

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 01 7419 - Construction Waste Management and Disposal: Limitations on disposal of removed materials; requirements for recycling.

1.03 REFERENCE STANDARDS

- A. 29 CFR 1926 - Safety and Health Regulations for Construction; Current Edition.
- B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2022, with Errata (2021).

PART 2 PRODUCTS -- NOT USED

PART 3 EXECUTION

3.01 GENERAL PROCEDURES AND PROJECT CONDITIONS

- A. Comply with requirements 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 permits from authority having jurisdiction.
 - 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 St. Cloud School District 742.
- D. Do not begin removal until built elements to be salvaged or relocated have been removed.
- E. Protect existing structures and other elements to remain in place and not 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. Perform demolition in a manner that maximizes salvage and recycling of materials.
1. Comply with requirements of Section 01 7419 - Construction Waste Management and Disposal.
 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 utilities before starting work, comply with their requirements, and 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 St. Cloud School District 742.
- 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 St. Cloud School District 742.
- 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. Existing construction and utilities indicated on drawings are based on casual field observation and existing record documents only.
1. Verify construction and utility arrangements are as indicated.
 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 areas that remain 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; prevent water and humidity damage.
- D. Remove existing work as indicated and required to accomplish new work.
1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction indicated.
 2. Remove items indicated on drawings.
- E. Protect existing work to remain.
1. Prevent movement of structure. Provide shoring and bracing as required.
 2. Perform cutting to accomplish removal work neatly and as specified for cutting new work.
 3. Repair adjacent construction and finishes damaged during removal work.

4. Patch to match new work.

3.04 DEBRIS AND WASTE REMOVAL

- A. Remove debris, junk, and trash from site.
- B. Remove materials not to be reused on site; comply with requirements of Section 01 7419 - Waste Management.
- 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 01 30.72 - STRENGTHENING OF CONCRETE WITH FRP (FIBER REINFORCED POLYMER) REINFORCEMENT

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. The Conditions of the Contract for Construction and the General Requirements of Division 1 of these Specifications apply to the Work in this Section.

1.02 WORK INCLUDED

- A. The Work of this Section shall include furnishing all labor, materials, equipment, and supervision to prepare the surface of the structural concrete members and to install the FRP Reinforcement as indicated on the Drawings.

1.03 REFERENCE STANDARDS

- A. Comply with the following reference standards, except where more stringent requirements are indicated on the Drawings or specified herein:
 - 1. American Concrete Institute (ACI)
 - a. ACI 440.2R-08, Guide for the Design and Construction of Externally Bonded FRP Systems for Strengthening Concrete Structures
 - b. ACI 440R-07, Report on Fiber-Reinforced Polymer (FRP) Reinforcement for Concrete Structures
 - c. ACI 440 R-96, State-of-the-Art Report on Fiber Reinforced Plastic (FRP) Reinforcement for Concrete Structures.
 - d. ACI 503 R, Pull-off test to determine FRP adhesion to concrete substrate.
 - 2. International Concrete Repair Institute (ICRI)
 - a. ICRI Guideline No. 03742, Guide for the Selection of Strengthening Systems for Concrete Structures
 - b. ICRI Guideline No. 03739, Guide to Using In-Situ Tensile Pull-Off Tests to Evaluate Bond of Concrete Surface Materials
 - 3. Sika CarboDur Composite Strengthening Systems – Engineering Guidelines for Design and Application.
 - 4. American Society of Testing and Materials (ASTM) as cited herein.

1.04 QUALITY CONTROL

- A. Quality Control procedures performed by the Manufacturer shall include, but not be limited to the following:
 - 1. Manufacturer shall have a nationally recognized program of contractor training, certification and technical support.
 - 2. The Manufacturer shall have minimum ten years experience in FRP Reinforcement confirmed by actual field tests of minimum 100 successful installations.
 - 3. The Manufacturer shall be able to supply testing data to demonstrate system properties and durability of the actual FRP Reinforcement to be used.

- B. Quality Control procedures performed by the Contractor shall include, but not be limited to the following:
1. The Contractor shall be trained by the Manufacturer and shall have completed a program of instruction in the use of FRP Reinforcement.
 2. The Contractor shall have a minimum of two years experience in FRP Reinforcement confirmed by actual field tests of at least 5 successful installations.
 3. The Contractor shall inspect all materials prior to application to assure that they meet specifications and have arrived to the job-site undamaged.
 4. The FRP Reinforcement shall be completely inspected by the contractor during and immediately following application of the composite materials. Conformance with the design drawings, proper alignment of fibers and quality workmanship shall be assured. Entrapped air shall be released or rolled out before the epoxy sets. Defects shall be noted in the Daily Construction Log.
 5. After FRP Reinforcement has cured, the contractor shall inspect the all work to check for voids and or debonding. Repairs shall be made as per Par. 3.7 Repair of Defects, and noted in the Daily Construction Log.

