLMT-5>: Self-adhering polymer-modified asphalt sheet complying with ASTM D1970; 40 mil (1 mm) total thickness; with strippable treated release paper and polyethylene sheet top surface.

B. Underlayment <RF UNDLMT-3>: Synthetic non-asphaltic sheet, intended by manufacturer for mechanically fastened roofing underlayment without sealed seams.
   1. Self Sealability: Passing nail sealability test specified in ASTM D1970/D1970M.
   2. Flammability: Minimum of Class A, when tested in accordance with ASTM E108.
   3. Ultraviolet Resistance and Weatherability: Approved in writing by manufacturer for exposure to weather for minimum of 6 months.
   4. Low Temperature Flexibility: Passing test specified in ASTM D1970/D1970M.
   5. Liquid Water Transmission: Passes ASTM D4869/D4869M.
   6. Functional Temperature Range: Minus 70 degrees F (56.7 C) to 212 degrees F (100 C).
   7. Fasteners: As specified by manufacturer and building code qualification report or approval, if any.
   8. Manufacturers:
      a. GAF; DeckArmor: www.gaf.com.
      b. CertainTeed; Roofers' Select: www.certainteed.com.
      c. Substitutions: See Section 01 6000 - Product Requirements.

### 2.04 ACCESSORIES

A. Nails: Standard round wire shingle type, of hot-dipped zinc coated steel, 10 wire gage, 0.1019 inch (2.59 mm) shank diameter, 3/8 inch (9.5 mm) head diameter, of sufficient length to penetrate through roof sheathing or 3/4 inch (19 mm) into roof sheathing or decking.

B. Lap Cement: Fibrated cutback asphalt type, recommended for use in application of underlayment, free of toxic solvents .

C. Ridge Vents <RF VENT-1>: Plastic, extruded with vent openings that do not permit direct water or weather entry; flanged to receive shingles; ShingleVent II Class A manufactured by Air Vent Inc. or approved equal.
   1. Integral insect screen.
   2. Net Free Area: 16 square inches of ventilation per linear foot.

### 2.05 METAL FLASHINGS

A. Metal Flashings: Provide sheet metal eave edge, gable edge, open valley flashing, and other flashing indicated on drawings.
   1. Form flashings to protect roofing materials from physical damage and shed water.
   2. Form sections square and accurate to profile, in maximum possible lengths, free from distortion or defects detrimental to appearance or performance.
   3. Hem exposed edges of flashings minimum 1/4 inch (6 mm) on underside.

B. At 'visual' areas, Sheet Metal: Prefinished galvanized steel, 0.018 inch/26 gage (0.45 mm) thick, minimum G90/Z275 hot-dipped galvanized; fluoropolymer coated, color as selected.

C. At 'non-visual', such as valley flashings, Sheet Metal: Galvanized steel, 0.018 inch/26 gage thick, minimum G90/Z275 hot-dipped galvanized.

D. Bituminous Paint: Acid and alkali resistant type; black color.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify existing conditions prior to beginning work.

B. Verify that roof penetrations and plumbing stacks are in place and flashed to deck surface.

C. Verify roof openings are correctly framed.

D. Verify deck surfaces are dry, free of ridges, warps, or voids.

### 3.02 PREPARATION

A. Broom clean deck surfaces before installing underlayment or eave protection.

B. Install eave edge and gable edge flashings tight with fascia boards. Weather lap joints 2 inches (50 mm) and seal with plastic cement. Secure flange with nails spaced at intervals recommended by NRCA.

### 3.03 INSTALLATION - EAVE PROTECTION MEMBRANE

A. See details and plans on drawings for extent of eave protection membrane application. Install membrane over all areas that are less than 4:12 slope.

B. Install eave protection membrane in accordance with manufacturer's instructions.

C. Do not leave eave protection membrane installed and exposed to weather for more than 14 days.

D. If adhesion to sheathing does not comply to manufacturer's recommendation, prime surface with manufacturer's primer. Refer to the manufacturers' technical literature.

**3.04 INSTALLATION - UNDERLAYMENT**

A. Underlayment At Roof Slopes Greater Than 4:12 (At Roof Slopes Greater Than 1:3): Install underlayment perpendicular to slope of roof, with ends and edges weather lapped minimum 4 inches (100 mm). Stagger end laps of each consecutive layer. Nail in place. Weather lap minimum 4 inches (100 mm) over eave protection.

B. Items projecting through or mounted on roof: Weather lap and seal watertight with plastic cement.

**3.05 INSTALLATION - VALLEY PROTECTION**

A. Install valley protection in accordance with SMACNA Architectural Sheet Metal Manual Details .

B. At Exposed Valleys: Install one layer of sheet metal flashing, minimum 24 inches (600 mm) wide, centered over open valley and crimped to guide water. Weather lap joints minimum 2 inch (50 mm) wide band of lap cement along each edge of first, press roll roofing into cement, and nail in place minimum 18 inches (450 mm) on center, 1 inch (25 mm) from edges.

**3.06 INSTALLATION - METAL FLASHING AND ACCESSORIES**

A. Install flashings in accordance with NRCA requirements.

B. Weather lap joints minimum 4 inches (100 mm) and seal weather tight with plastic cement.

C. Secure in place with nails at 12 inches (300 mm) on center. Conceal fastenings.

D. Items Projecting Through or Mounted on Roofing: Flash and seal weather tight with plastic cement.

**3.07 INSTALLATION - SHINGLES**

A. Install shingles in accordance with manufacturer's instructions.
   1. Fasten individual shingles using 3 nails per shingle, or as required for wind warranty, or as required by code, whichever is greater.
   2. Fasten strip shingles using 4 nails per strip, or as required for wind warranty, or as required by code, whichever is greater.

B. Place shingles in straight coursing pattern with 5 inch (125 mm) weather exposure to produce double thickness over full roof area. Using starter strip, Provide double course of shingles at eaves.

C. Project first course or starter strip of shingles 3/4 inch (19 mm) beyond fascia boards supported by metal edge trim.

D. Extend shingles 1/2 inch (13 mm) beyond face of gable edge fascia boards supported by metal edge trim.

E. Follow NRCA Recommendations for 'OPEN VALLEYS USING VALLEY METAL'. See NRCA Detail 20A and 20B. Valley Underlayment shall be Ice Dam Membrane.

F. Step Flash at all Roof-Wall Junctions. Turn up underlayment 18 inches up wall. Follow NRCA Recommendations for 'Flashings Against Vertical Walls'. See NRCA Details 23, 24, 25, and 26.

G. Complete installation to provide weather tight service.

**3.08 PROTECTION**

A. Do not permit traffic over finished roof surface.

## END OF SECTION

# SECTION 07 4623 - WOOD SIDING

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Board siding for Walls .

B. Trim, flashings, accessories, and fastenings.

### 1.02 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Siding substrate.

B. Section 07 2500 - Weather Barriers: Weather barrier under siding.

C. Section 07 6200 - Sheet Metal Flashing and Trim: Product requirements for metal flashings and trim associated with wood siding for placement by this section.

D. Section 07 9200 - Joint Sealants: Sealing joints between siding and adjacent construction and fixtures.

E. Section 09 9113 - Exterior Painting: Prime and finish painting.

### 1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating materials.

C. Samples: Submit two samples 12 x 12 inch (300 x 300 mm) in size illustrating surface texture.

### 1.04 DELIVERY, STORAGE, AND HANDLING

A. Store in ventilated areas with constant minimum temperature of 60 degrees F (16 degrees C) and maximum relative humidity of 55 percent.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

A. LP SmartSide Precision Series Lap Siding: www.lpcorp.com.

B. Substitutions: See Section 01 6000 - Product Requirements.

### 2.02 SIDING

A. Siding Panels <SIDING-70>: Manufactured wood siding from wood strands and/or wood fiber compined with zinc borate and exterior grade resins.
   1. Pattern: Board and batten.
   2. Surface Texture: Cedar woodgrain finish.
   3. Provide beveled edge for water shedding.

### 2.03 ACCESSORIES

A. Nails: Corrosion resistant type; non-staining, of size and strength to securely and rigidly retain the work.

B. Flashing: Galvanized steel as specified in Section 07 6200.

C. Soffits: Same material and finish as siding; in 24 inch (609 mm) wide sheets; vented type.

D. Prime Paint: Latex base primer enamel.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify that substrates are ready to receive work.

B. Verify that weather barrier has been installed over substrate completely and correctly.

C. Do not begin until unacceptable conditions have been corrected.

D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

### 3.02 PREPARATION

A. Prime paint surfaces in contact with cementitious materials.

B. Do not install materials until site pre-finishing is complete and dry.

### 3.03 INSTALLATION

A. Install siding in accordance with manufacturer's instructions.

B. Fasten siding in place, level and plumb.
   1. Arrange for orderly nailing pattern. Blind nail except on over trim.
   2. Install siding for natural shed of water.
   3. Position cut ends over bearing surfaces. Sand cut edges smooth and clean.
   4. Use largest lengths possible. Use full length boards where required length is less than 16 feet.
   5. Stagger joints in siding each row by a minimum of 16 inches.

C. Install metal flashings at internal and external corners, sills, heads of wall openings, and horizontal joints of sheet materials.

D. Touch-up prefinished paint surfaces that are disfigured. Unsightly touch-up will require removal and replacement of affected siding.

E. Prepare for site finishing specified in Section 09 9113.

### 3.04 TOLERANCES

A. Maximum Variation From Plumb and Level: 1/4 inch per 10 feet (6 mm/3 m).

B. Maximum Offset From Joint Alignment: 1/16 inch (1.5 mm).

## END OF SECTION

# SECTION 07 5300 - ELASTOMERIC MEMBRANE ROOFING

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Elastomeric roofing membrane, adhered conventional application.

B. Insulation, flat and tapered.

C. Vapor retarder.

D. Flashings.

E. Roofing cant strips and stack boots.

### 1.02 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Wood nailers and curbs.

B. Section 07 6200 - Sheet Metal Flashing and Trim: Counterflashings, reglets.

C. Section 07 7200 - Roof Accessories: Roof-mounted units; prefabricated curbs.

### 1.03 REFERENCE STANDARDS

A. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2016.

B. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2006a (Reapproved 2013).

C. ASTM D624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers; 2000 (Reapproved 2012).

D. ASTM D746 - Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact; 2014.

E. ASTM D4637/D4637M - Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane; 2015.

F. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.

G. FM DS 1-28 - Wind Design; 2007.

H. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating membrane materials, flashing materials, insulation, and fasteners.

C. Shop Drawings: Indicate joint or termination detail conditions, conditions of interface with other materials, setting plan for tapered insulation, and paver layout.

D. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

**1.05 QUALITY ASSURANCE**

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.

**1.06 DELIVERY, STORAGE, AND HANDLING**

A. Deliver products in manufacturer's original containers, dry, undamaged, with seals and labels intact.

B. Store products in weather protected environment, clear of ground and moisture.

C. Protect foam insulation from direct exposure to sunlight.

**1.07 FIELD CONDITIONS**

A. Do not apply roofing membrane during unsuitable weather.

B. Do not apply roofing membrane when ambient temperature is below 40 degrees F (5 degrees C) or above 100 degrees F (38 degrees C).

C. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.

D. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.

**1.08 WARRANTY**

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a two year period after Date of Substantial Completion.

C. General Warranty: The warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

D. Provide 20 year manufacturer's material and labor warranty to cover failure to prevent penetration of water.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

A. EPDM Membrane Materials:
   1. Carlisle Roofing Systems, Inc; Sure-Seal EPDM: www.carlisle-syntec.com.
   2. Firestone Building Products, LLC: www.firestonebpco.com.
   3. GenFlex Roofing Systems, LLC: www.genflex.com.
   4. Versico, a division of Carlisle Construction Materials Inc; VersiGard EPDM: www.versico.com/sle.

B. Insulation:
   1. Dow Chemical Company: www.dow.com.
   2. GAF: www.gaf.com/sle.
   3. Hunter Panels, LLC: www.hpanels.com.
   4. Owens Corning Corporation: www.owenscorning.com.
   5. Insulation manufactured by the membrane manufacturer is approved.

### 2.02 ROOFING - UNBALLASTED APPLICATIONS

A. Elastomeric Membrane Roofing <EPDM-2>: One ply membrane, fully adhered, over insulation.

B. Roofing Assembly Requirements:
   1. Roof Covering External Fire Resistance Classification: UL (DIR) certified Class A.
   2. Factory Mutual Classification: Class I and windstorm resistance of I-75, in accordance with FM DS 1-28.

C. Acceptable Insulation Types - Constant Thickness Application: Any of the types specified.
   1. Minimum 2 layers of polyisocyanurate board.

D. Acceptable Insulation Types - Tapered Application: Any of the types specified.
   1. Tapered polyisocyanurate board.

### 2.03 ROOFING MEMBRANE AND ASSOCIATED MATERIALS

A. Membrane: Ethylene-propylene-diene-terpolymer (EPDM); non-reinforced; complying with minimum properties of ASTM D4637.
   1. Thickness: 0.060 inch (1.5 mm).
   2. Color: Black.
   3. Tensile Strength: 1,400 psi (10.0 MPa), measured in accordance with ASTM D412.
   4. Ultimate Elongation: 300 percent, measured in accordance with ASTM D412.
   5. Tear Strength: 150 lbf/in (26.3 kN/m), measured in accordance with ASTM D624.
   6. Water Vapor Permeability: 0.5 perm inch (0.33 ng/(Pa s m)), measured in accordance with ASTM E96/E96M.
   7. Brittleness Temperature: -49 degrees F (-45 degrees C), measured in accordance with 1.

B. Seaming Materials: As recommended by membrane manufacturer.

C. Flexible Flashing Material: Same material as membrane; conforming to the following:
   1. Thickness: 60 mil (1.5 mm).
   2. Color: Black.

### 2.04 INSULATION

A. Polyisocyanurate Board Insulation: Rigid cellular foam, complying with ASTM C1289, Type II, Class 1, cellulose felt or glass fiber mat both faces; Grade 2 and with the following characteristics:
   1. System Identification:
      a. <INSUL-50>: Constant thickness; minimum two staggered layers of equal thickness; provide tapered insulation as needed.
      b. <INSUL-51>: Tapered insulation over constant thickness; minimum two staggered layers of equal thickness; provide tapered insulation over entire roof as indicated in the drawings.
   2. Compressive Strength: 20 psi (138 kPa)
   3. Tapered Board: Slope as indicated; minimum thickness 1/2 inch (12.7 mm); fabricate of fewest layers possible.
   4. Board Edges: Square.

### 2.05 ACCESSORIES

A. Stack Boots: Prefabricated flexible boot and collar for pipe stacks through membrane; same material as membrane.

B. Cant and Edge Strips: Wood fiberboard, compatible with roofing materials; cants formed to 45 degree angle.

C. Insulation Fasteners: Appropriate for purpose intended and approved by roofing manufacturer.

D. Membrane Adhesive: As recommended by membrane manufacturer.

E. Surface Conditioner for Adhesives: Compatible with membrane and adhesives.

F. Thinners and Cleaners: As recommended by adhesive manufacturer, compatible with membrane.

G. Sealants: As recommended by membrane manufacturer.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify that surfaces and site conditions are ready to receive work.

B. Verify deck is supported and secure.

C. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.

D. Verify deck surfaces are dry and free of snow or ice.

E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and cant strips are in place.

### 3.02 INSULATION - UNDER MEMBRANE

A. Attachment of Insulation:
   1. Mechanically fasten first layer of insulation to deck in accordance with roofing manufacturer's instructions and Factory Mutual requirements.

B. Lay subsequent layers of insulation with joints staggered minimum 6 inch (150 mm) from joints of preceding layer.

C. Place tapered insulation to the required slope pattern in accordance with manufacturer's instructions.

D. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.

E. At roof drains, use factory-tapered boards to slope down to roof drains over a distance of 18 inches (450 mm).

F. Do not apply more insulation than can be covered with membrane in same day.

**3.03 MEMBRANE APPLICATION**

A. Roll out membrane, free from wrinkles or tears. Place sheet into place without stretching.

B. Shingle joints on sloped substrate in direction of drainage.

C. Fully Adhered Application: Apply adhesive to substrate at manufacturer's recommended rate. Fully embed membrane in adhesive except in areas directly over or within 3 inches of expansion joints. Fully adhere one roll before proceeding to adjacent rolls.

D. Overlap edges and ends and seal seams by contact adhesive, minimum 3 inches (75 mm). Seal permanently waterproof. Apply uniform bead of sealant to joint edge.

E. At intersections with vertical surfaces:
   1. Extend membrane over cant strips and up a minimum of 4 inches (100 mm) onto vertical surfaces.
   2. Fully adhere flexible flashing over membrane and up to nailing strips.

F. At gravel stops, extend membrane under gravel stop and to the outside face of the wall.

G. Around roof penetrations, seal flanges and flashings with flexible flashing.

H. Coordinate installation of roof drains and sumps and related flashings.

**3.04 CLEANING**

A. Remove bituminous markings from finished surfaces.

B. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and conform to their documented instructions.

C. Repair or replace defaced or damaged finishes caused by work of this section.

**3.05 PROTECTION**

A. Protect installed roofing and flashings from construction operations.

B. Where traffic must continue over finished roof membrane, protect surfaces using durable materials.

## END OF SECTION

# SECTION 07 6200 - SHEET METAL FLASHING AND TRIM

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Fabricated sheet metal items, including flashings, counterflashings, gutters, downspouts, and other items indicated in Schedule.

B. Sealants for joints within sheet metal fabrications.

C. Precast concrete splash pads.

### 1.02 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Wood nailers for sheet metal work.

B. Section 07 9200 - Joint Sealants: Sealing non-lap joints between sheet metal fabrications and adjacent construction.

### 1.03 REFERENCE STANDARDS

A. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels; 2013.

B. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.

C. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric]; 2014.

D. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.

E. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007 (Reapproved 2012).

F. CDA A4050 - Copper in Architecture - Handbook; current edition.

G. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

### 1.05 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.

### 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. Pre-Finished Aluminum <SMF-2>: ASTM B209 (ASTM B209M); 0.032 inch (0.8 mm) thick; plain finish shop pre-coated with fluoropolymer coating.
   1. Fluoropolymer Coating: High Performance Organic Finish, AAMA 2604; multiple coat, thermally cured fluoropolymer finish system.
   2. Color: As selected by Architect from manufacturer's standard colors.

### 2.02 ACCESSORIES

A. Fasteners: Galvanized steel, with soft neoprene washers.

B. Primer: Zinc chromate type.

C. Protective Backing Paint: Zinc molybdate alkyd.

D. Sealant to be Concealed in Completed Work: Non-curing butyl sealant.

E. Sealant to be Exposed in Completed Work: ASTM C920; elastomeric sealant, 100 percent silicone with minimum movement capability of plus/minus 25 percent and recommended by manufacturer for substrates to be sealed; clear.

F. Plastic Cement: ASTM D4586/D4586M, 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.

F. Fabricate flashings to allow toe to extend 2 inches (50 mm) over roofing gravel. Return and brake edges.

### 2.04 GUTTER AND DOWNSPOUT FABRICATION

A. Gutters and Downspouts: Size for rainfall intensity determined by a storm occurrence of 1 in 10 years in accordance with SMACNA (ASMM).

B. Splash Pads: Precast concrete type, of size and profiles indicated; minimum 3000 psi (21 MPa) at 28 days, with minimum 5 percent air entrainment.

C. Seal metal joints.

## 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. Install surface mounted reglets true to lines and levels. Seal top of reglets with sealant.

C. 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. Insert flashings into reglets to form tight fit. Secure in place with lead wedges. Seal flashings into reglets with sealant.

B. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted.

C. Apply plastic cement compound between metal flashings and felt flashings.

D. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

E. Seal metal joints watertight.

F. Secure gutters and downspouts in place with concealed fasteners.

G. Set splash pads under downspouts.

## END OF SECTION

# SECTION 07 9200 - JOINT SEALANTS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Nonsag gunnable joint sealants.

B. Self-leveling pourable joint sealants.

C. Joint backings and accessories.

### 1.02 RELATED REQUIREMENTS

A. Section 07 1300 - Sheet Waterproofing: Sealing cracks and joints in waterproofing substrate surfaces using materials specified in this section.

B. Section 07 2500 - Weather Barriers: Sealants required in conjunction with air barriers and vapor retarders.

C. Section 07 8400 - Firestopping: Firestopping sealants.

D. Section 09 2116 - Gypsum Board Assemblies: Sealing acoustical and sound-rated walls and ceilings.

E. Section 09 3000 - Tiling: Sealant between tile and plumbing fixtures and at junctions with other materials and changes in plane.

### 1.03 REFERENCE STANDARDS

A. ASTM C794 - Standard Test Method for Adhesion-In-Peel of Elastomeric Joint Sealants; 2015a.

B. ASTM C834 - Standard Specification for Latex Sealants; 2014.

C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.

D. ASTM C1087 - Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems; 2016.

E. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.

F. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants; 2008 (Reapproved 2012).

G. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants; 2002 (Reapproved 2013).

H. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2015.

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.

1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
2. List of backing materials approved for use with the specific product.
3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
4. Substrates the product should not be used on.

C. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.

D. Samples for Verification: Where custom sealant color is specified, obtain directions from Architect and submit at least two physical samples for verification of color of each required sealant.