1.05 SUBMITTALS

- A. Submit for record Material Safety Data Sheets (MSDS) of each product, used on site.
- B. Submit product data indicating product standards, physical and chemical characteristics, environmental durability, technical specifications, limitations, installation instructions, and general recommendations regarding each material.
- C. Submit for record, a qualification statement by the Contractor listing their completed FRP Reinforcement projects, including size, location, owner, engineer/architect and contact numbers.
- D. Submit for record a complete description of the FRP Reinforcing system materials, surface preparation, application procedures, application rates, and cure times.
- E. Submit for record copies of purchase order and packaging slips showing quantities and dates of primer and resin purchased.
- F. Submit for review and approval shop drawings including, the following:
 1. Limits of FRP Reinforcing.
 2. Details of epoxy injection crack repair and epoxy resin patching.
 3. Complete system details including, but not limited to, FRP Reinforcement, primer, resin, and protective coating.
- G. Submit for record test results of the Pull-off test to determine FRP adhesion to concrete substrate.
- H. Submit for record Daily Construction Logs kept by the Contractor. These logs shall include the following information: Weather and temperature at application times; Amount of product used and square footage/linear footage of substrate covered; Batch numbers of all products used; Names of all crew members; Any bond-strength tests, noting location, quantity and who performed these tests.

- I. Submit an approved ICC Evaluation Report in the name of the proposed FRP system to be used on this project.
- J. Submit independent test report verifying the environmental durability of the proposed system to be used on this project. Such reports shall include as a minimum:
 - 1. 10,000 hr. resistance to salt water
 - 2. 10,000 hr. resistance to high temperature (38C) and high humidity (100%)
 - 3. 10,000 hr. resistance to alkali solution (pH 9.5)
 - 4. 3,000 hr. resistance to dry heat (60C)
 - 5. resistance to 20 freeze/thaw cycles
 - 6. resistance to UV/condensation @ 100 cycles
 - 7. resistance to diesel fuel (4 hr. exposure)

1.06 JOB-SITE CONDITIONS

- A. Do not apply FRP Reinforcement materials if raining, snowing, or dew condensation is expected or existing concrete surface is wet or if the ambient or surface temperature are below 40° F (4°C).
- B. The ambient temperature and temperature of the epoxy components shall be between 50° F (10°C) and 80° F (27°C) at the time of mixing. See appropriate technical data sheets for more specific instructions.
- C. Precautions should be taken to avoid damage to any surface near the work zone due to mixing and handling of the specified material.
- D. The Contractor is solely responsible for fume control and shall take necessary precautions against injury to Installer personnel or adjacent building occupants during application of primer and resin, etc. Contractor personnel shall use protective equipment and area shall be well vented to the outside. As a minimum, Installer must take the following precautions:
 - 1. Contractor to locate and protect building air intake during application.
 - 2. Contractor to follow all state, federal, and local safety regulations.
 - 3. Contractor to follow all Manufacturers' safety requirements as indicated on appropriate MSDS sheets.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver primer, saturant and protective coating in original, unopened containers with the Manufacturer's name, labels, product identification, and batch numbers.
- B. FRP Reinforcement shall be stored in a cool dry area away from direct sunlight, flame, moisture, or other hazards.
- C. Store primer, saturant and protective coating under conditions as recommended by the Manufacturer in a cool dry place out of direct sunlight. Products that have exceeded their shelf life shall not be used.
- D. Contractor is required to confirm that all materials used in accordance with this Section conform to local, state, and federal environmental and worker's safety laws and regulations.
- E. During operations Contractor shall maintain barricades.
- F. The Contractor shall properly dispose of empty containers in accordance with local regulations.

PART 2 - PRODUCTS

2.01 FRP REINFORCEMENT FABRIC AND/OR LAMINATE

- A. FRP Reinforcement fabric shall be high strength, high modulus, fiber fabric that may be unidirectional or woven (in various fiber architectures) to suit specific repair needs.
 - 1. FRP Reinforcement fabric shall be of the type, size, layer and location as indicated on the Drawings.
 - 2. FRP Reinforcement fabric shall meet the following minimum requirements:

	SikaWrap Hex 100G	SikaWrap Hex 103C	
Property* Prior to testing, laminate samples shall be cured at least 7 days at 70°F then post-cured at 140°F for 48 hours	Requirement	Requirement	ASTM Test Method
Laminate Tensile Strength , In primary fiber direction – 1 layer, per inch width	3,000 lbs./layer (13.3 kN/layer)	3,775 lbs./layer (16.8 kN/layer)	D3039
Laminate Tensile Modulus , In primary fiber direction	3.4x10 ⁶ psi (23,400 MPa)	9.0x10 ⁶ psi (62,000 MPa)	D3039
Laminate Elongation at break	2.00%	0.91%	D3039
Dry Fabric Weight , Minimum, per square yard	27 oz./yd ² (913 g/m ²)	18 oz./yd ² (618 g/m ²)	
Percent Laminate Tensile Strength Retained after: 7 days, 100% humidity, 100°F (38°C) 3,000 hrs exposure to alkali 3,000 hrs exposure to salt water 3,000 hrs exposure at 140°F (60°C)	90% 90% 90% 90%	90% 90% 90% 90%	
Visual Defects			D2563

- 3. Approved products are:
 - a. SikaWrap Hex Fabrics (100G, 106G, 107G, 320G, 430G, 103C, 113C, 117C, 230C), Sika Corp, Lyndhurst, NJ.
 - b. Alternate products must be submitted **and** approved by the Engineer a minimum of two weeks prior to the bid date.

- B. FRP Precured Strip shall be high strength, high modulus, unidirectional carbon fiber reinforced polymer (CFRP).
 - 1. FRP Precured Strip shall be of the type, size, layer and location as indicated on the Drawings.
 - 2. FRP Precured Strip, shall meet the following minimum requirements:

	Sika CarboDur Strip	
Property	Requirement	ASTM Test Method
Laminate Tensile Strength, In primary fiber direction	406,000 psi (2,800 MPa)	D3039

Laminate Tensile Modulus, In primary fiber direction	23.2x10 ⁶ psi (160,000 MPa)	D3039
Laminate Elongation at break	1.69 %	D3039
Laminate Thickness	0.047 in. (1.2mm)	
Fiber Volume, minimum	68%	D2563

3. Approved products are:
- a. Sika CarboDur, Sika Corp., Lyndhurst, NJ.
 - b. Alternate products must be submitted **and** approved by the Engineer a minimum of two weeks prior to the bid date.

2.02 CONCRETE SURFACE PRIMER

- A. Surface Primer shall be a two component, 100% solids, moisture/tolerant, high modulus, high strength epoxy.
- B. Surface Primer shall meet the following minimum requirements:

	Sikadur 300	Sikadur 330	
Property	Requirement	Requirement	ASTM Test Method
Tensile Strength	8,000 psi	4,900 psi	D638
Tensile Modulus	250,000 psi	---	D638
Elongation at Break	3.0%	1.2%	D638
Flexural Strength	11,500 psi	---	D790
Flexural Modulus	500,000 psi	506,000 psi	D790
Heat Deflection Temp. (HDT)	117F (47C)	120F (48C)	D648

- C. Approved products are:
 1. Sikadur 300, Sika Corp., Lyndhurst, NJ.
 2. Sikadur 330, Sika Corp., Lyndhurst, NJ.
 3. Alternate products must be submitted **and** approved by the Engineer a minimum of two weeks prior to the bid date.

2.03 FABRIC SATURANT

- A. Saturant resin shall be two component, 100% solids, moisture tolerant, high strength, high modulus epoxy.
- B. Saturants shall meet the following minimum requirements:

	Sikadur 300	Sikadur 330 (Dry Lay-up)	
Property	Requirement	Requirement	ASTM Test Method
Tensile Strength	8,000 psi	4,900 psi	D638
Tensile Modulus	250,000 psi	---	D638
Elongation at Break	3.0%	1.2%	D638
Flexural Strength	11,500 psi	---	D790
Flexural Modulus	500,000 psi	506,000 psi	D790
Heat Deflection Temp. (HDT)	120 F	120F (48C)	D648

- C. Approved products are:

1. Sikadur 300, Sika Corp, Lyndhurst, NJ.
2. Sikadur 330 (Dry Lay-up), Sika Corp, Lyndhurst, NJ.
3. Alternate products must be submitted **and** approved by the Engineer a minimum of two weeks prior to the bid date.

2.04 EPOXY REPAIR MORTAR

- A. Repair mortar shall be 100% solids, non-sag paste epoxy.
- B. Approved products are:
 1. Sikadur 30, Sika Corp., Lyndhurst, NJ.
 2. Sikadur 31, Sika Corp., Lyndhurst, NJ
 3. Alternate products must be submitted **and** approved by the Engineer a minimum of two weeks prior to the bid date.

2.05 PROTECTIVE COATING

- A. Protective coating shall be polymer or acrylic based and shall be UV resistant.
- B. Approved products are:
 1. Sikagard 550W, Sika Corp., Lyndhurst, NJ.
 2. Sikagard 670W, Sika Corp., Lyndhurst, NJ.
 3. Alternate products must be submitted **and** approved by the Engineer a minimum of two weeks prior to the bid date.