E. Preconstruction Laboratory Test Reports: Submit at least four weeks prior to start of installation.

**1.05 QUALITY ASSURANCE**

A. Installer Qualifications: Company specializing in performing the work of this section and with at least three years of experience.

B. Preconstruction Laboratory Testing: Arrange for sealant manufacturer(s) to test each combination of sealant, substrate, backing, and accessories.
1. Adhesion Testing: In accordance with ASTM C794.
2. Compatibility Testing: In accordance with ASTM C1087.
3. Allow sufficient time for testing to avoid delaying the work.
4. Deliver to manufacturer sufficient samples for testing.
5. Report manufacturer's recommended corrective measures, if any, including primers or techniques not indicated in product data submittals.
6. Testing is not required if sealant manufacturer provides data showing previous testing, not older than 24 months, that shows satisfactory adhesion, lack of staining, and compatibility.

**1.06 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 that fail to achieve watertight seal , exhibit loss of adhesion or cohesion, or do not cure.

## PART 2 PRODUCTS

**2.01 MANUFACTURERS**

A. Non-Sag Sealants: Permits application in joints on vertical surfaces without sagging or slumping.
1. BASF Construction Chemicals-Building Systems: www.buildingsystems.basf.com.
2. Dow Corning Corporation: www.dowcorning.com/construction.
3. Hilti, Inc: www.us.hilti.com.
4. Momentive Performance Materials, Inc (formerly GE Silicones): www.momentive.com.
5. Pecora Corporation: www.pecora.com.
6. Tremco Global Sealants: www.tremcosealants.com.
7. Sherwin-Williams Company: www.sherwin-williams.com.
8. Sika Corporation: www.usa-sika.com.
9. W.R. Meadows, Inc: www.wrmeadows.com.

10. Substitutions: See Section 01 6000 - Product Requirements.

B. Self-Leveling Sealants: Pourable or self-leveling sealant that has sufficient flow to form a smooth, level surface when applied in a horizontal joint.
   1. BASF Construction Chemicals-Building Systems: www.buildingsystems.basf.com.
   2. Dow Corning Corporation: www.dowcorning.com/construction.
   3. Pecora Corporation: www.pecora.com.
   4. Tremco Global Sealants: www.tremcosealants.com.
   5. Sherwin-Williams Company: www.sherwin-williams.com.
   6. Sika Corporation: www.usa-sika.com.
   7. W.R. Meadows, Inc: www.wrmeadows.com.
   8. Substitutions: See Section 01 6000 - Product Requirements.

**2.02 JOINT SEALANT APPLICATIONS**

A. Scope:
   1. Exterior Joints: Seal open joints, whether or not the joint is indicated on the drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
      a. Wall expansion and control joints.
      b. Joints between door, window, and other frames and adjacent construction.
      c. Joints between different exposed materials.
      d. Openings below ledge angles in masonry.
      e. Other joints indicated below.
   2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
      a. Joints between door, window, and other frames and adjacent construction.
      b. Other joints indicated below.
   3. Do not seal the following types of joints.
      a. Intentional weepholes in masonry.
      b. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
      c. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
      d. Joints where installation of sealant is specified in another section.
      e. Joints between suspended panel ceilings/grid and walls.

B. Exterior Joints: Use non-sag non-staining silicone sealant, unless otherwise indicated.
   1. Lap Joints in Sheet Metal Fabrications: Butyl rubber, non-curing.

C. Interior Joints: Use non-sag polyurethane sealant, unless otherwise indicated.
   1. Wall and Ceiling Joints in Non-Wet Areas: Acrylic emulsion latex sealant.
   2. Wall and Ceiling Joints in Wet Areas: Non-sag polyurethane sealant for continuous liquid immersion.
   3. Floor Joints in Wet Areas: Non-sag polyurethane "non-traffic-grade" sealant suitable for continuous liquid immersion.
   4. Joints between Fixtures in Wet Areas and Floors, Walls, and Ceilings: Mildew-resistant silicone sealant; white.
   5. In Sound-Rated Assemblies: Acrylic emulsion latex sealant.
   6. Narrow Control Joints in Interior Concrete Slabs: Self-leveling epoxy sealant.
   7. Other Floor Joints: Self-leveling polyurethane "traffic-grade" sealant.

D. Interior Wet Areas: Bathrooms, restrooms, kitchens, food service areas, and food processing areas; fixtures in wet areas include plumbing fixtures, food service equipment, countertops, cabinets, and other similar items.

E. Sound-Rated Assemblies: Walls and ceilings identified as "STC-rated", "sound-rated", or "acoustical".

**2.03 JOINT SEALANTS - GENERAL**

A. Material ID's:
   1. <SEALANT-1>: Provide a joint sealant. Type as indicated above.
   2. <SEALANT-2>: Provide a backer rod and joint sealant. Type as indicated above.

**2.04 NONSAG JOINT SEALANTS**

A. Non-Staining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
   1. Movement Capability: Plus 100 percent, minus 50 percent, minimum.
   2. Non-Staining To Porous Stone: Non-staining to light-colored natural stone when tested in accordance with ASTM C1248.
   3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.
   4. Color: To be selected by Architect from manufacturer's standard range.
   5. Cure Type: Single-component, neutral moisture curing.
   6. Service Temperature Range: Minus 65 to 180 degrees F (Minus 54 to 82 degrees C).

B. Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS, Uses M and A; single component, mildew resistant; not expected to withstand continuous water immersion or traffic.
   1. Color: White.

C. Acrylic Emulsion Latex: Water-based; ASTM C834, single component, non-staining, non-bleeding, non-sagging; not intended for exterior use.
   1. Color: To be selected by Architect from manufacturer's standard range.
   2. Grade: ASTM C834; Grade - Minus 18 Degrees C.

**2.05 SELF-LEVELING SEALANTS**

A. Semi-Rigid Self-Leveling Epoxy Joint Filler: Epoxy or epoxy/polyurethane copolymer; intended for filling cracks and control joints not subject to significant movement; rigid enough to support concrete edges under traffic.
   1. Composition: Multi-component, 100 percent solids by weight.
   2. Hardness: Minimum of 85 (Shore A) or 35 (Shore D), when tested in accordance with ASTM D2240 after 7 days.
   3. Color: To be selected by Architect from manufacturer's standard colors.
   4. Joint Width, Minimum: 1/8 inch (3 mm).
   5. Joint Width, Maximum: 1/4 inch (6 mm).
   6. Joint Depth: Provide product suitable for joints from 1/8 inch (3 mm) to 2 inches (51 mm) in depth including space for backer rod.

**2.06 ACCESSORIES**

A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.

1. Type for Joints Not Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type O - Open Cell Polyurethane.
2. Type for Joints Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type B - Bi-Cellular Polyethylene.
3. Open Cell: 40 to 50 percent larger in diameter than joint width.
4. Closed Cell and Bi-Cellular: 25 to 33 percent larger in diameter than joint width.

B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.

C. Masking Tape: Self-adhesive, nonabsorbent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.

D. Joint Cleaner: Non-corrosive and non-staining type, type recommended by sealant manufacturer; compatible with joint forming materials.

E. Primers: Type recommended by sealant manufacturer to suit application; non-staining.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify that joints are ready to receive work.

B. Verify that backing materials are compatible with sealants.

C. Verify that backer rods are of the correct size.

### 3.02 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.

B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

E. Concrete Floor Joints That Will Be Exposed in Completed Work: Test joint filler in inconspicuous area to verify that it does not stain or discolor slab.

### 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. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.

D. Install bond breaker backing tape where backer rod cannot be used.

E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.

F. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.

G. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

H. Concrete Floor Joint Filler: After full cure, shave joint filler flush with top of concrete slab.

## END OF SECTION

# SECTION 08 1113 - HOLLOW METAL DOORS AND FRAMES

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Non-fire-rated hollow metal doors and frames.

B. Hollow metal frames for wood doors.

C. Fire-rated hollow metal doors and frames.

D. Thermally insulated hollow metal doors with frames.

E. Hollow metal borrowed lites glazing frames.

### 1.02 RELATED REQUIREMENTS

A. Section 08 7100 - Door Hardware.

B. Section 08 8000 - Glazing: Glass for doors and borrowed lites.

C. Section 09 9113 - Exterior Painting: Field painting.

D. Section 09 9123 - Interior Painting: Field painting.

### 1.03 REFERENCE STANDARDS

A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

B. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2011.

C. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2014.

D. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2011.

E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.

F. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2015.

G. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2014.

H. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames; 2014.

I. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2009.

J. ITS (DIR) - Directory of Listed Products; current edition.

K. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.

L. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2011.

M. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; 2007.

N. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2016.

O. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2012.

P. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

Q. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

### 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, anchorage and fastening methods, and finishes.

C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.

### 1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

B. Copies of Documents at Project Site: Maintain at the project site a copy of each referenced document that prescribes installation requirements.

### 1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.

B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

A. Hollow Metal Doors and Frames:
   1. Ceco Door or Curries, an Assa Abloy Group company: www.assaabloydss.com.
   2. Republic Doors: www.republicdoor.com.
   3. Steelcraft, an Allegion brand: www.allegion.com/us.
   4. Substitutions: See Section 01 6000 - Product Requirements.

## 2.02 DESIGN CRITERIA

A. Requirements for Hollow Metal Doors and Frames:
   1. Steel used for fabrication of doors and frames shall comply with one or more of the following requirements; Galvannealed steel conforming to ASTM A653/A653M, cold-rolled steel conforming to ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel conforming to ASTM A1011/A1011M, Commercial Steel (CS) Type B for each.
   2. Accessibility: Comply with ICC A117.1 and ADA Standards.
   3. Exterior Door Top Closures: Flush end closure channel, with top and door faces aligned.
   4. Door Edge Profile: Manufacturers standard for application indicated.
   5. Typical Door Face Sheets: Flush.
   6. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings. Style: Manufacturers standard.
   7. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
      a. Provide minimum 3/16" plate steel as reinforcement for hardware. If the manufacturer's standard is for a greater thickness at specific locations, provide the thicker of the two standards.
   8. Electrified Hardware Preparation:
      a. Provide electrical conduit and junction-boxes as required for electric power and signal routing and for electrical terminations as required to support electrical and electronic hardware indicated in Section 08 7100.
      b. Secure conduit and boxes to the frame and doors. Extend conduit attached to frames 12 inches above frame for connection to conduit furnished by other sections.
      c. Coordinate locations of conduit and boxes with Section 08 7100.

B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

## 2.03 HOLLOW METAL DOORS

A. Exterior Doors: Thermally insulated.
   1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
      a. Level 3 - Extra Heavy-duty.
      b. Physical Performance Level A, 1,000,000 cycles; in accordance with ANSI/SDI A250.4.
      c. Model 2 - Seamless.
      d. Door Face Metal Thickness: 16 gage, 0.053 inch (1.3 mm), minimum.
      e. Zinc Coating: A60/ZF180 galvannealed coating; ASTM A653/A653M.
   2. Door Thickness: 1-3/4 inch (44.5 mm), nominal.
   3. Door Finish: Factory primed and field finished.

B. Interior Doors, Non-Fire Rated:
   1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
      a. Level 3 - Extra Heavy-duty.
      b. Physical Performance Level A, 1,000,000 cycles; in accordance with ANSI/SDI A250.4.
      c. Model 2 - Seamless.
      d. Door Face Metal Thickness: 16 gage, 0.053 inch (1.3 mm), minimum.

2. Core Material: Manufacturers standard core material/construction and in compliance with requirements.
3. Door Thickness: 1-3/4 inch (44.5 mm), nominal.

C. Fire-Rated Doors:
1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
a. Level 3 - Extra Heavy-duty.
b. Physical Performance Level A, 1,000,000 cycles; in accordance with ANSI/SDI A250.4.
c. Model 2 - Seamless.
d. Door Face Metal Thickness: 16 gage, 0.053 inch (1.3 mm), minimum.
2. Fire Rating: As indicated on Door Schedule, tested in accordance with UL 10C and NFPA 252 ("positive pressure fire tests").
a. Provide units listed and labeled by UL (DIR) or ITS (DIR).
b. Attach fire rating label to each fire rated unit.
3. Core Material: Manufacturers standard core material/construction in compliance with requirements.
4. Door Thickness: 1-3/4 inch (44.5 mm), nominal.

**2.04 HOLLOW METAL FRAMES**

A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.

B. Frame Finish: Factory primed and field finished.

C. Exterior Door Frames: Full profile/continuously welded type.
1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A60/ZF180 coating.
2. Frame Metal Thickness: 14 gage, 0.067 inch (1.7 mm), minimum.
3. Weatherstripping: Separate, see Section 08 7100.

D. Interior Door Frames, Non-Fire Rated: Face welded type.
1. Frame Metal Thickness: 16 gage, 0.053 inch (1.3 mm), minimum; except 14 gage, 0.067 inch (1.7 mm) for masonry applications.

E. Door Frames, Fire-Rated: Face welded type.
1. Fire Rating: Same as door, labeled.
2. Frame Metal Thickness: 16 gage, 0.053 inch (1.3 mm), minimum; except 14 gage, 0.067 inch (1.7 mm) for masonry applications.

F. Frames for Wood Doors: Comply with frame requirements in accordance with corresponding door.

G. Borrowed Lites Glazing Frames: Construction and face dimensions to match door frames, and as indicated on drawings.

H. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.

I. Frames Wider than 48 Inch (1219 mm): Reinforce with steel channel fitted tightly into frame head, flush with top.

### 2.05 ACCESSORIES

A. Glazing: As specified in Section 08 8000.

B. Grout for Frames: Portland cement grout with maximum 4 inch (102 mm) slump for hand troweling; thinner pumpable grout is prohibited.

C. 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.

D. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

### 2.06 FINISHES

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

B. Bituminous Coating: Asphalt emulsion or other high-build, water-resistant, resilient coating.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Verify that finished walls are in plane to ensure proper door alignment.

### 3.02 PREPARATION

A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

### 3.03 INSTALLATION

A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.

B. Install fire rated units in accordance with NFPA 80.

C. Coordinate frame anchor placement with wall construction.

D. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.

E. Coordinate installation of hardware.

F. Coordinate installation of glazing.

G. Coordinate installation of electrical connections to electrical hardware items.

**3.04 TOLERANCES**

A. Clearances Between Door and Frame: Comply with related requirements of specified door and frame standards or custom guidelines indicated.

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

**3.05 ADJUSTING**

A. Adjust for smooth and balanced door movement.

## END OF SECTION

# SECTION 08 1416 - FLUSH WOOD DOORS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Flush wood doors; flush and flush glazed configuration; non-rated.

### 1.02 RELATED REQUIREMENTS

A. Section 08 1113 - Hollow Metal Doors and Frames.

B. Section 08 7100 - Door Hardware.

C. Section 08 8000 - Glazing.

### 1.03 REFERENCE STANDARDS

A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014.

B. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.0; 2016.

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.

C. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.

D. Specimen warranty.

E. Samples: Submit two samples of door veneer, 6 by 6 inch (152 by 152 mm) in size illustrating wood grain, stain color, and sheen.

F. Manufacturer's Installation Instructions: Indicate special installation instructions.

G. Warranty, executed in Owner's name.

### 1.05 DELIVERY, STORAGE, AND HANDLING

A. Package, deliver and store doors in accordance with specified quality standard.

B. Accept doors on site in manufacturer's packaging. Inspect for damage.

C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one week. Break seal on site to permit ventilation.

### 1.06 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Interior Doors: Provide manufacturer's warranty for the life of the installation.

C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

A. Wood Veneer Faced Doors:
   1. Algoma Hardwoods: www.algomahardwoods.com.
   2. Eggers Industries: www.eggersindustries.com.
   3. Graham Wood Doors: www.grahamdoors.com.
   4. Marshfield DoorSystems, Inc: www.marshfielddoors.com.
   5. VT Industries, Inc: www.vtindustries.com.
   6. Substitutions: See Section 01 6000 - Product Requirements.

### 2.02 DOORS

A. Doors: Refer to drawings for locations and additional requirements.
   1. Quality Standard: Custom Grade, Heavy Duty performance, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
   2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.

B. Interior Doors: 1-3/4 inches (44 mm) thick unless otherwise indicated; flush construction.
   1. Provide solid core doors at each location.
   2. Wood veneer facing with factory transparent finish as indicated on drawings.

### 2.03 DOOR AND PANEL CORES

A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated.

### 2.04 DOOR FACINGS

A. Veneer Facing for Transparent Finish: Maple, veneer grade in accordance with quality standard indicated, plain sliced (flat cut), with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face.
   1. Vertical Edges: Same species as face veneer.
   2. "Pair Match" each pair of doors; "Set Match" pairs of doors within 10 feet (3 m) of each other when doors are closed.

### 2.05 DOOR CONSTRUCTION

A. Fabricate doors in accordance with door quality standard specified.

B. Cores Constructed with stiles and rails:
   1. Provide solid blocks at lock edge and top of door for closer for hardware reinforcement.
   2. Provide solid blocking for other throughbolted hardware.

C. Where supplementary protective edge trim is required, install trim after veneer facing has been applied full-width.

D. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.

E. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.

F. Provide edge clearances in accordance with the quality standard specified.

### 2.06 FACTORY FINISHING - WOOD VENEER DOORS

A. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:
   1. Transparent:
      a. System - 9, UV Curable, Acrylated Epoxy, Polyester or Urethane.
      b. Stain: As selected by Architect.
      c. Sheen: Satin.

B. Seal door top edge with color sealer to match door facing.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

### 3.02 INSTALLATION

A. Install doors in accordance with manufacturer's instructions and specified quality standard.

B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.

C. Use machine tools to cut or drill for hardware.

D. Coordinate installation of doors with installation of frames and hardware.

### 3.03 TOLERANCES

A. Conform to specified quality standard for fit and clearance tolerances.

B. Conform to specified quality standard for telegraphing, warp, and squareness.

### 3.04 ADJUSTING

A. Adjust doors for smooth and balanced door movement.

B. Adjust closers for full closure.

# END OF SECTION

# SECTION 08 3100 - ACCESS DOORS AND PANELS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Wall access door and frame units.

B. Ceiling access door and frame units.

### 1.02 RELATED REQUIREMENTS

A. Section 09 9123 - Interior Painting: Field paint finish.

### 1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.

C. Shop Drawings: Indicate exact position of each access door and/or panel unit.

D. Manufacturer's Installation Instructions: Indicate installation requirements.

## PART 2 PRODUCTS

### 2.01 ACCESS DOOR AND PANEL APPLICATIONS

A. Walls, Unless Otherwise Indicated:
   1. Material: Steel.
   2. Size: 12 by 12 inch (305 by 305 mm), unless otherwise indicated.
   3. Standard duty, hinged door.
   4. Tool-operated spring or cam lock; no handle.
   5. In Gypsum Board: Drywall bead frame with door surface flush with wall surface.
   6. In Masonry: Frameless with door surface recessed for infill with wall finish.

B. Walls in Wet Areas:
   1. Material: Steel, hot-dipped zinc or zinc-aluminum-alloy coated.
   2. Size: 12 by 12 inch (305 by 305 mm), unless otherwise indicated.
   3. Standard duty, hinged door.
   4. In Gypsum Board: Drywall bead frame with door surface flush with wall surface.
   5. In Masonry: Surface mounted frame with door surface flush with frame surface.

C. Fire Rated Walls: See drawings for wall fire ratings.
   1. Material: Steel.
   2. Size: 12 by 12 inch (305 by 305 mm), unless otherwise indicated.
   3. Tool-operated spring or cam lock; no handle.

D. Ceilings, Unless Otherwise Indicated: Same type as for walls.
   1. Size in Lay-in Grid Ceilings: To match grid module.
   2. Size in Other Ceilings: 12 by 12 inch (305 by 305 mm), unless otherwise indicated.
   3. Standard duty, hinged door.

4. Tool-operated spring or cam lock; no handle.

### 2.02 WALL AND CEILING UNITS

A. Manufacturers:
   1. ACUDOR Products Inc: www.acudor.com.
   2. Babcock-Davis: www.babcockdavis.com.
   3. Cendrex, Inc: www.cendrex.com/sle.
   4. Karp Associates, Inc: www.karpinc.com.
   5. Milcor, Inc: www.milcorinc.com.
   6. Substitutions: See Section 01 6000 - Product Requirements.

B. Door and Frameless Units <ACC PNL-1>: Factory fabricated, fully assembled units with corner joints welded, filled, and ground flush; square and without rack or warp; coordinate requirements with assemblies units are to be installed in.
   1. Style: Exposed frame with door surface flush with frame surface.
      a. In Gypsum Board: Use drywall bead type frame.
   2. Door Style: Single thickness with rolled or turned in edges.
   3. Frames: 16 gage, 0.0598 inch (1.52 mm), minimum.
   4. Single Thickness Steel Door Panels: 1/16 inch (1.6 mm), minimum.
   5. Units in Fire Rated Assemblies: Fire rating as required by applicable code for the fire rated assembly that access doors are being installed.
   6. Steel Finish: Primed.
   7. Primed and Factory Finish: Polyester powder coat; color as selected by Architect from manufacturer's standard colors.
   8. Size: As scheduled above unless otherwise indicated in the drawings.
   9. Hardware:
      a. Hardware for Fire Rated Units: As required for listing.
      b. Hinges for Non-Fire-Rated Units: Continuous piano hinge.
      c. Latch/Lock: Screw driver slot for quarter turn cam latch.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify that rough openings are correctly sized and located.