PART 3 - EXECUTION

3.01 GENERAL

- A. Inspect surfaces to receive the work and report immediately in writing to the Engineer as required in the General Conditions and deficiencies in the surface that render it unsuitable for proper execution of this work.
- B. Protect vehicles, concrete, and other items surrounding work area from dust or damage due to Work of this Section.

3.02 SURFACE PREPARATION

- A. All concrete surfaces shall be dry and free of surface moisture and frost, and tested by the Contractor to evaluate moisture transmission in accordance with ASTM D4263 "Indicating Moisture in Concrete by the Plastic Sheet Method."
- B. All concrete surfaces shall be sound. Remove deteriorated concrete, dust, laitance, grease, paint, curing compounds, waxes, impregnations, foreign particles, and other bond inhibiting materials from the surface by blast cleaning or equivalent mechanical means.
- C. All concrete surfaces shall be air blasted and vacuumed clean to a dust free condition.
- D. Concrete surface irregularities less than one inch shall be ground and smoothed and/or filled with an approved repair mortar (e.g., Sikadur 30) with the addition of 1 part oven dried sand to make an epoxy mortar. Surface irregularities shall be limited to less than 0.04 inches (1 mm). Surface irregularities greater than one inch shall be repaired using an approved cementitious repair mortar (e.g. SikaTop 123).

- E. External concrete corners shall be rounded to at least a 1/2" radius when perpendicular to fiber orientation and internal corners shall be smoothed by trowelling epoxy mortar into the corners.
- F. The adhesive strength of the concrete shall be verified after preparation by random pull-off testing (ACI 503R) at the direction of the Engineer. Minimum tensile strength is 200 psi with concrete substrate failure, or as approved by the Engineer.

3.03 MIXING PRIMER AND SATURANT

- A. Mix components in accordance with Manufacturer's recommendations.
- B. Diluting is not permitted. Pre-condition materials as indicated on technical data sheet.
- C. Mix only that quantity which can be used within its pot life.
- D. Do not batch delivered units into smaller quantities. Mix only full units.

3.04 PRIMER APPLICATION

- A. Apply primer in accordance with Manufacturer's recommendations.
- B. Primer may be applied with a brush or roller. Apply second coat as necessary after first coat has penetrated into concrete.
- C. Surface depressions shall be filled with epoxy filler per manufacturers' instructions.
- D. Primer must be covered with fiber within 24 hours of application, depending on temperature conditions. If 24-hour window is exceeded, the primed surfaces must be solvent wiped with a fast flashing solvent (e.g. MEK) or roughened with sandpaper to break the amine blush.

3.05 FRP REINFORCEMENT APPLICATION

- A. Method 1: Wet Lay-Up
 1. Apply FRP Reinforcement in accordance with Manufacturer's recommendations.
 2. When using saturator equipment, follow Manufacturer's procedures for proper machine set-up and calibration. Rollers shall be calibrated to saturate the fabric with the proper resin-to-fabric ratio. The roller gap shall be checked daily by a qualified technician for accuracy. The resin-to-fabric ratio shall also be verified by resin usage and documented on the daily project logs.
 3. Once the fabric is saturated, it may then either be spooled for easy handling, or cut to specified lengths and booked for handling. Care must be taken not to damage the fibers.
 4. The fabric may then be applied to the surface with no delay. Work from one end to the other, taking care to orient the fibers as specified. Remove any air entrapped in the fabric with a ribbed roller or squeegee.
 5. Sheets shall be lapped in the longitudinal direction 6 inches minimum or as indicated on the Drawings. Note: no lapping is required of the sheets parallel to the direction of fiber orientation.
- B. Method 2: Dry Lay-Up
 1. Apply FRP Reinforcement in accordance with Manufacturer's recommendations.
 2. FRP Reinforcement sheets shall be cut beforehand into prescribed lengths. Sheets shall be lapped in the longitudinal direction 6 inches minimum or as indicated on the Drawings. Note: no lapping is required of the sheets parallel to the direction of fiber orientation.

3. Follow Manufacturer's recommendations regarding primer open times.
 4. Apply a primary saturant coat uniformly by roller brush.
 5. Apply FRP Reinforcement sheets fiber side down to the concrete over the fresh saturant using a ribbed roller to remove any air bubbles.
 6. FRP Reinforcement sheets shall be left alone for about 30 minutes allowing for the primary saturant to soak through the fabric. Correct any dislocation on lifting.
 7. Apply secondary saturant coat with roller over installed sheets in order to impregnate and replenish primary saturant.
 8. If succeeding FRP Reinforcement sheets are specified on the Drawings repeat application procedures.
- C. Method 3: Precured Strip Application
1. Apply FRP Precured Strip in accordance with Manufacturer's recommendations.
 2. Care shall be taken not to damage the fibers in handling and unpacking the Strips.
 3. Strips may be either delivered to project site in factory pre-cut lengths, or cut on site. Care must be taken not to fray or otherwise damage the fibers when field cutting. Follow Manufacturer's recommendations for field cutting of strips.
 4. Strips shall be cleaned with a fast flashing solvent (e.g. MEK) to remove any bond inhibiting materials. A clean white cotton rag shall be used for this purpose. Continue cleaning the Strip in this manner until no black residue shows on the rag. Cleaning shall be performed the same day the strips are to be used.