### 3.02 INSTALLATION

A. Install units in accordance with manufacturer's instructions.

B. Install frames plumb and level in openings. Secure rigidly in place.

C. Position units to provide convenient access to the concealed work requiring access.

## END OF SECTION

# SECTION 08 4313 - ALUMINUM-FRAMED STOREFRONTS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Aluminum-framed storefront, with vision glass.

B. Aluminum doors and frames.

C. Weatherstripping.

### 1.02 RELATED REQUIREMENTS

A. Section 08 7100 - Door Hardware: Hardware items other than specified in this section.

B. Section 08 8000 - Glazing: Glass and glazing accessories.

### 1.03 REFERENCE STANDARDS

A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; 2015.

B. AAMA 501.2 - Field Check of Metal Storefronts, Curtain Walls, and Sloped Glazing Systems for Water Leakage; 2009.

C. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document); 2015.

D. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2012.

E. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

F. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.

G. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.

H. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2013.

I. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004 (Reapproved 2012).

J. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014.

K. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2009).

L. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

**1.04 ADMINISTRATIVE REQUIREMENTS**

A. Coordinate with installation of other components that comprise the exterior enclosure.

B. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

**1.05 SUBMITTALS**

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, internal drainage details.

C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work, expansion and contraction joint location and details, and field welding required.

D. Design Data: Provide framing member structural and physical characteristics, engineering calculations, and dimensional limitations.

E. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

**1.06 QUALITY ASSURANCE**

A. Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State in which the Project is located.

B. Manufacturer Qualifications: Company specializing in performing work of type specified and with at least three years of experience.

C. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of experience.

**1.07 DELIVERY, STORAGE, AND HANDLING**

A. Handle products of this section in accordance with AAMA CW-10.

B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

**1.08 FIELD CONDITIONS**

A. Do not install sealants when ambient temperature is less than 40 degrees F (5 degrees C). Maintain this minimum temperature during and 48 hours after installation.

**1.09 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. Provide five year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.

D. Provide five year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

## PART 2 PRODUCTS

### 2.01 BASIS OF DESIGN -- FRAMING FOR INSULATING GLAZING

A. Center-Set Style, Thermally-Broken:
   1. Basis of Design: Kawneer; Trifab VG 451T.
   2. Basis of Design: Tubelite; 14000 Series.
   3. Basis of Design: EFCO Corporation; Series 403, Thermal Storefront Framing: www.efcocorp.com/sle.
   4. Basis of Design: CMI Architectural; 450TB CG.
   5. Basis of Design: Manko; 2450 Series.

B. Substitutions: See Section 01 6000 - Product Requirements.
   1. For any product not identified as "Basis of Design", submit information as specified for substitutions.

### 2.02 BASIS OF DESIGN -- SWINGING DOORS

A. Wide Stile, Insulating Glazing, Not Thermally-Broken:
   1. Basis of Design: Kawneer; 500 Heavy Wall Wide Stile Door.
   2. Basis of Design: Tubelite; Monumental Doors
   3. Basis of Design: EFCO Corporation; Series D518 Durastile Heavy Duty: www.efcocorp.com/sle.
   4. Basis of Design: CMI Architectural; 500HD Heavy Duty Door.
   5. Basis of Design: Manko; 150H Series Wide Stile Door.

B. Substitutions: See Section 01 6000 - Product Requirements.
   1. For any product not identified as "Basis of Design", submit information as specified for substitutions.

### 2.03 STOREFRONT

A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
   1. Glazing Rabbet: For 1 inch (25 mm) insulating glazing.
   2. Finish: Class I natural anodized.
      a. Factory finish all surfaces that will be exposed in completed assemblies.
   3. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
   4. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
   5. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.

6. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F (95 degrees C) over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
7. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
8. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.

B. Performance Requirements:
1. Wind Loads: Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
a. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
2. Water Penetration Resistance: No uncontrolled water on interior face, when tested in accordance with ASTM E331 at pressure differential of 8 psf (390 Pa).
3. Air Leakage: Maximum of 0.06 cu ft/min sq ft (0.3 L/sec sq m) of wall area, when tested in accordance with ASTM E283 at 6.27 psf (300 Pa) pressure differential across assembly.

**2.04 COMPONENTS**

A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
1. Framing members for interior applications need not be thermally broken (except at interior locations with insulated glass).
2. Glazing Stops: Flush.
3. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel member.

B. Swing Doors: Glazed aluminum.
1. Thickness: 2 inches (50 mm), minimum.
2. Top Rail: 5 inches (125 mm) wide.
3. Vertical Stiles: 5 inches (125 mm) wide.
4. Bottom Rail: 10 inches (254 mm) wide.
5. Glazing Stops: Square.
6. Finish: Same as storefront.

C. Sill Plate: Provide a subsill plate with integral front lip. Match finish of storefront system.

**2.05 MATERIALS**

A. Extruded Aluminum: ASTM B221 (ASTM B221M).

B. Structural Steel Sections: ASTM A36/A36M; galvanized in accordance with requirements of ASTM A123/A123M.

C. Fasteners: Stainless steel.

D. Exposed Flashings: Aluminum sheet, 20 gage, 0.032 inch (0.81 mm) minimum thickness; finish to match framing members.

E. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.

F. Touch-Up Primer for Galvanized Steel Surfaces: SSPC-Paint 20, zinc rich.

### 2.06 FINISHES

A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils (0.018 mm) thick.

### 2.07 HARDWARE

A. Door Hardware: As specified in Section 08 7100 - Door Hardware.

B. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify dimensions, tolerances, and method of attachment with other work.

B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

### 3.02 INSTALLATION

A. Install wall system in accordance with manufacturer's instructions.

B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

C. Provide alignment attachments and shims to permanently fasten system to building structure.

D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

E. Provide thermal isolation where components penetrate or disrupt building insulation.

F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.

G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.

H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

I. Set thresholds in bed of sealant and secure.

J. Install glass and infill panels in accordance with Section 08 8000, using glazing method required to achieve performance criteria.

K. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

**3.03 TOLERANCES**

A. Maximum Variation from Plumb: 0.06 inches every 3 ft (1.5 mm/m) non-cumulative or 1/16 inches per 10 ft (1.5 mm/3 m), whichever is less.

B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch (0.8 mm).

**3.04 FIELD QUALITY CONTROL**

A. See Section 01 4000 - Quality Requirements, for independent testing and inspection requirements. Inspection will monitor quality of installation and glazing.

B. Test installed storefront for water leakage in accordance with AAMA 501.2 hose test.

**3.05 ADJUSTING**

A. Adjust operating hardware for smooth operation.

**3.06 CLEANING**

A. Remove protective material from pre-finished aluminum surfaces.

B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

C. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.

**3.07 PROTECTION**

A. Protect installed products from damage until Date of Substantial Completion.

## END OF SECTION

# SECTION 08 5313 - VINYL WINDOWS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Vinyl-framed, factory-glazed windows.

B. Operating hardware.

### 1.02 RELATED REQUIREMENTS

A. Section 07 9200 - Joint Sealants: Sealing joints between frames and adjacent construction.

### 1.03 REFERENCE STANDARDS

A. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/Specification for windows, doors, and skylights; 2011.

B. AAMA 701/702 - Combined Voluntary Specifications for Pile Weatherstrip and Replaceable Fenestration Weatherseals; 2011.

C. ASTM E2112 - Standard Practice for Installation of Exterior Windows, Doors and Skylights; 2007.

### 1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week week before starting work of this section.
   1. Manufacturer's representative shall be required to attend meeting.

### 1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide component dimensions, anchors, fasteners, glass, and internal drainage.

C. Shop Drawings: Indicate opening dimensions, framed opening tolerances, affected related work, and installation requirements.

D. Manufacturer's Certificate: Certify that products of this section meet or exceed specified requirements.

E. Grade Substantiation: Prior to submitting shop drawings or starting fabrication, submit one of the following showing compliance with specified grade:
   1. Evidence of AAMA Certification.
   2. Evidence of WDMA Certification.
   3. Evidence of CSA Certification.
   4. Test report(s) by independent testing agency itemizing compliance and acceptable to authorities having jurisdiction.

F. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

### 1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

B. Installer Qualifications: Company specializing in performing of type specified and with at least three years documented experience.

### 1.07 DELIVERY, STORAGE, AND HANDLING

A. Protect finished surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond when exposed to sunlight or weather.

B. Jig, brace, and box the window frame assemblies for transport to minimize flexing of members or joints.

### 1.08 FIELD CONDITIONS

A. Do not install sealants when ambient temperature is less than 40 degrees F (5 degrees C).

B. Maintain this minimum temperature during and after installation of sealants.

### 1.09 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a ten year period after Date of Substantial Completion.

C. Provide ten year manufacturer warranty for insulated glass units from seal failure, interpane dusting or misting, and replacement of same. Include coverage for degradation of color finish.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

A. Vinyl Windows Basis of Design: Thermo-Tech Vinyl Windows and Doors; www.ttwindows.com.

### 2.02 DESCRIPTION

A. Vinyl Windows: Factory fabricated frame and sash members of extruded, hollow, ultra-violet-resistant, polyvinyl chloride (PVC) with integral color; with factory-installed glazing, hardware, related flashings, anchorage and attachment devices.
   1. Configuration: As indicated on drawings.
      a. Product Type: C - Casement window and FW - Fixed window.
   2. Color: Color as selected.
   3. Size to fit openings with minimum clearance around perimeter of assembly providing necessary space for perimeter seals.
   4. Framing Members: Fusion welded corners and joints, with internal reinforcement where required for structural rigidity; concealed fasteners.
   5. System Internal Drainage: Drain to exterior side by means of weep drainage network any water entering joints, condensation within glazing channel, or other migrating moisture within system.
   6. Glazing Stops, Trim, Flashings, and Accessory Pieces: Formed of rigid PVC, fitting tightly into frame assembly.

B. Performance Requirements: Provide products that comply with the following:
   1. Grade: AAMA/WDMA/CSA 101/I.S.2/A440 requirements for specific window type:
      a. Performance Class (PC): LC.

### 2.03 COMPONENTS

A. Glazing: Insulated double pane, annealed glass, clear, low-E coated, argon filled, with glass thicknesses as recommended by manufacturer for specified wind conditions and acoustic rating indicated.

B. Operable Sash Weatherstripping: Wool pile; permanently resilient, profiled to maintain weather seal in accordance with AAMA 701/702.

C. Provide stops at all operable windows where the sill is less than 40 inches above the finish floor. Stops shall prevent the passage of a 4 inch sphere through the window when fully open.

D. Sealants for Setting Window Sill Pan Flashing: Provide butyl tape, non-hardening butyl, polyurethane, or silicone sealant; in compliance with ASTM E2112 installation practices.

### 2.04 HARDWARE

A. Sash lock: Lever handle and keeper with cam lock, provide at least one for each operating sash.

B. Casement/Awning Sash: Steel rotary arm sash operating mechanism with fold-down handle and two bar adjustable hinges and keepers fitted to projecting sash arms with limit stops.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify wall openings and adjoining air and vapor seal materials are ready to receive this work.

### 3.02 INSTALLATION

A. Install window unit assemblies in accordance with manufacturers instructions and applicable building codes.

B. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities as necessary.

C. Align window plumb and level, free of warp or twist, and maintain dimensional tolerances and alignment with adjacent work.

D. Set sill members and sill flashing in continuous bead of sealant.

E. Provide thermal isolation where components penetrate or disrupt building insulation. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

F. Install operating hardware.

### 3.03 TOLERANCES

A. Maximum Variation from Level or Plumb: 0.06 inches every 3 ft (1.5 mm/m) non-cumulative or 0.5 inches per 100 ft (12 mm/30 m), whichever is less.

**3.04 ADJUSTING**

A. Adjust hardware for smooth operation and secure weathertight closure.

**3.05 CLEANING**

A. Remove protective material from pre-finished surfaces.

B. Wash surfaces by method recommended and acceptable to window manufacturer; rinse and wipe surfaces clean.

C. Remove excess glazing sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer and appropriate for application indicated.

## END OF SECTION

# SECTION 08 7100 - DOOR HARDWARE

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Hardware for wood, aluminum, and hollow metal doors.

B. Electrically operated and controlled hardware.

C. Thresholds.

D. Weatherstripping, seals and door gaskets.

### 1.02 RELATED REQUIREMENTS

A. Section 08 1113 - Hollow Metal Doors and Frames.

B. Section 08 1416 - Flush Wood Doors.

C. Section 08 4313 - Aluminum-Framed Storefronts: Hardware for doors in storefront, including:
   1. Integral weatherstripping.

### 1.03 REFERENCE STANDARDS

A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

B. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2009.

C. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2016.

D. NFPA 101 - Life Safety Code; 2015.

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Within ten days after award of contract, submit detailed hardware schedule in quantities as required by Division 01 - General Conditions.

C. Schedule format shall be consistent with recommendations for a vertical format as set forth in the Door & Hardware Institute's (DHI) publication "Sequence and Format for the Hardware Schedule". Hardware sets shall be consolidated to group multiple door openings which share similar hardware requirements. Schedule shall include the following information:
   1. Door number, location, size, handing, and rating.
   2. Door and frame material, handing.
   3. Degree of swing.
   4. Manufacturer
   5. Product name and catalog number
   6. Function, type and style
   7. Size and finish of each item
   8. Mounting heights
   9. Explanation of abbreviations, symbols, etc.

10. Numerical door index, indicating the hardware set/ group number for each door.

D. When universal type door closers are to be provided, the schedule shall indicate the application method to be used for installation at each door: (regular arm, parallel arm, or top jamb).

E. The schedule will be prepared under the direct supervision of a certified Architectural Hardware Consultant (AHC) employed by the hardware distributor. The hardware schedule shall be signed and embossed with the DHI certification seal of the supervising AHC. The supervising AHC shall attend any meetings related to the project when requested by the architect.

F. Check the specified hardware for suitability and adaptability to the details and surrounding conditions.

G. Review drawings from related trades as required to verify compatibility with specified hardware. Indicate unsuitable or incompatible items, and proposed substitutions in the hardware schedule.

H. Provide documentation for all hardware to be furnished on labeled fire doors indicating compliance with positive pressure fire testing UL 10C.

I. Furnish manufacturers' catalog data for each item of hardware in quantities as required by Division 01 - General Conditions.

J. Submit a sample of each type of hardware requested by the architect. Samples shall be of the same finish, style, and function as specified herein. Tag each sample with its permanent location so that it may be used in the final work.

K. Furnish with first submittal, a list of required lead times for all hardware items.

L. After final approved schedule is returned, transmit corrected copies for distribution and field use in quantities as required by Division 01 - General Conditions.

M. Furnish approved hardware schedules, template lists, and pertinent templates as requested by related trades.

N. Furnish necessary diagrams, schematics, voltage and amperage requirements for all electro-mechanical devices or systems as required by related trades. Wiring diagrams shall be opening specific and include both a riser diagram and point to point diagram showing all wiring terminations.

O. After receipt of approved hardware schedule, Hardware supplier shall initiate a meeting including the owner's representative to determine keying requirements. Upon completion of the initial key meeting, hardware supplier shall prepare a proposed key schedule with symbols and abbreviations as set forth in the door and hardware institute's publication "Keying Procedures, Systems, and Nomenclature". Submit copies of owner approved key schedule for review and field use in quantities as required by Division 01 - General Conditions. Wiring diagrams shall be included in final submittals transmitted for distribution and field use.

**1.05 DELIVERY, STORAGE, AND HANDLING**

A. Hardware supplier shall deliver hardware to the job site unless otherwise specified.

B. All hardware shall be delivered in manufacturers' original cartons and shall be clearly marked with set and door number.

C. Coordinate with contractor prior to hardware delivery and recommend secure storage and protection against loss and damage at job site.

D. Contractor shall receive all hardware and provide secure and proper protection of all hardware items to avoid delays caused by lost or damaged hardware. Contractor shall report shortages to the Architect and hardware supplier immediately after receipt of material at the job site.

E. Coordinate with related trades under the direction of the contractor for delivery of hardware items necessary for factory installation.

### 1.06 COORDINATION

A. Templates: Distribute door hardware templates for doors, frames, and other Work specified to be factory prepared for installing door hardware. Check Shop Drawings of other Work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

B. Electrical System Roughing-in: Coordinate layout and installation of electrified door hardware with connections to power supplies, fire alarm system and detection devices, access control system, security system, and building control system.
   1. Prior to installation of electronic hardware, arrange conference between door hardware, and door/frame supplier, installers and related trades to review materials, procedures and coordinating related work.

### 1.07 PRE-INSTALLATION MEETING

A. Schedule a hardware pre-installation meeting on site to review and discuss the installation of continuous hinges, locksets, door closers, exit devices, overhead stops, and electromechanical door hardware.

B. Meeting attendees shall be notified 7 days in advance and shall include: Architect, Contractor, Door Hardware Installers (including low voltage hardware), Manufacturers representatives for above hardware items, and any other effected subcontractors or suppliers.

C. All attendees shall be prepared to distribute installation manuals, hardware schedules, templates, and physical hardware samples.

### 1.08 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. All hardware items shall be warranted against defects in material and workmanship as set forth in Division One General Requirements.

C. Repair, replace, or otherwise correct deficient materials and workmanship without additional cost to owner.

## PART 2 PRODUCTS

### 2.01 DOOR HARDWARE - GENERAL

A. Provide hardware specified or required to make doors fully functional, compliant with applicable codes, and secure to the extent indicated.

B. Provide items of a single type of the same model by the same manufacturer.

C. Provide products that comply with the following:
   1. Applicable provisions of federal, state, and local codes.
   2. Accessibility: ADA Standards and ICC A117.1.
   3. Applicable provisions of NFPA 101, Life Safety Code.

D. Fasteners:
   1. All exposed fasteners shall be Phillips head or as otherwise specified, and shall match the finish of the adjacent hardware. All fasteners exposed to the weather shall be non-ferrous or stainless steel. Furnish correct fasteners to accommodate surrounding conditions.
   2. Coordinate required reinforcements for doors and frames. Seek approval of the architect prior to furnishing through-bolts. Furnish through-bolts as required for materials not readily reinforced.

**2.02 HINGES**

A. Acceptable manufacturers and respective catalog numbers:

| | Ives | Stanley | Hager | McKinney |
|---|---|---|---|---|
| Standard Weight, Plain Bearing | 5PB1 | F179 | 1279 | T2714 |
| Standard Weight, Ball Bearing | 5BB1 | BB179 | BB1279 | TB2714 |
| Standard Weight, Ball Bearing, Non-Ferrous | 5BB1 | FBB191 | BB1191 | TB2314 |
| Heavy Weight, Ball Bearing | 5BB1HW | FBB168 | BB1168 | T4B3786 |
| Heavy Weight, Ball Bearing, Non-Ferrous | 5BB1HW | FBB199 | BB1199 | T4B3386 |

B. Quantity of Hinges Per Door:
   1. Doors From 60 inches (1.5 m) High up to 90 inches (2.3 m) High: Three hinges.
   2. Doors 90 inches (2.3 m) High up to 120 inches (3 m) High: Four hinges.

C. Unless otherwise specified, top and bottom hinges shall be located as specified in Division 08 Section "Hollow Metal Doors and Frames". Intermediate hinges shall be located equidistant from others.

D. Unless otherwise specified, furnish hinge weight and type as follows:
   1. Standard weight: plain bearing hinge 5PB1 for interior openings through 36 inches wide without a door closer.
   2. Standard weight: ball bearing hinge 5BB1 for interior opening over 36 through 40 inches wide without a door closer, and for interior openings through 40 inches wide with a door closer.
   3. Heavyweight: 4 ball bearing hinge 5BB1HW for interior openings over 40 inches wide, and for all vestibule doors.
   4. Heavyweight: 4 ball bearing hinge 5BB1HWss for exterior openings unless otherwise listed in groups.

E. Unless otherwise specified, furnish hinges for exterior doors, fabricated from brass, bronze, or stainless steel. Unless otherwise specified, hinges for interior doors may be fabricated from steel.

F. Unless otherwise specified, furnish hinges in the following sizes:
   1. 5" x 5" 2-1/4" thick doors
   2. 4-1/2" x 4-1/2" 1-3/4" thick doors
   3. 3-1/2" x 3-1/2" 1-3/8" thick doors

G. Furnish hinges with sufficient width to accommodate trim and allow for 180-degree swing.

H. Unless otherwise specified, furnish hinges with flat button tips with non-rising pins at interior doors, non-removable loose pins (NRP) at exterior and out-swinging interior doors.

I. Unless otherwise specified, furnish all hinges to template standards.

**2.03 CONTINUOUS PIN AND BARREL HINGES**

A. Acceptable manufacturers and respective catalog numbers:

| | Ives | Markar | Stanley | McKinney |
|---|---|---|---|---|
| Edge Mount Pin & Barrel Stainless Steel Continuous Hinge | 700 Series | 300 Series | 650 Series | 300 Series |

B. Continuous hinges shall be full height pin and barrel type hinge providing full height door support up to 600 lbs. Edge mount (unless noted otherwise).

C. Construct hinges of heavy-duty 14-gauge material. The stainless internal pin shall have a diameter of 0.25 and the exterior barrel diameter of 0.438.

D. Hinge shall be non-handed with symmetrical template hole pattern and factory drilled. Hinge must accept a minimum of 21 fasteners on the door and 21 fasteners on the frame.

E. Each knuckle to be 2 inch, including split nylon bearing at each separation for quiet, smooth, self-lubricating operation.