3.06 CURING

- A. Protect finished installation of FRP Reinforcement from rain, sand, dust, etc. using protective sheeting or other barriers. Do not allow protective sheeting to come in contact with finished application.
- B. Curing of finished application shall be a minimum of 24 hours and in order to achieve full strength curing shall be extended for a period of two weeks at an average ambient temperature of 68°F.

3.07 REPAIR OF DEFECTS

- A. Upon completion of the curing process, the installed system shall be checked for areas where saturant has not penetrated or where saturant has not completely cured. Such areas shall be epoxy injected to re-establish bond subject to the approval of the Project Engineer.
- B. Repair procedures shall be performed in accordance with guidelines established by ACI 440.2R-08 (paragraph 7.2.3) and approved by the Project Engineer. All repairs shall be subject to the same application, curing and quality control specifications as the original work.
 1. Small delaminations and voids less than 2 in² each are permissible as long as the delaminated area is less than 5% of the total laminate area and there are no more than 10 such delaminations per 10 ft².
 2. Medium sized delaminations and voids greater than 2 in² but less than 25 in² may be repaired by epoxy resin injection or ply replacement, depending on the size and number of delaminations and their location. The repair procedure should be determined by the Project Engineer.

3. Larger size delaminations and voids greater than 25 in² should be repaired by selectively cutting away the affected sheet and applying an overlapping sheet patch of equivalent plies. The overlap should extend a minimum of 6 in. in all directions.

3.08 PROTECTIVE COATING

- A. Apply protective coating in accordance with Manufacturer's recommendations.

3.09 CLEANING

- A. Uncured saturants may be cleaned from tools with an approved solvent and properly disposed.
- B. Cured saturants shall be removed by mechanical means and properly disposed.

END OF SECTION

SECTION 031000 - CONCRETE FORMING AND ACCESSORIES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section Includes:
 - 1. Form-facing material for cast-in-place concrete.
 - 2. Shoring, bracing, and anchoring.
- B. Related Requirements:
 - 1. Section 321313 "Concrete Paving" for formwork related to concrete pavement and walks.

1.03 DEFINITIONS

- A. Form-Facing Material: Temporary structure or mold for the support of concrete while the concrete is setting and gaining sufficient strength to be self-supporting.
- B. Formwork: The total system of support of freshly placed concrete, including the mold or sheathing that contacts the concrete, as well as supporting members, hardware, and necessary bracing.

1.04 ACTION SUBMITTALS

- A. Product Data: For each of the following:
 - 1. Exposed surface form-facing material.
 - 2. Pan-type forms.
 - 3. Form ties.
 - 4. Form-release agent.
- B. Shop Drawings: Prepared by, and signed and sealed by, a qualified professional engineer responsible for their preparation, detailing fabrication, assembly, and support of forms.
 - 1. For exposed vertical concrete walls, indicate dimensions and form tie locations.
 - 2. Indicate dimension and locations of construction and movement joints required to construct the structure in accordance with ACI 301.
 - a. Location of construction joints is subject to approval of the Architect.
 - 3. Indicate proposed schedule and sequence of stripping of forms, shoring removal, and reshoring installation and removal.
 - 4. Indicate layout of insulating concrete forms, dimensions, course heights, form types, and details.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Concrete Formwork: Design, engineer, erect, shore, brace, and maintain formwork, shores, and reshores in accordance with ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads, so that resulting concrete conforms to the required shapes, lines, and dimensions.
 - 1. Design wood panel forms in accordance with APA's "Concrete Forming Design/Construction Guide."
 - 2. Design formwork to limit deflection of form-facing material to 1/240 of center-to-center spacing of supports.

2.02 FORM-FACING MATERIALS

- A. As-Cast Surface Form-Facing Material:
 - 1. Provide continuous, true, and smooth concrete surfaces.
 - 2. Furnish in largest practicable sizes to minimize number of joints.
 - 3. Acceptable Materials: As required to comply with Surface Finish designations specified in Section 033000 "Cast-In-Place Concrete, and as follows:
 - a. Plywood, metal, or other approved panel materials.

2.03 RELATED MATERIALS

- A. Reglets: Fabricate reglets of not less than 0.022-inch- thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.
- B. Dovetail Anchor Slots: Hot-dip galvanized-steel sheet, not less than 0.034 inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.
- C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.
- D. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.
- E. Form-Release Agent: Commercially formulated form-release agent that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.
 - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
 - 2. Form release agent for form liners shall be acceptable to form liner manufacturer.
- F. Form Ties: Factory-fabricated, removable or snap-off, glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
 - 1. Furnish units that leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
 - 2. Furnish ties that, when removed, leave holes no larger than 1 inch in diameter in concrete surface.

PART 3 - EXECUTION

3.01 INSTALLATION OF FORMWORK

- A. Comply with ACI 301.
- B. Construct formwork, so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117 and to comply with the Surface Finish designations specified in Section 033000 "Cast-In-Place Concrete" for as-cast finishes .
- C. Limit concrete surface irregularities as follows:
 - 1. Surface Finish-1.0: ACI 117 Class D, 1 inch.
 - 2. Surface Finish-2.0: ACI 117 Class B, 1/4 inch.
 - 3. Surface Finish-3.0: ACI 117 Class A, 1/8 inch.
- D. Construct forms tight enough to prevent loss of concrete mortar.
 - 1. Minimize joints.
 - 2. Exposed Concrete: Symmetrically align joints in forms.
- E. Construct removable forms for easy removal without hammering or prying against concrete surfaces.
 - 1. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces.
 - 2. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
 - 3. Install keyways, reglets, recesses, and other accessories, for easy removal.
- F. Do not use rust-stained, steel, form-facing material.

- G. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces.
 - 1. Provide and secure units to support screed strips
 - 2. Use strike-off templates or compacting-type screeds.
- H. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible.
 - 1. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar.
 - 2. Locate temporary openings in forms at inconspicuous locations.
- I. Chamfer exterior corners and edges of permanently exposed concrete.
- J. At construction joints, overlap forms onto previously placed concrete not less than 12 inches.
- K. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work.
 - 1. Determine sizes and locations from trades providing such items.
 - 2. Obtain written approval of Architect prior to forming openings not indicated on Drawings.
- L. Construction and Movement Joints:
 - 1. Construct joints true to line with faces perpendicular to surface plane of concrete.
 - 2. Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 - 3. Place joints perpendicular to main reinforcement.
 - 4. Locate joints for beams, slabs, joists, and girders in the middle third of spans.
 - a. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
 - 5. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
 - 6. Space vertical joints in walls as indicated on Drawings .
 - a. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
- M. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection.
 - 1. Locate ports and openings in bottom of vertical forms, in inconspicuous location, to allow flushing water to drain.
 - 2. Close temporary ports and openings with tight-fitting panels, flush with inside face of form, and neatly fitted, so joints will not be apparent in exposed concrete surfaces.
- N. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- O. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- P. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.02 INSTALLATION OF EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete.
 - 1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.
3. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
4. Install dovetail anchor slots in concrete structures, as indicated on Drawings.
5. Clean embedded items immediately prior to concrete placement.

3.03 REMOVING AND REUSING FORMS

- A. Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations, and curing and protection operations need to be maintained.
 1. Leave formwork for beam soffits, joists, slabs, and other structural elements that support weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
 2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- B. Clean and repair surfaces of forms to be reused in the Work.
 1. Split, frayed, delaminated, or otherwise damaged form-facing material are unacceptable for exposed surfaces.
 2. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints.
 1. Align and secure joints to avoid offsets.
 2. Do not use patched forms for exposed concrete surfaces unless approved by Architect.
- D. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

END OF SECTION

SECTION 032000 - CONCRETE REINFORCING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Steel reinforcement bars.
 - 2. Welded-wire reinforcement.

1.2 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Each type of steel reinforcement.
 - 2. Bar supports.
- B. Shop Drawings: Comply with ACI SP-066:
 - 1. Include placing drawings that detail fabrication, bending, and placement.
 - 2. Include bar sizes, lengths, materials, grades, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, location of splices, lengths of lap splices, details of mechanical splice couplers, details of welding splices, tie spacing, hoop spacing, and supports for concrete reinforcement.
 - 3. For structural thermal break insulated connection system, indicate general configuration, insulation dimensions, tension bars, compression pads, shear bars, and dimensions.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.
 - 1. Store reinforcement to avoid contact with earth.

PART 2 - PRODUCTS

2.1 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A615/A615M, Grade 60, deformed.
- B. Plain-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, plain, fabricated from as-drawn steel wire into flat sheets.

2.2 REINFORCEMENT ACCESSORIES

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

2.3 FABRICATING REINFORCEMENT

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

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protection of In-Place Conditions:
 - 1. Do not cut or puncture vapor retarder.
 - 2. Repair damage and reseal vapor retarder before placing concrete.

- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

3.2 INSTALLATION OF STEEL REINFORCEMENT

- A. Comply with CRSI's "Manual of Standard Practice" for placing and supporting reinforcement.
- B. Accurately position, support, and secure reinforcement against displacement.
 - 1. Locate and support reinforcement with bar supports to maintain minimum concrete cover.
 - 2. Do not tack weld crossing reinforcing bars.
- C. Preserve clearance between bars of not less than 1 inch, not less than one bar diameter, or not less than 1-1/3 times size of large aggregate, whichever is greater.
- D. Provide concrete coverage in accordance with ACI 318.
- E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- F. Splices: Lap splices as indicated on Drawings.
 - 1. Bars indicated to be continuous, and all vertical bars to be lapped not less than 36 bar diameters at splices, or 24 inches, whichever is greater.
 - 2. Stagger splices in accordance with ACI 318.
 - 3. Weld reinforcing bars in accordance with AWS D1.4/D 1.4M, where indicated on Drawings.
- G. Install welded-wire reinforcement in longest practicable lengths.
 - 1. Support welded-wire reinforcement in accordance with CRSI "Manual of Standard Practice."
 - a. For reinforcement less than W4.0 or D4.0, continuous support spacing to not exceed 12 inches.
 - 2. Lap edges and ends of adjoining sheets at least one wire spacing plus 2 inches for plain wire and 8 inches for deformed wire.
 - 3. Offset laps of adjoining sheet widths to prevent continuous laps in either direction.
 - 4. Lace overlaps with wire.

3.3 JOINTS

- A. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 - 1. Place joints perpendicular to main reinforcement.
 - 2. Continue reinforcement across construction joints unless otherwise indicated.
 - 3. Do not continue reinforcement through sides of strip placements of floors and slabs.
- B. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length, to prevent concrete bonding to one side of joint.

3.4 INSTALLATION TOLERANCES

- A. Comply with ACI 117.

END OF SECTION

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Cast-in-place concrete, including concrete materials, mixture design, placement procedures, and finishes.
- B. Related Requirements:
 - 1. Section 031000 "Concrete Forming and Accessories" for form-facing materials, form liners, insulating concrete forms, and waterstops.
 - 2. Section 032000 "Concrete Reinforcing" for steel reinforcing bars and welded-wire reinforcement.
 - 3. Section 312000 "Earth Moving" for drainage fill under slabs-on-ground.

1.02 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.
- B. Water/Cement Ratio (w/cm): The ratio by weight of water to cementitious materials.

1.03 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site .
 - 1. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
 - a. Contractor's superintendent.
 - b. Independent testing agency responsible for concrete design mixtures.
 - c. Concrete Subcontractor.
 - 2. Review the following:
 - a. Special inspection and testing and inspecting agency procedures for field quality control.
 - b. Construction joints, control joints, isolation joints, and joint-filler strips.
 - c. Semirigid joint fillers.
 - d. Vapor-retarder installation.
 - e. Anchor rod and anchorage device installation tolerances.
 - f. Cold and hot weather concreting procedures.
 - g. Concrete finishes and finishing.
 - h. Curing procedures.
 - i. Forms and form-removal limitations.
 - j. Shoring and reshoring procedures.
 - k. Methods for achieving specified floor and slab flatness and levelness.
 - l. Floor and slab flatness and levelness measurements.
 - m. Concrete repair procedures.
 - n. Concrete protection.
 - o. Initial curing and field curing of field test cylinders (ASTM C31/C31M.)
 - p. Protection of field cured field test cylinders.

1.04 ACTION SUBMITTALS

- A. Product Data: For each of the following.
 - 1. Portland cement.
 - 2. Fly ash.
 - 3. Slag cement.
 - 4. Blended hydraulic cement.
 - 5. Silica fume.
 - 6. Performance-based hydraulic cement
 - 7. Aggregates.
 - 8. Admixtures:
 - a. Include limitations of use, including restrictions on cementitious materials, supplementary cementitious materials, air entrainment, aggregates, temperature at time of concrete placement, relative humidity at time of concrete placement, curing conditions, and use of other admixtures.
 - 9. Vapor retarders.
 - 10. Curing materials.
 - 11. Joint fillers.

1.05 DESIGN MIXTURES: FOR EACH CONCRETE MIXTURE, INCLUDE THE FOLLOWING:

- A. Mixture identification.
- B. Minimum 28-day compressive strength.
- C. Durability exposure class.
- D. Maximum w/cm.
- E. Calculated equilibrium unit weight, for lightweight concrete.
- F. Slump limit.
- G. Air content.
- H. Nominal maximum aggregate size.
- I. Steel-fiber reinforcement content.
- J. Synthetic micro-fiber content.
- K. Indicate amounts of mixing water to be withheld for later addition at Project site if permitted.
- L. Intended placement method.
- M. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1.06 SHOP DRAWINGS:

- A. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
 - 1. Location of construction joints is subject to approval of the Architect.