F. Hinge to be able to carry Warnock Hersey Int. or UL for fire rated doors and frames up to 3 hours.

G. Provide machine screws for doors which have been reinforced to accept machine screws.

H. Note: Fire label for doors and frames should be placed on the header and top rail of fire rated doors and frames.

**2.04 LOCKS AND LATCHES**

A. Acceptable manufacturers and respective catalog numbers:

| | Schlage | Sargent | Corbin | Best |
|---|---|---|---|---|
| Grade 1 Cylindrical | ND Series SPA | 10 Line LP | CL3300 PZD | 9K Series 14D |
| Grade 1 Mortise | L9000 Series 17A | 8200 Series LNP | ML2000 Series PS | 45H Series 14H |

B. Minimize transmission of heat to lock trim. Provide temperature control modules (TCM) on all electrified locks when cataloged by the lock manufacturer.

C. Unless otherwise specified, all locks and latches to have:
1. 2-3/4" Backset
2. 1/2" minimum throw latchbolt
3. 1" throw deadbolt
4. 6 pin cylinders
5. ANSI A115.2 strikes

D. Provide guarded latch bolts for all locksets, and latch bolts with sufficient throw to maintain fire rating of both single and paired door assemblies.

E. Length of strike lip shall be sufficient to clear surrounding trim.

F. Provide wrought boxes for strikes at inactive doors, wood frames, and metal frames without integral mortar covers.

**2.05 EXIT DEVICES**

A. Acceptable manufacturers and respective catalog numbers:

| | Von Duprin | Sargent | Detex |
|---|---|---|---|
| Wide Stile, Push Pad | 98/99 Series | GL-43-80 Series | Advantex (Wide Stile) |
| Wide Stile, Electric Latch Retraction | QEL 98/99 Series | GL-43-56-80 Series | Advantex-ER (Wide Stile) |
| Lever Trim | 996 Series | 740 ET | "D/DM" Trim |
| Pull Trim | 990 Series | 800 MAL | "C" Trim |

B. Obtain exit devices from a single manufacturer, although several may be indicated as offering products complying with requirements.

C. All exit devices shall be equipped with a sound-dampening feature to reduce touch pad return noise.

D. Quiet Electric Latch Retraction shall be accomplished using a motor driven assembly, and shall incorporate the following features:
   1. Motor shall retract both the push pad assembly and latchbolt.
   2. Automatic calibration of latch throw and pull.
   3. Built-in time delay.
   4. On-board installation and troubleshooting diagnostics built into power supply and device.
   5. Retry mode if device does not pull on the first try.

E. All exit devices shall be provided with flush end caps to reduce potential damage from impact.

F. All exit devices shall be provided with dead-locking latch bolts to insure security.

G. All exit devices shall be U.L. listed for accident hazard. Exit device for use on fire doors shall also be U.L. listed for fire exit hardware.

H. Provide optional strikes, special length rods, and adapter plates to accommodate door and frame conditions. Provide narrow style series devices in lieu of wide stile series devices where optional strikes will not accommodate door and frame conditions.

I. Coordinate with related trades to insure adequate clearance and reinforcement is provided in doors and frames. Provide thru bolts as required.

J. Refer to hardware groups for exit device applications utilizing the option of: "less bottom rod and floor strike" (LBR)

K. All exit devices shall be provided with optional trim designs to match other lever and pull designs used on the project.

L. Unless specific exit device dogging options are noted within hardware sets, provide dogging options as follows:
   1. Fire Rated devices: Dogging not permitted.
   2. Non-Rated Exit Only functions not equipped with outside trim or pull: Less Dogging.
   3. Non-Rated Classroom functions: Less Dogging.
   4. Non-Rated devices utilizing electric latch retraction or electrified outside trim: Less Dogging.
   5. All Other Non-Rated devices: Cylinder Dogging utilizing interchangeable core cylinders. Cylinder keyway shall match locksets furnished on this project.

M. Provide glass bead kits as required to accommodate door conditions. Screws shall not be visible through full glass doors.

N. Where specified, provide compatible keyed mullions with cylinder for pairs of doors.

O. Provide reinforced crossbars for all traditional style exit devices applied to doors over 36" wide.

**2.06 CLOSERS**

A. Acceptable manufacturers and respective catalog numbers:

| LCN | Norton | Sargent | Corbin |
|---|---|---|---|
| 4050/4050 EDA | R7500/PR7500 | 351/351P10 | DC8000 A10/DC8000 A3 |

B. Obtain door closers from a single manufacturer, although several may be indicated as offering products complying with requirements.

C. Provide extra heavy duty arm (EDA / HD) when closer is to be installed using parallel arm mounting.

D. Hardware supplier shall coordinate with related trades to insure aluminum frame profiles will accommodate specified door closers.

E. Closers shall use high strength cast cylinders, forged main arms, and 1 piece forged steel pistons.

F. Closers shall utilize a stable fluid withstanding temperature range of +120 deg F to -30 deg F without seasonal adjustment of closer speed to properly close the door. Closers for fire-rated doors shall be provided with temperature stabilizing fluid that complies with standards UL10C.

G. Unless otherwise specified, all door closers shall have full covers and separate adjusting valves for sweeps, latch, and backcheck.

H. Provide closers for all labeled doors. Provide closer series and type consistent with other closers for similar doors specified elsewhere on the project.

I. Provide closers with adjustable spring power. Size closers to insure exterior and fire rated doors will consistently close and latch doors under existing conditions. Size all other door closers to allow for reduced opening force not to exceed 5 lbs.

J. Install closers on the room side of corridor doors, stair side of stairways and interior side of exterior doors.

K. Closers shall be furnished complete with all mounting brackets and cover plates as required by door and frame conditions, and by adjacent hardware.

L. Door closers shall be provided with a powder coat finish to provide superior protection against the effects of weathering. Powder coat finish shall successfully pass a 100 hour salt spray test.

M. Pressure Relief Valve, PRV, shall not be acceptable.

**2.07 LOW ENERGY ELECTRO-HYDRAULIC AUTOMATIC OPERATORS**

A. Acceptable manufacturers and respective catalog numbers:

| | LCN | Besam |
|---|---|---|
| Electro-Hydraulic Operator | 4640 | PowerSwing |

B. Where low kinetic energy, as defined by ANSI/BHMA Standard A156.19, power operators are indicated for doors required to be accessible to the disabled, provide electrically powered operators complying with the ADA for opening force and time to close standards.

C. The closing action shall be controlled by modern type cast iron door closer cylinder filled with a flat viscosity fluid, stable from +120F to -30F that would require no seasonal adjustments. The closer shall have field adjustable spring power; have two independent closing speed adjustment valves, and hydraulic back-check.

D. Full closing force shall be provided when the power or assist cycle ends.

E. All power operator systems shall include the following features and functions:
   1. Provisions for separate conduits to carry high and low voltage wiring in compliance with the National Electrical Code, section 725-31.
   2. The operator will be designed with an electronically controlled mechanical clutching mechanism to prevent damage to the operator if the system is actuated while the door is latched or if the door is forced closed during the opening cycle.
   3. All covers, mounting plates and arm systems shall be powder coated and successfully pass a minimum of 100 hours testing as outlined in ANSI/BHMA Standard A156.18.
   4. UL listed for use on labeled doors.
   5. All operators shall be non-handed with spring power over a range of at least four sizes; either 1 through 4 or 2 through 5.
   6. The power operator shall incorporate microprocessor controlled digital controls including: factory default memory settings, on-board diagnostics, non-volital memory, and integrated delay and relay for controlling door release devices.
   7. Provisions in the control box or module shall provide control inputs and outputs) for; electric strike delay, auxiliary contacts, sequential operation, fire alarms systems, actuators, swing side sensors, and stop side sensors.
   8. Wall mounted actuators shall consist of a 4-1/2 inch diameter stainless steel touch plate with a blue filled handicapped symbol. Switches shall be weather resistant and mount on a single gang electrical box furnished by Division 26.

F. All electrically powered operators shall include the following features or functions:
   1. When an obstruction or resistance to the opening swing is encountered, the operator will pause at that point, then attempt to continue opening the door. If the obstruction or resistance remains, the operator will again pause the door.
   2. Easily accessible main power and maintain hold open switches will be provided on the operator.
   3. An electronically controlled clutch to provide adjustable opening force.
   4. A microprocessor to control all motor and clutch functions.

5. An on-board power supply capable of delivering both 12V and 24V outputs up to a maximum of 1.0 ampere combined load.
6. All input and output power wiring shall be protected by slow blow fuses. These fuses shall be easily replaceable without special tools or component replacement.
7. If electrical failure occurs, the unit shall operate as a standard door closer.

G. Power Operators shall be warranted by the manufacture to be free from defects in material and workmanship for a period of two years.

**2.08 OVERHEAD STOPS**

A. Acceptable manufacturers and respective catalog numbers:

| | Glynn-Johnson | Rixson | Sargent |
|---|---|---|---|
| Heavy Duty Surface Mount | GJ900 Series | 9 Series | 590 |
| Heavy Duty Concealed Mount | GJ100 Series | 1 Series | 690 |

B. Overhead stops (including slide block and end caps) shall be fabricated from metal.

C. Unless otherwise specified, furnish GJ900 series overhead stop for doors equipped with regular arm surface type closers that swing more than 140 degrees before striking a wall, for doors that open against equipment, casework, sidelights, or other objects that would make wall bumpers inappropriate, and as specified in hardware groups.

D. Furnish sex bolt attachments for wood and mineral core doors unless doors are supplied with proper reinforcing blocks.

E. Provide special stop only (“SE” suffix) overhead stops when used in conjunction with electronic hold open closers.

F. Do not provide holder function for labeled doors.

**2.09 WALL STOPS AND HOLDERS**

A. Acceptable manufacturers and respective catalog numbers:

| | Ives | Hager | Burns | Rockwood |
|---|---|---|---|---|
| Wrought Convex Wall Bumper | WS406CVX | 232W | 570 | 406 |
| Wrought Concave Wall Bumper | WS406CCV | 236W | 575 | 409 |
| Automatic Wall Holder | WS40 | 326W | 533 | 490 |

B. Furnish a stop or holder for all doors. Furnish floor stops or hinge pin stops only where specifically specified.

C. Where wall stops are not applicable, furnish overhead stops.

D. Do not provide holder function for labeled doors.

**2.10 WEATHERSTRIP, GASKETING**

A. Acceptable manufacturers and respective catalog numbers:

| | Zero | Pemko | NGP | Reese |
|---|---|---|---|---|
| Weatherstrip | 429 | 2891_PK | 700NA | 755 |
| Adhesive Gasket | 188S | S88 | 5050 | 797 |
| Mullion Seal/Silencer | 8780 | 5110 | 5100N | |
| Meeting Edge Seals | 8193 | 18041 | 9605 | 959 |
| Automatic Door Bottom (hard surface) | 360 | 434_RL | 423N | 430 |
| Automatic Door Bottom (carpet) | 360 | 434_NBL | 683 | 943 |
| Automatic Door Bottom | 355 | 420APKL | 320N | 372A |
| Sweeps | 8192 | 18061_NB | B606 | 964 |
| Sweep w/ Drip | 8198 | 345_N | C627 | 354 |
| Drip Cap | 142 | 346 | 16 | R201 |

B. Where specified in the hardware groups, furnish the above products unless otherwise detailed in groups.

C. Provide weatherstripping all exterior doors and where specified.

D. Provide intumescent and other required edge sealing systems as required by individual fire door listings to comply with positive pressure standards UL 10C.

E. Provide Zero 188S smoke gaskets at all fire rated doors and smoke and draft control assemblies.

F. Provide gasketing for all meeting edges on pairs of fire doors. Gasketing shall be compatible with astragal design provided by door supplier as required for specific fire door listings.

**2.11 THRESHOLDS**

A. Acceptable manufacturers and respective catalog numbers:

| | Zero | Pemko | NGP | Reese |
|---|---|---|---|---|
| Saddle Thresholds | 8655 | 171 | 425 | S205 |

B. Hardware supplier shall verify all finish floor conditions and coordinate proper threshold as required to insure a smooth transition between threshold and interior floor finish.

C. Threshold Types:
1. Unless otherwise specified, provide saddle threshold similar to Zero 8655 for all exterior openings with an interior floor finish less than or equal to 1/4" in height.
2. Unless otherwise specified, provide half saddle threshold similar to Zero 1674 for all exterior openings with an interior floor finish greater than 1/4" in height. Threshold height shall match thickness of interior floor finish.

**2.12 PULLS, PUSH BARS, PUSH/PULL PLATES**

A. Acceptable manufacturers and respective catalog numbers:

| | Burns | Hager | Rockwood | Ives |
|---|---|---|---|---|
| Straight Pull (1" dia. 10" ctc) | 26C | 4J | 111 | 8103-0 |

| | | | | |
|---|---|---|---|---|
| Straight Pull (3/4" dia. 8" ctc) | 25B | 3G | 107 | 8102-8 |
| Offset Door Pull (1" dia. 10" ctc) | 39C | 12J | BF157 | 8190-0 |
| Pull/Push Bar (1" dia. 10" ctc Pull) | 422 x 26C | 153 | 11147 | 9103-0 |
| Offset Pull/Push Bar (1" dia. 10" ctc Pull) | 422 x 39C | 157 | BF15747 | 9190-0 |
| Push Plate (0.050 4" x 16") | 54 | 30S 4 x 16 | 70C | 8200 4" x 16" |
| Push Plate (0.050 6" x 16") | 56 | 30S 6 x 16 | 70E | 8200 6" x 16" |
| Pull Plate (1" dia. 10" ctc - 0.050" x 4" x 16") | 5426C | 34J 4 x 16 | 111 x 70C | 8303-0 4" x 16" |

B. Adjust dimensions of push plates to accommodate stile and rail dimensions, lite and louver cutouts, and adjacent hardware. Where required by adjacent hardware, push plates shall be factory drilled for cylinders or other mortised hardware. All push plates shall be beveled 4 sides and counter sunk.

C. Where possible, provide back-to-back, and concealed mounting for pulls and push bars. Push bar length shall be 3" less door width, or center of stile to center of stile for stile & rail or full glass doors.

**2.13 COORDINATORS**

A. Acceptable manufacturers and respective catalog numbers:

| | Ives | Door Controls | Hager | Rockwood |
|---|---|---|---|---|
| Bar Coordinator | COR x FL | 600 x Filler | 297D x 297F | 2600 Series |
| Mounting Bracket | MB Series | AB, C Series | 297 Series | 2600 Series |

B. Provide coordinators at all pairs of doors having automatic flush bolts and closers on the inactive leaf, and for pairs of doors having vertical rod/mortise exit device combinations with overlapping astragals.

C. Provide appropriate filler bars, closer mounting brackets, carry bars, and special top latch preparations as required by adjacent hardware.

**2.14 KICK PLATES AND MOP PLATES**

A. Acceptable manufacturers and respective catalog numbers:

| | Rockwood | Hager | Ives | Hiawatha |
|---|---|---|---|---|
| Kick Plate | K1050 | 190S | 8400 | J102 |

B. Furnish protective plates as specified in hardware groups.

C. Where specified, provide 10" kick plates, 34" armor plates, and 4" mop plates. Unless otherwise specified, metal protective plates shall be .050" thick; plastic plates shall be 1/8" thick.

D. Protective plates shall be 2" less door width, or 1" less door width at pairs. All protective plates shall be beveled 4 sides and counter sunk. Protection plates over 16" shall not be provided for labeled doors unless specifically approved by door manufacturers listing.

E. Where specified, provide surface mounted door edges. Edges shall butt to protective plates. Provide edges with cutouts as required adjacent hardware.

F. Adjust dimensions of protection plates to accommodate stile and rail dimensions, lite and louver cutouts, and adjacent hardware. Where required by adjacent hardware, protection plates shall be factory drilled for cylinders or other mortised hardware.

**2.15 FINISHES AND BASE MATERIALS**

A. Unless otherwise indicated in the hardware groups or herein, hardware finishes shall be applied over base metals as specified in the following finish schedule:

| | HARDWARE ITEM | BHMA FINISH AND BASE MATERIAL |
|---|---|---|
| 1. | Butt Hinges: Exterior, or Non-Ferrous | 630 (US32D - Satin Stainless Steel) |
| 2. | Butt Hinges: Interior | 652 (US26D - Satin Chromium) |
| 3. | Continuous Hinges | 630 (US32D - Satin Stainless Steel) |
| 4. | Flush Bolts | 626 (US26D - Satin Chromium) |
| 5. | Exit Devices | 626 (US26D - Satin Chromium) |
| 6. | Locks and Latches | 626 (US26D - Satin Chromium) |
| 7. | Pulls and Push Plates/Bars | 630 (US32D - Satin Stainless Steel) |
| 8. | Coordinators | 600 (Prime painted or mill alum.) |
| 9. | Closers | 689 (Powder Coat Aluminum) |
| 10. | Protective Plates | 630 (US32D - Satin Stainless Steel) |
| 11. | Overhead Stops | 630 (US32D - Satin Stainless Steel) |
| 12. | Wall Stops and Holders | 630 (US32D - Satin Stainless Steel) |
| 13. | Thresholds | 628 (Mill Aluminum) |
| 14. | Weatherstrip, Sweeps Drip Caps | Aluminum Anodized |
| 15. | Magnetic Holders | Sprayed Aluminum |
| 16. | Miscellaneous | 626 (US26D - Satin Chromium) |

**2.16 KEYING**

A. Acceptable manufacturers and respective catalog numbers:

| Schlage | Sargent | Corbin |
|---|---|---|
| Everest 29 | Degree | Access |

B. Provide all locks and cylinders utilizing a patented keyway to prevent manufacturing and distribution of aftermarket key blanks by anyone other than factory authorized dealers.

C. All locks under this section shall be keyed as directed by the owner to a new Patented Grand Master Key System.

D. Keying shall be by lock manufacturer where permanent records shall be kept.

E. Furnish a total of 2 keys per cylinder. Actual cut keys to be determined by owner.

F. Master keys and control keys to be delivered by registered mail to the owner. Change keys shall be delivered in a set up key cabinet. Construction keys shall be delivered to the contractor.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify that doors and frames are ready to receive work; labeled, fire-rated doors and frames are present and properly installed, and dimensions are as indicated on shop drawings.

B. Verify that electric power is available to power operated devices and of the correct characteristics.

C. Prior to installation of hardware, installer shall examine door frame installation to insure frames have been set square and plumb. Installer shall examine doors, door frames, and adjacent wall, floor, and ceiling for conditions, which would adversely effect proper operation and function of door assemblies. Do not proceed with hardware installation until such deficiencies have been corrected.

### 3.02 INSTALLATION

A. Before hardware installation, general contractor/construction manager shall coordinate a hardware installation seminar with a 1 week notice to all parties involved. The seminar is to be conducted on the installation of hardware, specifically of locksets, closers, exit devices, continuous hinges and overhead stops. Manufacturer's representative of the above products to present seminar. Seminar to be held at the job site and attended by installers of hardware (including low voltage hardware) for aluminum, hollow metal and wood doors. Training to include use of installation manuals, hardware schedule, templates and physical products samples.

B. Install all hardware in accordance with the approved hardware schedule and manufacturers instructions for installation and adjustment.

C. Set units level, plumb and true to the line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

D. Drill and countersink units which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accord with industry standards.

E. Drill appropriate size pilot holes for all hardware attached to wood doors and frames.

F. Shim doors as required to maintain proper operating clearance between door and frame.

G. Unless otherwise specified, locate all hardware in accordance with the recommended locations for builders hardware for standard doors and frames as published by the Door and Hardware Institute.

H. Use only fasteners supplied by or approved by the manufacturer for each respective item of hardware.

I. Mortise and cut to close tolerance and conceal evidence of cutting in the finished work.

J. Conceal push and pull bar fasteners where possible. Do not install through bolts through push plates.

K. Install hardware on UL labeled openings in accordance with manufacturer's requirements to maintain the label.

L. Apply self-adhesive gasketing on frame stop at head & latch side and on rabbet of frame at hinge side.

M. Install hardware in accordance with supplemental "S" label instructions on all fire rated openings.

N. Install wall stops to contact lever handles or pulls. Do not mount wall stops on casework, or equipment.

O. Where necessary, adjust doors and hardware as required to eliminate binding between strike and latchbolt. Doors should not rattle.

P. Overhead stops used in conjunction with electrified hold open closers shall be templated and installed to coincide with engagement of closer hold open position.

Q. Install door closers on corridor side of lobby doors, room side of corridor doors, and stair side of stairways.

R. Adjust spring power of door closers to the minimum force required to insure exterior and fire rated doors will consistently close and latch doors under existing conditions. Adjust all other door closers to insure opening force does not to exceed 5 lbs.

S. Adjust "sweep", "latch", & "back check" valves on all door closers to properly control door through out the opening and closing cycle. Adjust total closing speed as required to comply with all applicable state and local building codes.

T. Install "hardware compatible" (bar stock) type weatherstripping continuously for an uninterrupted seal. Adjust templating for parallel arm door closers, exit devices, etc., as required to accommodate weatherstripping.

U. Unless otherwise specified or detailed, install thresholds with the bevel in vertical alignment with the outside door face. Notch and closely fit thresholds to frame profile. Set thresholds in full bed of sealant.

V. Compress sweep during installation as recommended by sweep manufacturer to facilitate a water resistant seal.

W. Deliver to the owner 1 complete set of installation and adjustment instructions, and tools as furnished with the hardware.

**3.03 CLEANING**

A. Clean adjacent surfaces soiled by hardware installation. Clean finished hardware per manufacturer's instructions after final adjustments has been made. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

**3.04 PROTECTION**

A. Protect finished Work under provisions of Section 01 7000 - Execution and Closeout Requirements.

B. Do not permit adjacent work to damage hardware or finish.

## END OF SECTION

# SECTION 08 7105 - HARDWARE GROUPS

**HDWE GROUP 1.0**

| Qty | | Description | Product Number | Manufacturer |
|---|---|---|---|---|
| | | Hinges | As specified | IVE |
| 1 | EA | Passage Lockset | ND10S | SCH |
| 1 | EA | Wall Stop | WS406 | IVE |

Function:

Latch bolt by lever at all times.

**HDWE GROUP 3.0**

| Qty | | Description | Product Number | Manufacturer |
|---|---|---|---|---|
| | | Hinges | As required | IVE |
| 1 | EA | Classroom Lockset | ND70 | SCH |
| 1 | EA | Wall Stop | WS406 | IVE |

Function:

Outside lever locked and unlocked by key. Inside lever always unlocked.

**HDWE GROUP 3.1**

| Qty | | Description | Product Number | Manufacturer |
|---|---|---|---|---|
| | | Hinges | As required | IVE |
| 1 | EA | Classroom Lockset | ND70 | SCH |
| 1 | EA | Overhead stop | 90S | GLY |

Function:

Outside lever locked and unlocked by key. Inside lever always unlocked.

**HDWE GROUP 4.0**

| Qty | | Description | Product Number | Manufacturer |
|---|---|---|---|---|
| | | Hinges | As required | IVE |
| 1 | EA | Storeroom Lock | ND80 | SCH |
| 1 | EA | Wall Stop | WS406 | IVE |

Function:

Outside lever fixed. Entrance by key only. Inside lever always unlocked.

**HDWE GROUP 5.0**

| Qty | | Description | Product Number | Manufacturer |
|---|---|---|---|---|
| | | Hinges | As required | IVE |
| 1 | EA | Entrance Lock | ND53 | SCH |
| 1 | EA | Wall Stop | WS406 | IVE |

Function:

Turn/Push button locking; pushing and turning button locks outside lever requiring use of key until the button is manually unlocked. Push-button locking; pushing button locks outside lever until unlocked by key or by turning the inside lever.

**HDWE GROUP 19.0**

| Qty | | Description | Product Number | Manufacturer |
|---|---|---|---|---|
| | | Hinges | As required | IVE |
| 1 | EA | Push Plate | 8200 6" x 16" | IVE |
| 1 | EA | Pull plate | 8302 10" 4" x 16" | IVE |
| 1 | EA | Surface closer | 4011/4111 EDA | LCN |
| 1 | EA | Kick Plate | 8400 10" x 2" LDW B4E | IVE |
| 1 | EA | Wall Stop | WS406 | IVE |

Function:
Push/pull

**HDWE GROUP 29.0**

| Qty | | Description | Product Number | Manufacturer |
|---|---|---|---|---|
| | | Hinges | As required | IVE |
| 2 | EA | Push Plate | 8200 6" x 16" | IVE |
| 2 | EA | Pull plate | 8302 10" 4" x 16" | IVE |
| 2 | EA | Surface closer | 4011/4111 EDA | LCN |
| 2 | EA | Kick Plate | 8400 10" x 1" LDW B4E | IVE |
| 2 | EA | Wall stop/holder | WS40 | IVE |

Function:
Push/pull

**HDWE GROUP 130.0**

| Qty | | Description | Product Number | Manufacturer |
|---|---|---|---|---|
| | | Hinges | As required | IVE |
| 1 | EA | Panic Hardware | 99-EO-ALK | VON |
| 1 | EA | Surface Closer | 4011/4111 EDA | LCN |
| 1 | EA | Kick Plate | 8400 10" x 2" LDW B4E | IVE |
| 1 | EA | Rain Drip | 142 | ZER |
| 1 | Set | Weatherstripping | 429 | ZER |
| 1 | EA | Door Sweep w/ Drip | 8198 | ZER |
| 1 | EA | Threshold | 8655 | ZER |

Function:
Latchbolt retracted by depressing the actuation bar. No exterior trim or cylinder.
Alarm kit - alarm will sound if actuation bar is depressed.

**HDWE GROUP 219.0**

| Qty | | Description | Product Number | Manufacturer |
|---|---|---|---|---|
| 1 | EA | Continuous hinge | 700 | IVE |
| 1 | EA | Door pull, 1" Round | 8103 10" | IVE |
| 1 | EA | Push bar | 9100 | IVE |
| 1 | EA | Surface closer | 4111 HEDA | LCN |
| 1 | EA | Wall stop | WS406 | IVE |

Function:
Push/pull

**HDWE GROUP 259.0**

| Qty | | Description | Product Number | Manufacturer |
|---|---|---|---|---|
| | | Hinges | As required | IVE |
| 1 | EA | Push plate | 8200 6" x 16" | IVE |
| 1 | EA | Pull plate | 8302 10" 4" x 16" | IVE |
| 1 | EA | Surface Auto Operator | 4642 | LCN |
| 2 | EA | Actuator, wall mount | 8310-853 | LCN |
| 1 | EA | Kick Plate | 8400 10" x 2" LDW B4E | IVE |
| 1 | EA | Wall stop | WS406 | IVE |

Function:

Push/pull

**HDWE GROUP 334.0**

| Qty | | Description | Product Number | Manufacturer |
|---|---|---|---|---|
| 1 | EA | Continuous hinge | 700 | IVE |
| 1 | EA | Panic Hardware | CD-99-NL-OP | VON |
| 1 | EA | Door pull, 1" round | 8103 10" | IVE |
| 1 | EA | OH Stop | 100S | GLY |
| 1 | EA | Surface Closer | 4011/4111 EDA | LCN |
| 1 | EA | Rain Drip | 142A | ZER |
| 1 | EA | Weather Strip | By Door Manufacturer | |
| 1 | EA | Door Sweep w/Drip | 8198 | ZER |
| 1 | EA | Threshold | 8655 | ZER |

Function:

Latchbolt retracted inside by device push pad and outside by key in cylinder. Door locks when key is removed.

**HDWE GROUP 354.0**

| Qty | | Description | Product Number | Manufacturer |
|---|---|---|---|---|
| 1 | EA | Continuous hinge | 700 | IVE |
| 1 | EA | Panic hardware | CD-99-NL-OP | VON |
| 1 | EA | IC Cylinder | As required | |
| 1 | EA | Door pull, 1" round | 8103 10" | IVE |
| 1 | EA | OH Stop | 100S | GLY |
| 1 | EA | Surface auto operator | 4642 | LCN |
| 2 | EA | Actuator | 8310-853 (bollard mount) | LCN |
| 2 | EA | Bollard post | 8310-866 | LCN |
| 1 | EA | Rain Drip | 142 | ZER |
| 1 | EA | Weather Strip | By Door Manufacturer | |
| 1 | EA | Door Sweep w/Drip | 8198 | ZER |
| 1 | EA | Threshold | 8655 | ZER |

Function:

Latchbolt retracted inside by device push pad and outside by key in cylinder. Door locks when key is removed. Actuator inoperable unless device push pad is dogged.

## END OF SECTION

# SECTION 08 8000 - GLAZING

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Insulating glass units.

B. Glazing units.

C. Glazing compounds and accessories.

### 1.02 RELATED REQUIREMENTS

A. Section 07 2500 - Weather Barriers.

### 1.03 REFERENCE STANDARDS

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; current edition.

B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings, Safety Performance Specifications and Methods of Test; 2010.

C. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2011).

D. ASTM C1036 - Standard Specification for Flat Glass; 2011.

E. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2012.

F. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.

G. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass; 2015.

H. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2012a.

I. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2010.

J. GANA (GM) - GANA Glazing Manual; 2009.

K. GANA (SM) - GANA Sealant Manual; 2008.

L. GANA (LGRM) - Laminated Glazing Reference Manual; 2009.

M. IGMA TM-3000 - North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use; 1990 (2004).

N. NFRC 100 - Procedure for Determining Fenestration Product U-factors; 2014.

O. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence; 2014.

P. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems; 2014.

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data on Insulating Glass Unit and Glazing Unit Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.

C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.

D. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

### 1.05 QUALITY ASSURANCE

A. Perform Work in accordance with GANA (GM), GANA (SM), GANA (LGRM), and IGMA TM-3000 for glazing installation methods.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.

### 1.06 FIELD CONDITIONS

A. Do not install glazing when ambient temperature is less than 40 degrees F (4 degrees C).

B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

### 1.07 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Insulating Glass Units: Provide a five (5) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including replacement of failed units.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

A. Float Glass Manufacturers:
   1. Cardinal Glass Industries: www.cardinalcorp.com.
   2. Guardian Industries Corp: www.sunguardglass.com.
   3. Pilkington North America Inc: www.pilkington.com/na.
   4. PPG Industries, Inc: www.ppgideascapes.com.
   5. Substitutions: Refer to Section 01 6000 - Product Requirements.

### 2.02 PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES

A. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.
   1. Design Pressure: Calculated in accordance with applicable codes.
   2. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.

3. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
4. Glass thicknesses listed are minimum.

B. Vapor Retarder and Air Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure vapor retarder and air barrier.
1. In conjunction with vapor retarder and joint sealer materials described in other sections.
a. Refer to Section 07 2500.
2. To utilize the inner pane of multiple pane insulating glass units for the continuity of the vapor retarder and air barrier seal.
3. To maintain a continuous vapor retarder and air barrier throughout the glazed assembly from glass pane to heel bead of glazing sealant.

C. Thermal and Optical Performance: Provide glass products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:
1. Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
2. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
3. Solar Optical Properties: Comply with NFRC 300 test method.

**2.03 GLASS MATERIALS**

A. Float Glass: Provide float glass based glazing unless noted otherwise.
1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality-Q3.
2. Heat-Strengthened and Fully Tempered Types: ASTM C1048, Kind HS and FT.
3. Fully Tempered Safety Glass: Complies with ANSI Z97.1 and 16 CFR 1201 criteria.
4. Tinted Type: ASTM C1036, Class 2 - Tinted, Quality-Q3, color and performance characteristics as indicated.
5. Thicknesses: As indicated; provide greater thickness as required for exterior glazing wind load design.

**2.04 INSULATING GLASS UNITS**

A. Manufacturers:
1. Cardinal Glass Industries: www.cardinalcorp.com.
2. Guardian Industries Corp: www.sunguardglass.com.
3. Pilkington North America Inc: www.pilkington.com/na.
4. PPG Industries, Inc: www.ppgideascapes.com.
5. Viracon, Apogee Enterprises, Inc: www.viracon.com.
6. Substitutions: Refer to Section 01 6000 - Product Requirements.

B. Insulating Glass Units: Types as indicated.
1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
2. Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.
3. Metal Edge Spacers: Aluminum, bent and soldered corners.
4. Spacer Color: Black.
5. Edge Seal:

a. Dual-Sealed System: Provide polyisobutylene sealant as primary seal applied between spacer and glass panes, and silicone, polysulfide, or polyurethane sealant as secondary seal applied around perimeter.

6. Color: Black.
7. Purge interpane space with dry air, hermetically sealed.

C. Insulating Glass Units <INSUL GL-1>: Vision glass, double glazed.
1. Applications: Exterior glazing unless otherwise indicated.
2. Space between lites filled with argon.
3. Outboard Lite: Heat-strengthened float glass, 1/4 inch (6.4 mm) thick, minimum.
a. Tint: Clear.
b. Coating: Low-E (passive type), on #2 surface.
1) Basis of Design:
(a) VNE1-63 by Viracon.
(b) PPG Industries: Solarban 70XL.
(c) Guardian Industries: SunGuard SNX 62/27.
4. Inboard Lite: Heat-strengthened float glass, 1/4 inch (6.4 mm) thick, minimum.
a. Tint: Clear.
5. Total Thickness: 1 inch (25.4 mm).
6. Thermal Transmittance (U-Value), Winter - Center of Glass: 0.25, nominal.
7. Visible Light Transmittance (VLT): 62 percent, nominal.
8. Solar Heat Gain Coefficient (SHGC): 28 percent, nominal.
9. Visible Light Reflectance, Outside: 10 percent, nominal.

D. Insulating Glass Units: Safety glazing.
1. Applications:
a. Glazed lites in exterior doors.
b. Glazed sidelights and panels next to doors.
c. Other locations required by applicable federal, state, and local codes and regulations.
d. Other locations where the material ID includes <INSUL TEMP___>.
2. Space between lites filled with argon.
3. Glass Type: Same as other vision glazing except use fully tempered float glass for both outboard and inboard lites.
4. Total Thickness: 1 inch (25.4 mm).

**2.05 GLAZING UNITS**

A. Monolithic Interior Vision Glazing <GL-1>:
1. Applications: Interior glazing unless otherwise indicated.
2. Glass Type: Heat-strengthened float glass.
3. Tint: Clear.
4. Thickness: 1/4 inch (6.4 mm), nominal.

B. Monolithic Safety Glazing: Non-fire-rated.
1. Applications:
a. Glazed lites in doors, except fire doors.
b. Glazed sidelights to doors, except in fire-rated walls and partitions.
c. Other locations required by applicable federal, state, and local codes and regulations.
d. Other locations indicated on drawings.
e. Other locations where the material ID includes <TEMP GL-___>.
2. <TEMP GL-___> Glass Type: Fully tempered safety glass as specified.
3. Tint: Clear.

4. Thickness: 1/4 inch (6.4 mm), nominal.

### 2.06 GLAZING COMPOUNDS

A. Manufacturers:
   1. Bostik Inc: www.bostik-us.com.
   2. Dow Corning Corporation: www.dowcorning.com/construction.
   3. Momentive Performance Materials, Inc: www.momentive.com.
   4. Pecora Corporation: www.pecora.com.
   5. BASF Corporation: www.basf.com/us/en.html.
   6. Substitutions: Refer to Section 01 6000 - Product Requirements.

### 2.07 ACCESSORIES

A. Setting Blocks: Neoprene, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot (25 mm for each square meter) of glazing or minimum 4 inch (100 mm) x width of glazing rabbet space minus 1/16 inch (1.5 mm) x height to suit glazing method and pane weight and area.

B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inch (75 mm) long x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.

C. Glazing Splines: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color black.

## PART 3 EXECUTION

### 3.01 VERIFICATION OF CONDITIONS

A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.

B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.

C. Verify that sealing between joints of glass framing members has been completed effectively.

D. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

### 3.02 PREPARATION

A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

### 3.03 INSTALLATION, GENERAL

A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.

B. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.

C. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.

D. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.

E. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.

F. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, etc.

**3.04 INSTALLATION - DRY GLAZING METHOD (GASKET GLAZING)**

A. Application - Exterior and/or Interior Glazed: Set glazing infills from either the exterior or the interior of the building.

B. Place setting blocks at 1/4 points with edge block no more than 6 inch (152 mm) from corners.

C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.

D. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

**3.05 CLEANING**

A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.

B. Remove non-permanent labels immediately after glazing installation is complete.

C. Clean glass and adjacent surfaces after sealants are fully cured.

D. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

**3.06 PROTECTION**

A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.

B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

## END OF SECTION

# SECTION 09 2116 - GYPSUM BOARD ASSEMBLIES

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Acoustic insulation.

B. Gypsum wallboard.

C. Joint treatment and accessories.

### 1.02 RELATED REQUIREMENTS

A. Section 07 9200 - Joint Sealants: Sealing acoustical gaps in construction other than gypsum board or plaster work.

### 1.03 REFERENCE STANDARDS

A. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2015.

B. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2012.

C. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2015.

D. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2013.

E. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2015.

F. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2014.

G. ASTM C1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base; 2014a.

H. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2014.

I. GA-216 - Application and Finishing of Gypsum Board; 2013.

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on gypsum board.

C. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.

## PART 2 PRODUCTS

### 2.01 GYPSUM BOARD ASSEMBLIES

A. Provide completed assemblies complying with ASTM C840 and GA-216.

### 2.02 METAL FRAMING MATERIALS

A. Resilient Furring Channels <MET FURG-4>: 1/2 inch (12 mm) depth, for attachment to substrate through one leg only.

### 2.03 BOARD MATERIALS

A. Manufacturers - Gypsum-Based Board:
   1. CertainTeed Corporation: www.certainteed.com.
   2. Georgia-Pacific Gypsum: www.gpgypsum.com.
   3. National Gypsum Company: www.nationalgypsum.com.
   4. USG Corporation: www.usg.com.
   5. Substitutions: See Section 01 6000 - Product Requirements.

B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
   1. Material ID <GYP BD-1>: 5/8 inch Type X.
   2. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
   3. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, Type C, UL or WH listed.
   4. Paper-Faced Products:
      a. USG Corporation: Sheetrock Brand Gypsum Panels.
      b. National Gypsum Company: Gold Bond Gypsum Panels.
      c. CertainTeed Gypsum: ProRoc.
      d. Georgia-Pacific Gypsum; ToughRock.
      e. Substitutions: See Section 01 6000 - Product Requirements.

C. Backing Board For Non-Wet Areas: Water-resistant gypsum backing board as defined in ASTM C1396/C1396M; sizes to minimum joints in place; ends square cut.
   1. Application: Vertical surfaces in bathrooms with material ID <GYP BD-1>.
   2. Type X Thickness: 5/8 inch (16 mm).
   3. Edges: Tapered.
   4. Products:
      a. Georgia-Pacific Gypsum; ToughRock Mold-Guard Gypsum Board.
      b. National Gypsum Company; Gold Bond XP Gypsum Board.
      c. USG Corporation: Sheetrock Brand Mold Tough.
      d. CertainTeed Gypsum: Moisture and Mold Resistant.
      e. Substitutions: See Section 01 6000 - Product Requirements.

### 2.04 ACCESSORIES

A. Acoustic Insulation <INSUL-80>: ASTM C665; preformed glass fiber, friction fit type, unfaced. Thickness: 2 inch (51 mm).

B. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.

C. Finishing Accessories: ASTM C1047, galvanized steel or rolled zinc, unless noted otherwise.
   1. Types: As detailed or required for finished appearance.

D. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
   1. Tape: 2 inch (50 mm) wide, coated glass fiber tape for joints and corners.
   2. Tape: 2 inch (50 mm) wide, creased paper tape for joints and corners.
   3. Ready-mixed vinyl-based joint compound.

E. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inch (0.84 mm) in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion resistant.

F. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch (0.84 to 2.84 mm) in Thickness: ASTM C954; steel drill screws, corrosion resistant.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

### 3.02 FRAMING INSTALLATION

A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.

B. Standard Wall Furring: Install at indicated walls scheduled to receive gypsum board, not more than 4 inches (100 mm) from floor and ceiling lines and abutting walls. Secure in place on alternate channel flanges at maximum 24 inches (600 mm) on center.

C. Acoustic Furring: Install resilient channels at maximum 24 inches (600 mm) on center. Locate joints over framing members.

### 3.03 ACOUSTIC ACCESSORIES INSTALLATION

A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.

B. Acoustic Sealant: Install in accordance with manufacturer's instructions.
   1. Place continuous bead at perimeter of each layer of gypsum board.
   2. Seal around all penetrations by conduit, pipe, ducts, and rough-in boxes, except where firestopping is provided.

### 3.04 BOARD INSTALLATION

A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. Single-Layer Non-Rated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
   1. Exception: Tapered edges to receive joint treatment at right angles to framing.

C. Installation on Wood Framing: For non-rated assemblies, install as follows:
   1. Single-Layer Applications: Screw attachment.

### 3.05 INSTALLATION OF TRIM AND ACCESSORIES

A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
   1. Not more than 30 feet (10 meters) apart on walls and ceilings over 50 feet (16 meters) long.

B. Corner Beads: Install at external corners, using longest practical lengths.

C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

### 3.06 JOINT TREATMENT

A. Paper Faced Gypsum Board: Use paper joint tape, bedded with ready-mixed vinyl-based joint compound and finished with ready-mixed vinyl-based joint compound.

B. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
   1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
   2. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.
   3. Level 1: Wall areas above finished ceilings, whether or not accessible in the completed construction.

C. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
   1. Feather coats of joint compound so that camber is maximum 1/32 inch (0.8 mm).

### 3.07 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet (3 mm in 3 m) in any direction.

## END OF SECTION

# SECTION 09 3000 - TILING

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Tile for floor applications.

B. Tile for wall applications.

### 1.02 REFERENCE STANDARDS

A. ANSI A108/A118/A136.1 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium); 2013.1.

B. ANSI A108.1a - American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar; 2014.

C. ANSI A108.1b - American National Standard Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar; 1999 (Reaffirmed 2010).

D. ANSI A108.1c - Specifications for Contractors Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Bed with Dry-Set or Latex-Portland Cement; 1999 (Reaffirmed 2010).

E. ANSI A108.4 - American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile-Setting Epoxy Adhesive; 2009 (Revised).

F. ANSI A108.5 - American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar; 1999 (Reaffirmed 2010).

G. ANSI A108.6 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy; 1999 (Reaffirmed 2010).

H. ANSI A108.8 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout; 1999 (Reaffirmed 2010).

I. ANSI A108.9 - American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout; 1999 (Reaffirmed 2010).

J. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework; 1999 (Reaffirmed 2010).

K. ANSI A108.11 - American National Standard for Interior Installation of Cementitious Backer Units; 2010 (Revised).

L. ANSI A108.12 - American National Standard for Installation of Ceramic Tile with EGP (Exterior glue plywood) Latex-Portland Cement Mortar; 1999 (Reaffirmed 2010).

M. ANSI A108.13 - American National Standard for Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone; 2005 (Reaffirmed 2010).

N. ANSI A118.3 - American National Standard Specifications for Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive; 2013 (Revised).

O. ANSI A118.4 - American National Standard Specifications for Modified Dry-Set Cement Mortar; 2012 (Revised).

P. ANSI A118.7 - American National Standard Specifications for High Performance Cement Grouts for Tile Installation; 2010 (Revised).

Q. ANSI A118.10 - American National Standard Specifications for Load Bearing, Bonded, Waterproof Membranes For Thin-Set Ceramic Tile And Dimension Stone Installation; 2014.

R. ANSI A118.15 - American National Standard Specifications for Improved Modified Dry-Set Cement Mortar; 2012.

S. ANSI A137.1 - American National Standard Specifications for Ceramic Tile; 2013.1.

T. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation; 2015.

**1.03 ADMINISTRATIVE REQUIREMENTS**

A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

**1.04 SUBMITTALS**

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.

C. Samples: Provide two tiles, actual size, illustrating pattern and color.

D. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods.

E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.
   2. Extra Tile: 10 square feet (1 square meters) of each size, color, and surface finish combination.

**1.05 QUALITY ASSURANCE**

A. Maintain one copy of and ANSI A108/A118/A136.1 and TCNA (HB) on site.

B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum five years of documented experience.

C. Installer Qualifications: Company specializing in performing tile installation, with minimum of five years of documented experience.

**1.06 DELIVERY, STORAGE, AND HANDLING**

A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

### 1.07 FIELD CONDITIONS

A. Do not install solvent-based products in an unventilated environment.

B. Maintain ambient and substrate temperature of 50 degrees F (10 degrees C) during installation of mortar materials.

### 1.08 WARRANTY

A. Tile and Stone Installation System Warranty: Manufacturer's standard system warranty protecting against break down or deterioration of the tile setting system under normal usage, and ensuring the products are free from manufacturer defects. Manufacturer shall pay for replacement of its own products and replacement of finishing materials, including labor, for defective portions of the project.
   1. Warranty Period: 25 years.

## PART 2 PRODUCTS

### 2.01 TILE

A. Manufacturers: All products by the same manufacturer.

B. Tile: ANSI A137.1, standard grade.
   1. To be selected by Owner.

### 2.02 SETTING MATERIALS

A. Latex-Portland Cement Mortar Bond Coat: ANSI A118.4 or ANSI A118.15.
   1. Application(s): Use this type of bond coat where indicated below; basis of design product indicated.
      a. Typical Floors:
         1) LATICRETE 254 Platinum.
         2) TEC Specialty Full Flex.
      b. Typical Walls:
         1) LATICRETE 4-XLT.
         2) TEC Specialty Ultimate Large Tile.
   2. Products:
      a. ARDEX Engineered Cements; ARDEX X 77 MICROTEC: www.ardexamericas.com.
      b. LATICRETE International, Inc: www.laticrete.com.
      c. ProSpec, an Oldcastle brand: www.prospec.com.
      d. Mapei Corporation: www.mapei.com.
      e. TEC Specialty: www.tecspecialty.com.
      f. Substitutions: See Section 01 6000 - Product Requirements.

### 2.03 GROUTS

A. Manufacturers:
   1. LATICRETE International, Inc: www.laticrete.com.
   2. Mapei Corporation: www.mapei.com.
   3. TEC Specialty: www.tecspecialty.com.
   4. Substitutions: See Section 01 6000 - Product Requirements.

B. Polymer Modified Grout: ANSI A118.7 polymer modified cement grout.

1. Applications: Use this type of grout for typical walls.
2. Use sanded grout for joints 1/8 inch (3.2 mm) wide and larger; use unsanded grout for joints less than 1/8 inch (3.2 mm) wide.
3. Basis of Design:
    a. LATICRETE International, Inc; LATICRETE PERMACOLOR Grout: www.laticrete.com.
    b. TEC Specialty; PowerGrout.
    c. Substitutions: See Section 01 6000 - Product Requirements.

C. Epoxy Grout: ANSI A118.3 chemical resistant and water-cleanable epoxy grout.
1. Applications: Typical floors.
2. Color(s): As selected by Architect from manufacturer's full line.
3. Basis of Design:
    a. LATICRETE International, Inc; LATICRETE SpectraLOCK PRO Premium Grout.
    b. TEC Specialty; Epoxy AccuColor EFX.
    c. Substitutions: See Section 01 6000 - Product Requirements.

### 2.04 MAINTENANCE MATERIALS

A. Tile Sealant: Gunnable, silicone, siliconized acrylic, or urethane sealant; moisture and mildew resistant type.
1. Applications: Between tile and plumbing fixtures.
2. Color(s): As selected by Architect from manufacturer's full line.
3. Products:
    a. LATICRETE International, Inc; LATICRETE LATASIL: www.laticrete.com.
    b. TEC Specialty; Silicone Caulk.
    c. Substitutions: See Section 01 6000 - Product Requirements.

### 2.05 ACCESSORY MATERIALS

A. Waterproofing Membrane: Specifically designed for bonding to cementitious substrate under thick mortar bed or thin-set tile; complying with ANSI A118.10.
1. Application: Provide at walls and ceilings in showers only. Provide at all floors.
2. Fluid or Trowel Applied Type:
    a. Products:
        1) LATICRETE International, Inc; LATICRETE HYDRO BAN: www.laticrete.com.
        2) TEC Specialty; HydraFlex.
        3) Substitutions: See Section 01 6000 - Product Requirements.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.

B. 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 tile.

C. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of setting materials to sub-floor surfaces.

D. Verify that concrete sub-floor surfaces are ready for tile installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within limits recommended by tile manufacturer and setting materials manufacturer.

E. Verify that required floor-mounted utilities are in correct location.

**3.02 PREPARATION**

A. Protect surrounding work from damage.

B. Vacuum clean surfaces and damp clean.

C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.

D. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

**3.03 INSTALLATION - GENERAL**

A. Install tile and grout in accordance with applicable requirements of ANSI A108.1a thru A108.13, manufacturer's instructions, and TCNA (HB) recommendations.

B. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.

C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.

D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.

E. Form internal angles square and external angles bullnosed.

F. Sound tile after setting. Replace hollow sounding units.

G. Keep control and expansion joints free of mortar, grout, and adhesive.

H. Prior to grouting, allow installation to completely cure; minimum of 48 hours.

I. Grout tile joints unless otherwise indicated. Use standard grout unless otherwise indicated.

J. At changes in plane and tile-to-tile control joints, use tile sealant instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.

**3.04 INSTALLATION - FLOORS - THIN-SET METHODS**

A. Over interior concrete substrates, install in accordance with TCNA (HB) Method F115, with epoxy grout. Provide waterproofing membrane under all tile.
   1. Use uncoupling membrane under all tile unless other underlayment is indicated.

**3.05 INSTALLATION - WALL TILE**

A. Over gypsum wallboard on wood or metal studs install in accordance with TCNA (HB) Method W243, thin-set with dry-set or latex-Portland cement bond coat, unless otherwise indicated.

**3.06 CLEANING**

A. Clean tile and grout surfaces.

**3.07 PROTECTION**

A. Do not permit traffic over finished floor surface for 4 days after installation.

## END OF SECTION

# SECTION 09 5100 - SUSPENDED ACOUSTICAL CEILINGS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Suspended metal grid ceiling system.

B. Acoustical units.

### 1.02 RELATED REQUIREMENTS

A. Divisions 21 through 28 for mechanical and electrical components in acoustical ceilings.

### 1.03 REFERENCE STANDARDS

A. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2013a.

B. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels; 2013.

C. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions; 2014.

D. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2014.

### 1.04 ADMINISTRATIVE REQUIREMENTS

A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.

B. Do not install acoustical units until after interior wet work is dry.

### 1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on suspension system components and acoustical units.

C. Samples: Submit two samples 4 x 6 inch (100 x 150 mm) in size illustrating material and finish of acoustical units.

D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.
   2. Extra Acoustical Units: Quantity equal to 5 percent of total installed.

### 1.06 QUALITY ASSURANCE

A. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

B. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

### 1.07 FIELD CONDITIONS

A. Maintain uniform temperature of minimum 60 degrees F (16 degrees C), and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

A. Acoustic Tiles/Panels:
   1. Armstrong World Industries, Inc: www.armstrong.com.
   2. CertainTeed Corporation: www.certainteed.com.
   3. USG: www.usg.com.
   4. Substitutions: See Section 01 6000 - Product Requirements.

B. Suspension Systems:
   1. Armstrong World Industries, Inc: www.armstrong.com.
   2. CertainTeed Corporation: www.certainteed.com.
      Rockfon, LLC: www.rockfon.com.
   3. USG: www.usg.com.
   4. Substitutions: See Section 01 6000 - Product Requirements.

### 2.02 ACOUSTICAL UNITS

A. Acoustical Panels <ACT-1>: Painted mineral fiber, ASTM E1264 Type III, with the following characteristics:
   1. Size: 24 by 24 inches (600 by 600 mm).
   2. Thickness: 3/4 inches (19 mm).
   3. NRC Range: 0.65 to 0.75, determined in accordance with ASTM E1264.
   4. Edge: Reveal edge.
   5. Surface Color: White.
   6. Suspension System: Exposed grid.
   7. Basis of Design Product: Eclipse ClimaPlus by USG.

### 2.03 SUSPENSION SYSTEM(S)

A. Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.

B. Exposed Steel Suspension System: Formed steel, commercial quality cold rolled; intermediate-duty.
   1. Profile: Tee; 9/16 inch (14 mm) wide face.
   2. Finish: White painted.

### 2.04 ACCESSORIES

A. Support Channels and Hangers: Galvanized steel; size and type to suit application and ceiling system flatness requirement specified.

B. Perimeter Moldings: Same material and finish as grid.

1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.

C. Touch-up Paint: Type and color to match acoustical and grid units.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that layout of hangers will not interfere with other work.

### 3.02 INSTALLATION - SUSPENSION SYSTEM

A. Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, and manufacturer's instructions and as supplemented in this section.

B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.

C. Locate system on room axis according to reflected plan.

D. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.

E. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.

F. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.

G. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.

H. Support fixture loads using supplementary hangers located within 6 inches (150 mm) of each corner, or support components independently.

I. Do not eccentrically load system or induce rotation of runners.

J. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
   1. Use longest practical lengths.
   2. Miter corners.

### 3.03 INSTALLATION - ACOUSTICAL UNITS

A. Install acoustical units in accordance with manufacturer's instructions.

B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.

C. Fit border trim neatly against abutting surfaces.

D. Install units after above-ceiling work is complete.

E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.

F. Cutting Acoustical Units:
   1. Make field cut edges of same profile as factory edges.
   2. Double cut and field paint exposed reveal edges.

G. Where round obstructions occur, provide preformed closures to match perimeter molding.

H. Install hold-down clips on panels within 20 ft (6 m) of an exterior door.

**3.04 TOLERANCES**

A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet (3 mm in 3 m).

B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

## END OF SECTION

# SECTION 09 6500 - RESILIENT FLOORING

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Resilient base.

B. Installation accessories.

### 1.02 REFERENCE STANDARDS

A. ASTM F1861 - Standard Specification for Resilient Wall Base; 2008 (Reapproved 2012).

### 1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.

C. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.

D. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.
   2. Extra Wall Base: 20 linear feet (6.1 linear meters) of each type and color.

### 1.04 FIELD CONDITIONS

A. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F (21 degrees C) to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F (13 degrees C).

### 1.05 WARRANTY

A. Manufacturer's standard limited 5 year commercial warranty.

## PART 2 PRODUCTS

### 2.01 RESILIENT BASE

A. Resilient Base <RB BASE-1>: ASTM F1861, Type TS rubber, vulcanized thermoset; top set Style B, Cove, and as follows:
   1. Manufacturers:
      a. Burke Flooring: www.burkeflooring.com.
      b. Johnsonite, a Tarkett Company: www.johnsonite.com.
      c. Roppe Corp: www.roppe.com.
      d. Substitutions: See Section 01 6000 - Product Requirements.
   2. Height: 4 inch (100 mm).
   3. Thickness: 0.125 inch (3.2 mm) thick.

4. Finish: Satin.
5. Length: Roll.
6. Color: To be selected by Architect from manufacturer's full range.

### 2.02 ACCESSORIES

A. Primers, Adhesives, and Seam Sealer: Waterproof; types recommended by flooring manufacturer.

B. Filler for Coved Base: Plastic.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. 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 resilient base.

### 3.02 PREPARATION

A. Clean substrate.

B. Apply primer as required to prevent "bleed-through" or interference with adhesion by substances that cannot be removed.

### 3.03 INSTALLATION

A. Install in accordance with manufacturer's written instructions.

B. Spread only enough adhesive to permit installation of materials before initial set.

C. Fit joints and butt seams tightly.

### 3.04 RESILIENT BASE

A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches (45 mm) between joints.

B. Install base on solid backing. Bond tightly to wall and floor surfaces.

C. Scribe and fit to door frames and other interruptions.

### 3.05 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean in accordance with manufacturer's written instructions.

## END OF SECTION

# SECTION 09 6813 - TILE CARPETING

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Carpet tile, fully adhered.

### 1.02 REFERENCE STANDARDS

### 1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.

C. Samples: Submit two carpet tiles illustrating color and pattern design for each carpet color selected.

D. Manufacturer's Installation Instructions: Indicate special procedures.

E. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.
   2. Extra Carpet Tiles: Quantity equal to 5 percent of total installed of each color and pattern installed.

### 1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing specified carpet tile with minimum three years documented experience.

B. Installer Qualifications: Company specializing in installing carpet tile with minimum three years documented experience.

### 1.05 FIELD CONDITIONS

A. Store materials in area of installation for minimum period of 24 hours prior to installation.

## PART 2 PRODUCTS

### 2.01 MATERIALS

A. Tile Carpeting <CPT TILE-1>: As selected by Owner.

### 2.02 ACCESSORIES

A. Sub-Floor Filler: White premix latex; type recommended by flooring material manufacturer.

B. Adhesives:
   1. Compatible with materials being adhered; maximum VOC content of 50 g/L; CRI (GLP) certified; in lieu of labeled product, independent test report showing compliance is acceptable.

C. Carpet Tile Adhesive: Recommended by carpet tile manufacturer; releasable type.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify that sub-floor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive carpet tile.

B. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to sub-floor surfaces.

C. Verify that required floor-mounted utilities are in correct location.

### 3.02 PREPARATION

A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.

B. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with sub-floor filler.

C. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.

D. Vacuum clean substrate.

### 3.03 INSTALLATION

A. Starting installation constitutes acceptance of sub-floor conditions.

B. Install carpet tile in accordance with manufacturer's instructions.

C. Blend carpet from different cartons to ensure minimal variation in color match.

D. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.

E. Fully adhere carpet tile to substrate.

F. Trim carpet tile neatly at walls and around interruptions.

G. Complete installation of edge strips, concealing exposed edges.

### 3.04 CLEANING

A. Remove excess adhesive without damage, from floor, base, and wall surfaces.

B. Clean and vacuum carpet surfaces.

## END OF SECTION

# SECTION 09 9113 - EXTERIOR PAINTING

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints, stains, and varnishes.

C. Scope: Finish exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
   1. Exposed surfaces of steel lintels and ledge angles.
   2. Mechanical and Electrical:
      a. Exterior mechanical and electrical: Paint all mechanical and electrical pipes, conduits, etc that penetrate exterior building walls, except as indicated below in paragraph D.

D. Do Not Paint or Finish the Following Items:
   1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
   5. Stainless steel, anodized aluminum, bronze, terne coated stainless steel, zinc, and lead.
   6. Floors, unless specifically indicated.
   7. Glass.
   8. Concealed pipes, ducts, and conduits.

### 1.02 RELATED REQUIREMENTS

A. Section 09 9123 - Interior Painting.

B. Divisions 21 through 26: Identification for mechanical and electrical systems.

### 1.03 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.

B. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials; 2007.

C. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition, www.paintinfo.com.

D. SSPC-SP 1 - Solvent Cleaning; 2015.

E. SSPC-SP 2 - Hand Tool Cleaning; 1982 (Ed. 2004).

F. SSPC-SP 6 - Commercial Blast Cleaning; 2007.

G. SSPC-SP 13 - Surface Preparation of Concrete; (Reaffirmed 2015); 2003.

**1.04 SUBMITTALS**

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide complete list of products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
   2. MPI product number (e.g. MPI #47).
   3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.

C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches (216 by 279 mm) in size, illustrating range of colors available for each finishing product specified.
   1. Where sheen is specified, submit samples in only that sheen.
   2. Where sheen is not specified, discuss sheen options with Architect before preparing samples, to eliminate sheens definitely not required.
   3. Paint color submittals will not be considered until color submittals for major materials not to be painted, such as masonry, have been approved.

D. Certification: By manufacturer that paints and finishes comply with VOC limits specified.

E. Manufacturer's Instructions: Indicate special surface preparation procedures.

F. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.

G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.
   2. Extra Paint and Finish Materials: 1 gallon (4 L) of each color, type, surface texture, and sheen; from the same product run, store where directed.
   3. Label each container with color in addition to the manufacturer's label.

**1.05 QUALITY ASSURANCE**

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum five years experience.

**1.06 DELIVERY, STORAGE, AND HANDLING**

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

### 1.07 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Do not apply exterior paint and finishes during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.

D. Minimum Application Temperatures for Latex Paints: 50 degrees F (10 degrees C) for exterior; unless required otherwise by manufacturer's instructions.

E. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.

B. Paints:
   1. Benjamin Moore & Co: www.benjaminmoore.com.
   2. Diamond Vogel Paints: www.diamondvogel.com.
   3. PPG Paints: www.ppgpaints.com.
   4. Pratt & Lambert Paints: www.prattandlambert.com.
   5. Sherwin-Williams Company: www.sherwin-williams.com.

### 2.02 PAINTS AND FINISHES - GENERAL

A. Paints and Finishes: Ready mixed, unless required to be a field-catalyzed paint.
   1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
   3. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
   4. Supply each paint material in quantity required to complete entire project's work from a single production run.
   5. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

B. Volatile Organic Compound (VOC) Content:
   1. Provide paints and finishes that comply with the most stringent requirements specified in the following:
      a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.

2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

C. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.

D. Colors: To be selected from manufacturer's full range of available colors.
   1. Selection to be made by Architect after award of contract.
   2. Allow for minimum of six colors for each system, unless otherwise indicated, without additional cost to Owner.
   3. Extend colors to surface edges; colors may change at any edge as directed by Architect.

### 2.03 PAINT SYSTEMS - EXTERIOR

A. Paint E-OP - Exterior Surfaces to be Painted, Unless Otherwise Indicated: Including concrete, concrete masonry units, primed wood, and primed metal.
   1. Two top coats and one coat primer.
   2. Top Coat(s): Exterior Latex; MPI #10, 11, 15, 119, or 214.
   3. Primer: As recommended by top coat manufacturer for specific substrate.
   4. Masonry: One coat of block filler as recommended by top coat manufacturer for specific substrate.

### 2.04 ACCESSORY MATERIALS

A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Do not begin application of paints and finishes until substrates have been properly prepared.

B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.

D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

E. Test shop-applied primer for compatibility with subsequent cover materials.

F. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
   1. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
   2. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.

**3.02 PREPARATION**

A. Clean surfaces thoroughly and correct defects prior to application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces for finishing.

D. Seal surfaces that might cause bleed through or staining of topcoat.

E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

F. Concrete:
   1. Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
   2. Prepare surface as recommended by top coat manufacturer and according to SSPC-SP 13.

G. Masonry:
   1. Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
   2. Prepare surface as recommended by top coat manufacturer.

H. Galvanized Surfaces:
   1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
   2. Prepare surface according to SSPC-SP 2.

I. Ferrous Metal:
   1. Solvent clean according to SSPC-SP 1.
   2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.
   3. Remove rust, loose mill scale, and other foreign substances using using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.

J. Exterior Wood Surfaces to Receive Opaque Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior calking compound after prime coat has been applied. Back prime concealed surfaces before installation.

K. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

**3.03 APPLICATION**

A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

B. Exterior Wood to Receive Opaque Finish: If final painting must be delayed more than 2 weeks after installation of woodwork, apply primer within 2 weeks and final coating within 4 weeks.

C. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".

D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

E. Apply each coat to uniform appearance.

F. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply additional coats until complete hide is achieved.

G. Sand wood and metal surfaces lightly between coats to achieve required finish.

H. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

I. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

**3.04 CLEANING**

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

**3.05 PROTECTION**

A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

## END OF SECTION

# SECTION 09 9123 - INTERIOR PAINTING

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints, stains, and varnishes.

C. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
   1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
   2. Elevator pit ladders.
   3. Prime surfaces to receive wall coverings.
   4. Mechanical and Electrical:
      a. In finished areas, paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
      b. In finished areas, paint shop-primed items.
      c. Paint interior surfaces of air ducts and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
      d. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.

D. Do Not Paint or Finish the Following Items:
   1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
   5. Stainless steel, anodized aluminum, bronze, terne coated stainless steel, and lead items.
   6. Floors, unless specifically indicated.
   7. Ceramic and other tiles.
   8. Glass.
   9. Concealed pipes, ducts, and conduits.

### 1.02 RELATED REQUIREMENTS

A. Section 01 3515 - LEED Certification Procedures.

B. Section 09 9113 - Exterior Painting.

C. Divisions 21 through 26: Identification for mechanical and electrical systems.

### 1.03 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.

B. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials; 2007.

C. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition, www.paintinfo.com.

D. SSPC-SP 1 - Solvent Cleaning; 2015.

E. SSPC-SP 6 - Commercial Blast Cleaning; 2007.

F. SSPC-SP 13 - Surface Preparation of Concrete; (Reaffirmed 2015); 2003.

**1.04 SUBMITTALS**

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide complete list of products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
   2. MPI product number (e.g. MPI #47).
   3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.

C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches (216 by 279 mm) in size, illustrating range of colors available for each finishing product specified.
   1. Where sheen is specified, submit samples in only that sheen.
   2. Where sheen is not specified, discuss sheen options with Architect before preparing samples, to eliminate sheens definitely not required.
   3. Paint color submittals will not be considered until color submittals for major materials not to be painted, such as masonry, have been approved.

D. Certification: By manufacturer that paints and finishes comply with VOC limits specified.

E. Manufacturer's Instructions: Indicate special surface preparation procedures.

F. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.

G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.
   2. Extra Paint and Finish Materials: 1 gallon (4 L) of each color, type, surface texture, and sheen; from the same product run, store where directed.
   3. Label each container with color in addition to the manufacturer's label.

**1.05 QUALITY ASSURANCE**

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum five years experience.

### 1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

### 1.07 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Do not apply materials when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F (3 degrees C) above the dew point; or to damp or wet surfaces.

D. Minimum Application Temperatures for Paints: 50 degrees F (10 degrees C) for interiors unless required otherwise by manufacturer's instructions.

E. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.

B. Paints:
   1. Benjamin Moore & Co: www.benjaminmoore.com.
   2. Diamond Vogel Paints: www.diamondvogel.com.
   3. PPG Paints: www.ppgpaints.com.
   4. Pratt & Lambert Paints: www.prattandlambert.com.
   5. Sherwin-Williams Company: www.sherwin-williams.com.

C. Substitutions: See Section 01 6000 - Product Requirements.

### 2.02 PAINTS AND FINISHES - GENERAL

A. Paints and Finishes: Ready mixed, unless intended to be a field-catalyzed paint.
   1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
   3. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.

4. Supply each paint material in quantity required to complete entire project's work from a single production run.
5. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

B. Volatile Organic Compound (VOC) Content:
1. Provide paints and finishes that comply with the most stringent requirements specified in the following:
a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
b. USGBC LEED Rating System, edition as stated in Section 01 3515; for interior wall and ceiling finish (all coats), anti-corrosive paints on interior ferrous metal, clear wood stains and finishes, sanding sealers, other sealers, shellac, and floor coatings.
2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

C. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.

D. Colors: To be selected from manufacturer's full range of available colors.
1. Selection to be made by Architect after award of contract.
2. Allow for minimum of six colors for each system, unless otherwise indicated, without additional cost to Owner.
3. Extend colors to surface edges; colors may change at any edge as directed by Architect.
4. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling they are mounted on/under, unless noted otherwise.

**2.03 PAINT SYSTEMS - INTERIOR**

A. Paint I-OP - Interior Surfaces to be Painted, Unless Otherwise Indicated: Including gypsum board, concrete, wood, uncoated steel, shop primed steel, and galvanized steel.
1. Two top coats and one coat primer.
2. Top Coat(s): Interior Latex; MPI #43, 44, 52, 53, 54, or 114.
a. Basis of Design Products:
1) Sherwin-Williams ProMar 200 Zero VOC Interior Latex, Semi-Gloss. (MPI #43)
2) Sherwin-Williams ProMar 200 Zero VOC Interior Latex, Eg-Shel. (MPI #52)
3. Primer: As recommended by top coat manufacturer for specific substrate.

B. Paint I-OP-MD-DT - Medium Duty Door/Trim: For surfaces subject to frequent contact by occupants, including metals and wood:
1. Medium duty applications include doors, door frames, railings, handrails, guardrails, and balustrades.
2. Two top coats and one coat primer.
3. Top Coat(s): High Performance Architectural Interior Latex; MPI #139, 140, or 141.
a. Basis of Design Products:
1) Sherwin-Williams Pro Industrial Pre-Catalyzed Waterbased Epoxy, Eg-Shel. (MPI #139)
2) Sherwin-Williams Pro Industrial Pre-Catalyzed Waterbased Epoxy, Semi-Gloss. (MPI #141)
4. Primer: As recommended by top coat manufacturer for specific substrate.

C. Paint I-TR -W - Transparent Finish on Wood.
1. 1 top coat over sanding sealer over stain.

2. Stain: Semi-Transparent Stain for Wood; MPI #90.
3. Top Coat(s): Clear Water Based Varnish; MPI #128, 129, or 130.

### 2.04 ACCESSORY MATERIALS

A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Do not begin application of paints and finishes until substrates have been properly prepared.

B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.

D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

E. Test shop-applied primer for compatibility with subsequent cover materials.

F. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
1. Gypsum Wallboard: 12 percent.
2. Masonry, Concrete, and Concrete Masonry Units : 12 percent.
3. Interior Wood: 15 percent, measured in accordance with ASTM D4442.

### 3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

D. Seal surfaces that might cause bleed through or staining of topcoat.

E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

F. Concrete:
1. Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
2. Prepare surface as recommended by top coat manufacturer and according to SSPC-SP 13.

G. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.

H. Galvanized Surfaces:
   1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.

I. Ferrous Metal:
   1. Solvent clean according to SSPC-SP 1.
   2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.
   3. Remove rust, loose mill scale, and other foreign substances using using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.

J. Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.

K. Wood Surfaces to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.

L. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

**3.03 APPLICATION**

A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

B. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".

C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

D. Apply each coat to uniform appearance in thicknesses specified by manufacturer.

E. Sand wood and metal surfaces lightly between coats to achieve required finish.

F. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

G. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

H. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

**3.04 CLEANING**

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

**3.05 PROTECTION**

A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

## END OF SECTION

# SECTION 10 1400 - SIGNAGE

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Room and door signs.

### 1.02 REFERENCE STANDARDS

A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.

B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

C. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2009.

### 1.03 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 numbers 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. Verification Samples: Submit samples showing colors specified.

G. Manufacturer's Installation Instructions: Include installation templates and attachment devices.

### 1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

### 1.05 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.

### 1.06 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: www.bestsigns.com.
   2. Inpro: www.inprocorp.com.
   3. Mohawk Sign Systems, Inc: www.mohawksign.com.
   4. Seton Identification Products: www.seton.com/aec.
   5. Gemini: www.signletters.com.
   6. Substitutions: See Section 01 6000 - Product Requirements.

### 2.02 SIGNAGE APPLICATIONS

A. Accessibility Compliance: Signs are required to comply with ADA Standards and ICC A117.1 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 corridors, lobbies, and similar open areas.
   1. Sign Type: Flat signs with applied character panel media as specified.
   2. Provide "tactile" signage, with letters raised minimum 1/32 inch (0.8 mm) and Grade II braille.
   3. Character Height: 1 inch (25 mm).
   4. Office Doors: Identify with room numbers to be determined later, not the numbers shown on the drawings.
   5. Classrooms and Assembly Rooms: Identify with room numbers and names to be determined later, not the numbers shown on the drawings.
      a. Provide "Maximum Occupant" signs at assembly rooms.
   6. Service Rooms: Identify with room names and numbers to be determined later, not those shown on the drawings.
   7. Rest Rooms: Identify with pictograms, the names "MEN" and "WOMEN", room numbers to be determined later, and braille.

### 2.03 SIGN TYPES

A. Flat Signs: Signage media without frame. See drawings for materials and configuration.
   1. Size: 8 inches square, unless noted otherwise on the drawings.
   2. Edges: Bevelled.
   3. Corners: Square.
   4. Wall Mounting of One-Sided Signs: Tape adhesive for interior signs and concealed screws for exterior signs.

B. Color and Font: Unless otherwise indicated:
   1. Character Font: Arial.
   2. Character Case: Upper case only.
   3. Background Color: Clear.

4. Character Color: Contrasting color.

### 2.04 TACTILE SIGNAGE MEDIA

A. Applied Character Panels: Acrylic plastic base, with applied acrylic plastic letters and braille.
   1. Total Thickness: 1/8 inch (3 mm).
   2. Letter Thickness: 1/8 inch (3 mm).
   3. Letter Edges: Square.

### 2.05 ACCESSORIES

A. 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 and mount at heights indicated on drawings and in accordance with ADA Standards and ICC A117.1.

D. Protect from damage until Substantial Completion; repair or replace damaged items.

## END OF SECTION

# SECTION 10 2113.19 - PLASTIC TOILET COMPARTMENTS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Solid plastic toilet compartments.

B. Urinal screens.

### 1.02 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Blocking and supports.

B. Section 10 2800 - Toilet, Bath, and Laundry Accessories.

### 1.03 REFERENCE STANDARDS

A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.

B. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2015.

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall supports, door swings.

C. Product Data: Provide data on panel construction, hardware, and accessories.

D. Samples: Submit two samples of partition panels, 6 x 6 inch (152 x 152 mm) in size illustrating panel finish, color, and sheen.

E. Manufacturer's Installation Instructions: Indicate special procedures.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

A. Solid Plastic Toilet Compartments:
   1. Ampco Products, Inc: www.ampco.com.
   2. Accurate Partitions Corporation: www.accuratepartitions.com.
   3. Comtec Industries: www.comtecindustries.com.
   4. Global Partitions: www.globalpartitions.com.
   5. Metpar Corp: www.metpar.com.
   6. Sanymetal Products Company: www.sanymetal.com.
   7. Scranton Products (Santana/Comtec/Capital): www.scrantonproducts.com.
   8. Substitutions: Section 01 6000 - Product Requirements.

### 2.02 SOLID PLASTIC TOILET COMPARTMENTS

A. Toilet Compartments <TOILET COMP-40>: Factory fabricated doors, pilasters, and divider panels made of solid molded high density polyethylene (HDPE), tested in accordance with NFPA 286, floor-mounted headrail-braced.
   1. Color: Single color as selected.

B. Doors:
   1. Thickness: 1 inch (25 mm).
   2. Width: 24 inch (610 mm).
   3. Width for Handicapped Use: 36 inch (915 mm), out-swinging.
   4. Height: 55 inch (1397 mm).

C. Panels:
   1. Thickness: 1 inch (25 mm).
   2. Height: 55 inch (1397 mm).
   3. Depth: As indicated on drawings.

D. Pilasters:
   1. Thickness: 1 inch (25 mm).
   2. Width: As required to fit space; minimum 3 inch (76 mm).

E. Screens: Without doors; to match compartments; mounted to wall with two panel brackets.

### 2.03 ACCESSORIES

A. Pilaster Shoes: Formed ASTM A666, Type 304 stainless steel with No. 4 finish, 3 in (75 mm) high, concealing floor fastenings.
   1. Provide adjustment for floor variations with screw jack through steel saddles integral with pilaster.

B. Head Rails: Hollow anodized aluminum, 1 by 1-1/2 inch (25 by 38 mm) size, with anti-grip profile and cast socket wall brackets.

C. Pilaster Brackets: Polished stainless steel.

D. Wall Brackets: Continuous type, polished stainless steel.

E. Attachments, Screws, and Bolts: Stainless steel, tamper proof type.
   1. For attaching panels and pilasters to brackets: Through-bolts and nuts; tamper proof.

F. Hardware: Polished stainless steel:
   1. Pivot hinges, gravity type, adjustable for door close positioning; two per door.
   2. Door Latch: Slide type with exterior emergency access feature.
   3. Door strike and keeper with rubber bumper; mounted on pilaster in alignment with door latch.
   4. Coat hook with rubber bumper; one per compartment, mounted on door.
   5. Provide door pull for outswinging doors.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify correct spacing of and between plumbing fixtures.

C. Verify correct location of built-in framing, anchorage, and bracing.

**3.02 INSTALLATION**

A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's instructions.

B. Maintain 3/8 to 1/2 inch (9 to 13 mm) space between wall and panels and between wall and end pilasters.

C. Attach panel brackets securely to walls using anchor devices.

D. Attach panels and pilasters to brackets. Locate head rail joints at pilaster center lines.

**3.03 TOLERANCES**

A. Maximum Variation From True Position: 1/4 inch (6 mm).

B. Maximum Variation From Plumb: 1/8 inch (3 mm).

**3.04 ADJUSTING**

A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch (5 mm).

B. Adjust hinges to position doors in partial opening position when unlatched. Return out-swinging doors to closed position.

C. Adjust adjacent components for consistency of line or plane.

## END OF SECTION

# SECTION 10 2800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Accessories for toilet rooms and utility rooms.

B. Grab bars.

### 1.02 RELATED REQUIREMENTS

A. Section 10 2113.19 - Plastic Toilet Compartments.

### 1.03 REFERENCE STANDARDS

A. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service; 2015.

B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.

C. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.

D. ASTM C1036 - Standard Specification for Flat Glass; 2011.

E. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror; 2008 (Reapproved 2013).

F. ASTM F2285 - Standard Consumer Safety Performance Specification for Diaper Changing Tables for Commercial Use; 2004 (Reapproved 2010).

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.

C. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

A. Toilet Accessories:
   1. AJW Architectural Products: www.ajw.com.
   2. ASI - American Specialties, Inc: www.americanspecialties.com.
   3. Bradley Corporation: www.bradleycorp.com.
   4. Bobrick Washroom Equipment, Inc: www.bobrick.com.
   5. Substitutions: Section 01 6000 - Product Requirements.

B. All items of each type to be made by the same manufacturer.

## 2.02 MATERIALS

A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
   1. Grind welded joints smooth.
   2. Fabricate units made of metal sheet of seamless sheets, with flat surfaces.

B. Stainless Steel Sheet: ASTM A666, Type 304.

C. Stainless Steel Tubing: ASTM A269/A269M, Type 304 or 316.

D. Galvanized Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G90/Z275 coating.

E. Mirror Glass: Annealed float glass, ASTM C1036 Type I, Class 1, Quality Q2, with silvering, protective and physical characteristics complying with ASTM C1503.

F. Fasteners, Screws, and Bolts: Hot dip galvanized; tamper-proof; security type.

## 2.03 FINISHES

A. Stainless Steel: No. 4 Brushed finish, unless otherwise noted.

B. Baked Enamel: Pretreat to clean condition, apply one coat primer and minimum two coats epoxy baked enamel.

C. Back paint components where contact is made with building finishes to prevent electrolysis.

## 2.04 TOILET ROOM ACCESSORIES

A. Combination Towel Dispenser/Waste Receptacle: Recessed flush with wall, stainless steel; seamless wall flanges, continuous piano hinges, tumbler locks on upper and lower doors.
   1. Towel dispenser capacity: 400 C-fold.
   2. Product: Model 225 manufactured by Bradley.

B. Soap Dispenser <SOAP DISP-1>: Liquid soap dispenser, wall-mounted, surface, with stainless steel cover and horizontal stainless steel tank and working parts; push type soap valve, check valve, and window gage refill indicator, tumbler lock.
   1. Minimum Capacity: 40 ounces (1.2 liters).
   2. Product: Model 6563 manufactured by Bradley.

C. Frameless Mirrors <MIRROR-50>: Frameless, 6 mm thick mirror.
   1. Size: As indicated on drawings.
   2. Installation: Secure mirror with metal mounting clips to wall with screws, then engage mirror into clips.
   3. Product: 747 Series manufactured by Bradley or equal.

D. Grab Bars <GRAB BAR-#>: Stainless steel, nonslip grasping surface finish.
   1. Standard Duty Grab Bars:
      a. Push/Pull Point Load: 250 pound-force (1112 N), minimum.
      b. Dimensions: 1-1/4 inch (32 mm) outside diameter, minimum 0.05 inch (1.3 mm) wall thickness, exposed flange mounting, 1-1/2 inch (38 mm) clearance between wall and inside of grab bar.
      c. Length and Configuration: As indicated on drawings.

2. Product: 812 Series manufactured by Bradley.

E. Sanitary Napkin Disposal Unit <NPKN DISP-1>: Stainless steel, surface-mounted, self-closing door, locking bottom panel with full-length stainless steel piano-type hinge, removable receptacle.
   1. Product: Model 4781-15 manufactured by Bradley.

F. Coat Hook <COAT HOOK-1>: Stainless steel, 3 inch (75 mm) extension from wall; rectangular-shaped bracket and backplate for concealed attachment, satin finish.
   1. Product: Model 9134 by Bradley.

G. Diaper Changing Station <BABY CHNG-1>: Wall-mounted folding diaper changing station for use in commercial toilet facilities, meeting or exceeding ASTM F2285.
   1. Style: Horizontal.
   2. Material: Polyethylene.
   3. Mounting: Surface.
   4. Minimum Rated Load: 250 lbs (113.4 kg).
   5. Manufacturers:
      a. American Specialties, Inc: www.americanspecialties.com.
      b. Bradley Corporation: www.bradleycorp.com.
      c. Koala Kare Products: www.koalabear.com.
      d. Substitutions: 01 6000 - Product Requirements.

### 2.05 UTILITY ROOM ACCESSORIES

A. Combination Utility Shelf/Mop and Broom Holder <MOP HLDR-1>: 0.05 inch (1.3 mm) thick stainless steel, Type 304, with 1/2 inch (12 mm) returned edges, 0.06 inch (1.6 mm) steel wall brackets.
   1. Hooks: 4, 0.06 inch (1.6 mm) stainless steel rag hooks at shelf front.
   2. Mop/broom holders: 3 spring-loaded rubber cam holders at shelf front.
   3. Length: Manufacturer's standard length for number of holders/hooks.
   4. Product: Model 9933 manufactured by Bradley.
   5. Provide one in each janitor's closet, locations indicated as <MOP HLDR-1>, unless otherwise noted.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify exact location of accessories for installation.

C. Verify that field measurements are as indicated on drawings.

D. See Section 06 1000 for installation of blocking, reinforcing plates, and concealed anchors in walls and ceilings.

### 3.02 PREPARATION

A. Deliver inserts and rough-in frames to site for timely installation.

B. Provide templates and rough-in measurements as required.

### 3.03 INSTALLATION

A. Install accessories in accordance with manufacturers' instructions in locations indicated on the drawings.

B. Install plumb and level, securely and rigidly anchored to substrate.

C. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.

## END OF SECTION

# SECTION 10 4400 - FIRE PROTECTION SPECIALTIES

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Fire extinguishers.

B. Fire extinguisher cabinets.

C. Accessories.

### 1.02 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Wood blocking product and execution requirements.

### 1.03 REFERENCE STANDARDS

A. FM (AG) - FM Approval Guide; current edition.

B. NFPA 10 - Standard for Portable Fire Extinguishers; 2013.

C. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide extinguisher operational features, extinguisher ratings and classifications, and color and finish.

C. Shop Drawings: Indicate locations of cabinets, cabinet physical dimensions, and rough-in measurements for recessed cabinets.

D. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.

E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

F. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

### 1.05 FIELD CONDITIONS

A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

A. Fire Extinguishers:
   1. Ansul, a Tyco Business: www.ansul.com.
   2. JL Industries, Inc: www.jlindustries.com.
   3. Larsen's Manufacturing Co: www.larsensmfg.com.
   4. Pyro-Chem, a Tyco Business: www.pyrochem.com.

5. Substitutions: See Section 01 6000 - Product Requirements.

B. Fire Extinguisher Cabinets and Accessories:
1. Ansul, a Tyco Business: www.ansul.com.
2. JL Industries, Inc: www.jlindustries.com.
3. Larsen's Manufacturing Co: www.larsensmfg.com.
4. Pyro-Chem, a Tyco Business: www.pyrochem.com.
5. Substitutions: See Section 01 6000 - Product Requirements.

**2.02 FIRE EXTINGUISHERS**

A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
1. Provide extinguishers labeled by UL (DIR) or FM (AG) for purpose specified and as indicated.

B. Multipurpose Dry Chemical Type Fire Extinguishers: Carbon steel tank, with pressure gage.
1. Provide one fire extinguisher for each cabinet or bracket indicated on the drawings.
2. Basis of Design: Cosmic by JL Industries.
3. Class: A:B:C type.
4. Finish: Baked polyester powder coat, color as selected.
5. Temperature range: Minus 40 degrees F (Minus 40 degrees C) to 120 degrees F (49 degrees C).

**2.03 FIRE EXTINGUISHER CABINETS**

A. Fire-Rated Construction: Provide fire-rated cabinets in fire-rated walls (see drawings for locations).

B. Cabinet Configuration <FIRE CAB-1>: Semi-recessed type.
1. Size to accommodate accessories.
2. Basis of Design: JL Industries "Ambassador Series" sized for 10 lb fire extinguisher.
3. Projected Trim: Returned to wall surface, with 2-1/2 inch (63 mm) projection, and 1-3/4 inch (44 mm) wide face.
4. Provide cabinet enclosure with right angle inside corners and seams, and with formed perimeter trim and door stiles.

C. Door: 0.036 inch (0.9 mm) metal thickness, reinforced for flatness and rigidity with nylon catch. Hinge doors for 180 degree opening with two butt hinge.

D. Door Glazing: Float glass, clear, 1/8 inch (3 mm) thick, and set in resilient channel glazing gasket.

E. Cabinet Mounting Hardware: Appropriate to cabinet, with pre-drilled holes for placement of anchors.

F. Weld, fill, and grind components smooth.

G. Finish of Cabinet Exterior Trim and Door: Baked enamel, color as selected.

H. Finish of Cabinet Interior: White colored enamel.

**2.04 ACCESSORIES**

A. Extinguisher Brackets <FIRE BRKT-1>: Formed steel, chrome-plated.

B. Cabinet Signage: Silk-screened vertical red lettering applied to the door - FIRE EXTINGUISHER.

C. Fire Department Access Box:

1. Acceptable manufacturers, subject to compliance with specified requirements:
    a. Dama, S3 (surface-mount)
    b. Dama, R3 (recessed mount)
    c. Knox-Box, 3200 Series
    d. Tru-Lock (recessed mount), Eau Claire, WI
2. Verify manufacturer is acceptable to local Fire Department.
3. Requirements:
    a. Coordinate keying requirements with the authority having jurisdiction.
    b. Verify surface or flush mount box with Architect.
    c. Finish: Corrosion resistant.
4. Provide one access box in a location to be determined by Architect (unless location is indicated on drawings).

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify rough openings for cabinet are correctly sized and located.

### 3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Secure rigidly in place.

C. Place extinguishers in cabinets.

## END OF SECTION

# SECTION 11 9113 - BAPTISTRIES

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Glass fiber reinforced baptistries.

### 1.02 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on specified component products.

C. Shop Drawings: Indicate design load parameters, dimensions, adjacent construction, materials, thicknesses, fabrication details, required clearances, field jointing, tolerances, colors, finishes, methods of support, integration of plumbing components, and anchorages.

D. Maintenance Data: Include instructions for stain removal, surface and gloss restoration, and maintenance.

### 1.03 DELIVERY, STORAGE, AND HANDLING

A. Protect components from damage by retaining shipping protection in place until installation.

### 1.04 FIELD CONDITIONS

A. Do not install site fabricated components when site conditions may be detrimental to successful installation.

B. Maintain temperature and humidity conditions favorable to proper curing of resin during and after installation.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

A. Fiberglass Reinforced Baptistries:
   1. Church Pools.com: www.churchpools.com.
   2. Substitutions: See Section 01 6000 - Product Requirements.

### 2.02 BAPTISTRY

A. Fiberglass Reinforced Baptistries:
   1. Basis of Design: Model 11B by Church Pools.com.
   2. Capacity: 475 gallons.
   3. Interior corners rounded.
   4. Textured floor finish.
   5. Solid core bottom.

B. Baptistry Heater and Control System:
   1. Basis of Design: Model BES6005T 11KW by ChurchRite.com.
   2. Provide all fittings, fasteners and accessories required for a full and complete installation.

3. Provide Auto Fill and Auto Drain features.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify that surfaces are ready to receive work and dimensions are as indicated on shop drawings.

### 3.02 INSTALLATION

A. Install fabrications in accordance with shop drawings and fabricator's instructions.

### 3.03 TOLERANCES

A. Maximum variation from true position: 1/4 inch (6 mm).

B. Maximum offset from true alignment: 1/8 inch (3 mm).

### 3.04 CLEANING

A. Clean components of foreign material without damaging finished surface.

B. Clean fabrications in accordance with fabricator's instructions.

# END OF SECTION

# SECTION 12 3600 - COUNTERTOPS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Countertops for architectural cabinet work.

### 1.02 RELATED REQUIREMENTS

A. Section 06 4100 - Architectural Wood Casework.

B. Division 22 - Plumbing fixtures, sinks.

### 1.03 REFERENCE STANDARDS

A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

B. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014.

C. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.0; 2016.

D. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

E. PS 1 - Structural Plywood; 2009.

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

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. Specimen warranty.

C. Shop Drawings: Complete details of materials and installation; combine with shop drawings of cabinets and casework specified in other sections.

D. Selection Samples: For each finish product specified, color chips representing manufacturer's full range of available colors and patterns.

E. Installation Instructions: Manufacturer's installation instructions and recommendations.

F. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

### 1.05 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.

### 1.06 FIELD 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

### 2.01 COUNTERTOPS

A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

B. Plastic Laminate Countertops <PLAM CTOP-1>: High-pressure decorative laminate (HPDL) sheet bonded to substrate.
   1. Laminate Sheet: NEMA LD 3, Grade HGS, 0.048 inch (1.2 mm) nominal thickness.
      a. Manufacturers:
         1) Formica Corporation: www.formica.com.
         2) Lamin-Art, Inc: www.laminart.com.
         3) Panolam Industries International, Inc.\Nevamar: www.nevamar.com.
         4) Panolam Industries International, Inc.\Pionite: www.pionitelaminates.com.
         5) Wilsonart: www.wilsonart.com.
         6) Substitutions: See Section 01 6000 - Product Requirements.
      b. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
      c. Finish: Matte or suede, gloss rating of 5 to 20.
      d. Surface Color and Pattern: As selected by Architect from the manufacturer's full standard or premium line.
   2. Exposed Edge Treatment: Molded rubber edge sized to completely cover edge of panel.
      a. Color: As selected by Architect from the manufacturer's full line.
   3. Back and End Splashes: Same material, same construction.
      a. Provide where indicated on the Drawings.
   4. Fabricate in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 11 - Countertops, Custom Grade.

### 2.02 MATERIALS

A. Wood-Based Components:
   1. Wood fabricated from old growth timber is not permitted.

B. Plywood for Supporting Substrate: PS 1 Exterior Grade, A-C veneer grade, minimum 5-ply; minimum 3/4 inch (19 mm) thick; join lengths using metal splines.

C. Countertop Support Members: Furniture grade, epoxy powder coated steel.
   1. Basis of Design: Rakks Model EH-1818FM with cover bracket as manufactured by Rangine Corporation or approved equal.

D. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.

### 2.03 FABRICATION

A. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.
   1. Join lengths of tops using best method recommended by manufacturer.
   2. Fabricate to overhang fronts and ends of cabinets 1 inch (25 mm) except where top butts against cabinet or wall.
   3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.

B. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.
   1. Secure to countertop with concealed fasteners and with contact surfaces set in waterproof glue.
   2. Height: 4 inches (102 mm), unless otherwise indicated.
   3. Detail top of backsplash to allow scribing of backsplash to wall.

## PART 3 EXECUTION

### 3.01 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 that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

### 3.02 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.

### 3.03 INSTALLATION

A. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.

B. Attach plastic laminate countertops using screws with minimum penetration into substrate board of 5/8 inch (16 mm).

C. Attach countertops using compatible adhesive as well as mechanical fasteners.

D. Seal joint between back/end splashes and vertical surfaces.

### 3.04 CLEANING

A. Clean countertops surfaces thoroughly.

### 3.05 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

## END OF SECTION

# SECTION 14 4000 - PLATFORM LIFTS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Commercial platform lifts.

### 1.02 RELATED SECTIONS

A. Division 26 Sections for electrical service for elevators to and including disconnect and fused switches at machine room.

### 1.03 REFERENCES

A. Provide Vertical Wheelchair Lift complying with:
   1. ASME A18.1 - Safety Code for Platform Lifts
   2. ASME A17.1 - Safety Code for Elevators and Escalators
   3. ASME A17.5 - Elevator and Escalator Electrical Equipment

### 1.04 REQUIREMENTS OF REGULATORY AGENCIES:

A. Fabricate and install work in compliance with applicable jurisdictional authorities.

B. File shop drawings and submissions with local authorities as the information is made available. Company pre-inspection and jurisdictional authority inspections and permits are to be made on timely basis as required.

### 1.05 SUBMITTALS

A. Submit under provisions of Section 01 3000.

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: Provide a complete layout of lift equipment detailing dimensions and clearances as required.

D. Selection Samples: For each finish product specified requiring selection of color or finish, two complete sets of color charts representing manufacturer's full range of available colors and patterns.

### 1.06 QUALITY ASSURANCE

A. Installer Qualifications:
   1. Skilled tradesmen shall be employees of the installing contractor approved by the manufacturer, with demonstrated ability to perform the work on a timely basis.
   2. Execute work of this section only by a company that has adequate product liability insurance.

### 1.07 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.

### 1.08 PROJECT CONDITIONS

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

### 1.09 WARRANTY

A. Unit shall have a FOUR (4) year limited parts warranty covering replacement of defective parts of the basic unit, including all electrical and drive system components, at no cost. Labor costs required to replace parts is not included. Preventative maintenance agreement required.

## PART 2 PRODUCTS

### 2.01 COMMERCIAL PLATFORM LIFT

A. Basis of Design: Symmetry Elevating Solutions Model VPC-SL Vertical Platform Lift; www.symmetryelevators.com.

B. General Description: The Unenclosed vertical platform lift is designed for lifting heights up to 60”. Versatile enough for indoor or outdoor use, this unit can either be mounted directly to the floor or in a shallow pit.

C. Capacity:
   1. 750 lbs.

D. Gate/Door:
   1. Gate Height: 42 inches.
   2. Platform Gate: Travels with platform and opens at lower landing.
   3. Upper Landing Gate: Detached, freestanding type.
   4. Lower Landing: Door.
   5. Upper Landing: Door.
   6. Doors: 42 inches tall.

E. Screw Drive:
   1. Drive Type: Acme Screw Drive.
   2. Travel speed: 10 fpm.
   3. Motor: 1HP, 115 volt, 1 phase.
   4. Power Supply:
      a. 115 VAC, 30 Amp, Single Phase.
   5. Battery Powered Emergency Lowering:
      a. Battery powered platform lowering device which automatically activates in the event of power failure.
   6. The drive mechanism shall be a stationary nut on a rotating 1” diameter Acme screw with a secondary safety nut.

F. Lift Components:

1. Symmetry Elevating solutions PLC Controller with self diagnostics and digital display. A.W.A.R.E. System (Active Wiring, Accessories, Relay & Electronics Diagnosis System) generates on-demand diagnostic codes identifying trouble or maintenance codes.
2. The Drive Tower support shall be a combination 7 gauge C Channel, 7 gauge interface plates and 16 gauge exterior skin.
3. Platform shall be constructed of 12-gauge minimum hot rolled steel. If unit is not installed in a 3-inch pit, an auto-retracting ramp, or stationary ramp, shall be provided that extends to meet lower landing.
4. Platform side panels shall be 42" high, Side panel framework shall be a minimum of 1"x1 ½" steel. Solid infill panels shall be a minimum of 18 gauge steel.
5. Carriage platform supports shall be a minimum of ½" steel. Solid infill panels shall be a minimum of 18 gauge steel.
6. Elevator style (Nylon) rollers shall be used for axial carriage guidance and wear pads shall be used for horizontal stability.
7. Loaded fasteners shall be grade eight or higher. Locking fasteners shall be used in all critical locations.

G. Platform Base & Frame Installation:
1. Pit Mount: (recess application) Level pit floor slab recessed min. 3" by others as outlined on site specific show drawings. This application does not require ramp and allows for smooth transition from landing into lifting equipment.
2. Floor Mount: (non-recess application) If unit is not installed in a min. 3" pit, an auto-retracting ramp shall be provided that extends to meet the lower landing. Optional fixed mounted ramp is available. (verify clear landing requirements if fixed ramp selected)
    a. Platform Access Ramp: 12 gauge galvanized steel plates; slip resistant surfaces.
        1) Ramp: Stationary type.
        2) Ramp: Automatic folding type.
3. Carriage to be equipped standard with articulating base and carriage design, which allows the carriage to be folded to reduce the tower and carriage width to 21" for ease of installation, without removal of the carriage.

H. Platform Controls:
1. Constant pressure up/down control switches shall be installed on the platform. All switches meet IP66 requirements.
2. An illuminated emergency stop switch / Audible alarm switch shall be provided on the car as a means of signaling for assistance in the event of an emergency.
3. Keyless operation.
4. Keyed operation.
5. Emergency Telephone:
    a. Wiring Only.
    b. Platform shall be equipped with a telephone meeting the following requirements:
        1) ADA compliant.
        2) Shall be operational in the event of power failure.

I. Call Station Controls:
1. Constant pressure up/down control switch installed on the platform.
2. Keyless operation.
3. Call Station Mounting:
    a. Lower:
        1) In-Frame.
        2) Surface Mount.
        3) Flush Mount.

b. Upper:
    1) In-Frame.
    2) Surface Mount.
    3) Flush Mount.

J. Safety Features/Devices:
1. Grounded electrical system with upper, lower, and final limit switches.
2. Safety Pan (Required).
3. Obstruction Panel, preventing unit from moving downward when an obstruction is encountered.
4. A grab rail shall be provided on the platform.
5. A gate with a min. height of 42” and a combination mechanical lock with an electric contact shall be provided at the upper landing, lock must be engaged for lift to move from landing.
6. At all landings an electromechanical interlock shall be used to keep doors closed when lift is on another floor.
7. Electrical disconnect which will shut off power to the lift.
8. Pit stop switch mounted on Drive Tower.

K. Finishes:
1. Finish shall be powder coating, oven baked.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Do not begin installation until hoistway has been properly prepared.

B. Site dimensions shall be taken to verify that tolerances and clearances have been maintained and meet local regulations.

C. Notify Architect of unsatisfactory preparation before proceeding. Start of work indicates acceptance of existing conditions.

### 3.02 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.

### 3.03 LIFT INSTALLATION

A. Install all the components of the lift system that are specified in this section to be provided, and that are required by jurisdictional authorities to license the lift.

B. Trained employees of the lift contractor shall perform all installation work of this section.

C. Adjust lift for proper operation and clean unit thoroughly.

D. Instruct users in operation procedures and Owner's maintenance person in trouble-shooting and maintenance procedures.

### 3.04 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

## END OF SECTION

# SECTION 31 2316 - EXCAVATION

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Excavating for building volume below grade, footings, slabs-on-grade, and utilities within the building.

### 1.02 RELATED REQUIREMENTS

A. Section 31 2323 - Fill: Fill materials, filling, and compacting.

B. Section 33 4600 - Subdrainage: Filter aggregate and filter fabric for foundation drainage systems.

### 1.03 PROJECT CONDITIONS

A. Verify that survey bench mark and intended elevations for the Work are as indicated.

## PART 2 PRODUCTS - NOT USED

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify that survey bench mark and intended elevations for the work are as indicated.

### 3.02 PREPARATION

A. Identify required lines, levels, contours, and datum locations.

B. Locate, identify, and protect utilities that remain and protect from damage.

### 3.03 EXCAVATING

A. Excavate to accommodate new structures and construction operations.

B. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.

C. Slope banks of excavations deeper than 4 feet (1.2 meters) to angle of repose or less until shored.

D. Do not interfere with 45 degree bearing splay of foundations.

E. Cut utility trenches wide enough to allow inspection of installed utilities.

F. Hand trim excavations. Remove loose matter.

G. Correct areas that are over-excavated and load-bearing surfaces that are disturbed; see Section 31 2323.

H. Grade top perimeter of excavation to prevent surface water from draining into excavation.

I. Remove excavated material that is unsuitable for re-use from site.

J. Stockpile excavated material to be re-used in area designated on site .

K. Remove excess excavated material from site.

**3.04 FIELD QUALITY CONTROL**

A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection and testing.

B. Provide for visual inspection of load-bearing excavated surfaces before placement of foundations.

**3.05 PROTECTION**

A. Prevent displacement of banks and keep loose soil from falling into excavation; maintain soil stability.

B. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

## END OF SECTION

# SECTION 31 2323 - FILL

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Filling, backfilling, and compacting for building volume below grade.

B. Filling holes, pits, and excavations generated as a result of removal (demolition) operations.

### 1.02 RELATED REQUIREMENTS

A. Section 31 2316 - Excavation: Removal and handling of soil to be re-used.

### 1.03 REFERENCE STANDARDS

A. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2012.

B. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method; 2007.

C. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN m/m3)); 2012.

D. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 2008.

E. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2011.

F. ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth); 2010.

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used, including manufactured fill.

C. Compaction Density Test Reports.

### 1.05 DELIVERY, STORAGE, AND HANDLING

A. When necessary, store materials on site in advance of need.

B. When fill materials need to be stored on site, locate stockpiles where indicated.
   1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
   2. Prevent contamination.
   3. Protect stockpiles from erosion and deterioration of materials.

## PART 2 PRODUCTS

### 2.01 FILL MATERIALS

A. Provide soil materials for fill and backfill in gradations and compactions as indicated in the geotechinical report.

B. Sand - Fill Type Clean Granular Fill: Natural river or bank sand; free of silt, clay, loam, friable or soluble materials, and organic matter.
   1. At the final 6" fill below concrete floor slabs and as noted otherwise on the Drawings.
   2. Grade in accordance with ASTM D2487 Group Symbol SP, unless noted otherwise in geotechnical report.

### 2.02 SOURCE QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for general requirements for testing and analysis of soil material.

B. Where fill materials are specified by reference to a specific standard, test and analyze samples for compliance before delivery to site.

C. If tests indicate materials do not meet specified requirements, change material and retest.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify that survey bench marks and intended elevations for the Work are as indicated.

B. Identify required lines, levels, contours, and datum locations.

C. Verify subdrainage, dampproofing, or waterproofing installation has been inspected.

D. Verify structural ability of unsupported walls to support imposed loads by the fill.

### 3.02 PREPARATION

A. Scarify and proof roll subgrade surface to a depth of 6 inches (150 mm) to identify soft spots.

B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with controlled density.

C. Compact subgrade to density equal to or greater than requirements for subsequent fill material.

D. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.

### 3.03 FILLING

A. Fill to contours and elevations indicated using unfrozen materials.

B. Fill up to subgrade elevations unless otherwise indicated.

C. Employ a placement method that does not disturb or damage other work.

D. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.

E. Maintain optimum moisture content of fill materials to attain required compaction density.

F. Soil Fill: Place and compact material in equal continuous layers not exceeding 8 inches (200 mm) compacted depth.

G. Slope grade away from building minimum 2 inches in 10 feet (50 mm in 3 m), unless noted otherwise. Make gradual grade changes. Blend slope into level areas.

H. Correct areas that are over-excavated in accordance with geotechnical report.

I. Reshape and re-compact fills subjected to vehicular traffic.

**3.04 TOLERANCES**

A. Top Surface of General Filling: Plus or minus 1 inch (25 mm) from required elevations.

**3.05 FIELD QUALITY CONTROL**

A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection and testing.

B. Perform compaction density testing on compacted fill in accordance with ASTM D1556, ASTM D2167, or ASTM D6938.

C. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D 698 ("standard Proctor") or ASTM D 1557 ("modified Proctor").

D. If tests indicate work does not meet specified requirements, remove work, replace and retest.

**3.06 CLEANING**

A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

## END OF SECTION

# SECTION 33 4600 - SUBDRAINAGE

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Building Perimeter Drainage Systems.

B. Filter aggregate and fabric and bedding.

### 1.02 RELATED REQUIREMENTS

A. Section 31 2316 - Excavation: Excavating for subdrainage system piping and surrounding filter aggregate.

B. Section 31 2323 - Fill: Backfilling over filter aggregate, up to subgrade elevation.

### 1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on pipe drainage products and pipe accessories.

C. Shop Drawings: Indicate dimensions, layout of piping, high and low points of pipe inverts, gradient of slope between corners and intersections.

## PART 2 PRODUCTS

### 2.01 PIPE MATERIALS

A. Corrugated Plastic Tubing: Flexible type; 4 inch (100 mm) diameter, with required fittings.

B. Use perforated pipe at subdrainage system; unperforated through sleeved walls.

### 2.02 AGGREGATE AND BEDDING

A. Filter Aggregate and Bedding Material: Granular fill as specified in Section 31 2323.

### 2.03 ACCESSORIES

A. Pipe Couplings: Solid plastic.

B. Filter Fabric: Water pervious type, black polyolefin.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify that trench cut is ready to receive work and excavations, dimensions, and elevations are as indicated on layout Drawings.

**3.02 PREPARATION**

A. Hand trim excavations to required elevations. Correct over-excavation with material as indicated in Section 31 2323.

B. Remove large stones or other hard matter that could damage drainage piping or impede consistent backfilling or compaction.

**3.03 INSTALLATION**

A. Install and join pipe and pipe fittings in accordance with pipe manufacturer's instructions.

B. Place drainage pipe on clean cut subsoil.

C. Lay pipe to slope gradients noted on Drawings; with maximum variation from true slope of 1/8 inch (3 mm) in 10 feet (3 m).

D. Place pipe with perforations facing down. Mechanically join pipe ends.

E. Install pipe couplings.

F. Install filter aggregate at sides, over joint covers and top of pipe. Provide top cover compacted thickness of 12 inches (300 mm).

G. Place filter fabric over levelled top surface of aggregate cover prior to subsequent backfilling operations.

H. Place aggregate in maximum 4 inch (100 mm) lifts, consolidating each lift.

I. Refer to Section 31 2323 for compaction requirements. Do not displace or damage pipe when compacting.

J. Place impervious fill over drainage pipe aggregate cover and compact.

**3.04 PROTECTION**

A. Protect pipe and aggregate cover from damage or displacement until backfilling operation begins.

## END OF SECTION