1.07 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For each of the following, signed by manufacturers:
 - 1. Cementitious materials.
 - 2. Admixtures.
 - 3. Curing compounds.
 - 4. Bonding agents.
 - 5. Adhesives.
 - 6. Vapor retarders.

7. Semirigid joint filler.
 8. Joint-filler strips.
- B. Field quality-control reports.

1.08 QUALITY ASSURANCE

- A. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.

1.09 DELIVERY, STORAGE, AND HANDLING

- A. Comply with ASTM C94/C94M and ACI 301.

1.010 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with ACI 301 and ACI 306.1 and as follows.
1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 2. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
 3. Do not use frozen materials or materials containing ice or snow.
 4. Do not place concrete in contact with surfaces less than 35 deg F, other than reinforcing steel.
 5. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- B. Hot-Weather Placement: Comply with ACI 301 and ACI 305.1, and as follows:
1. Maintain concrete temperature at time of discharge to not exceed 95 deg F.
 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.01 CONCRETE, GENERAL

- A. ACI Publications: Comply with ACI 301 unless modified by requirements in the Contract Documents.

2.02 CONCRETE MATERIALS

- A. Source Limitations:
1. Obtain all concrete mixtures from a single ready-mixed concrete manufacturer for entire Project.
 2. Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant.
 3. Obtain aggregate from single source.
 4. Obtain each type of admixture from single source from single manufacturer.
- B. Cementitious Materials:
1. Portland Cement: ASTM C150/C150M, Type I/II, .
 2. Fly Ash: ASTM C618, Class C or F.
 3. Slag Cement: ASTM C989/C989M, Grade 100 or 120.

- C. Normal-Weight Aggregates: ASTM C33/C33M, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source.
 - 1. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
 - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- D. Air-Entraining Admixture: ASTM C260/C260M.
- E. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
 - 1. Water-Reducing Admixture: ASTM C494/C494M, Type A.
 - 2. Retarding Admixture: ASTM C494/C494M, Type B.
 - 3. Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type D.
 - 4. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
 - 5. High-Range, Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type G.
 - 6. Plasticizing and Retarding Admixture: ASTM C1017/C1017M, Type II.
- F. Water and Water Used to Make Ice: ASTM C94/C94M, potable

2.03 VAPOR RETARDERS

- A. Sheet Vapor Retarder, Class A: ASTM E1745, Class A ; not less than 15 mils thick. Include manufacturer's recommended adhesive or pressure-sensitive tape.

2.04 LIQUID FLOOR TREATMENTS

- A. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or silicate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces.

2.05 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- C. Moisture-Retaining Cover: ASTM C171, polyethylene film burlap-polyethylene sheet.
 - 1. Color:
 - a. Ambient Temperature Below 50 deg F: Black.
 - b. Ambient Temperature between 50 deg F and 85 deg F: Any color.
 - c. Ambient Temperature Above 85 deg F: White.
- D. Water: Potable or complying with ASTM C1602/C1602M.
- E. Clear, Waterborne, Membrane-Forming, Dissipating Curing Compound: ASTM C309, Type 1, Class B.
- F. Clear, Waterborne, Membrane-Forming, Nondissipating Curing Compound: ASTM C309, Type 1, Class B , certified by curing compound manufacturer to not interfere with bonding of floor covering.
- G. Clear, Waterborne, Membrane-Forming, Curing Compound: ASTM C309, Type 1, Class B, 18 to 25 percent solids, nondissipating , certified by curing compound manufacturer to not interfere with bonding of floor covering.

2.06 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D1751, asphalt-saturated cellulosic fiber .
- B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 in accordance with ASTM D2240.

- C. Bonding Agent: ASTM C1059/C1059M, Type II, nonredispersible, acrylic emulsion or styrene butadiene.
- D. Epoxy Bonding Adhesive: ASTM C881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade and class to suit requirements, and as follows:
 - 1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.07 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, in accordance with **ACI 301**.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
 - 1. Fly Ash or Other Pozzolans: 25 percent by mass.
 - 2. Slag Cement: 50 percent by mass.
 - 3. Total of Fly Ash or Other Pozzolans, Slag Cement, and Silica Fume: 50 percent by mass, with fly ash or pozzolans not exceeding 25 percent by mass and silica fume not exceeding 10 percent by mass.
 - 4. Total of Fly Ash or Other Pozzolans and Silica Fume: 35 percent by mass with fly ash or pozzolans not exceeding 25 percent by mass and silica fume not exceeding 10 percent by mass.
- C. Admixtures: Use admixtures in accordance with manufacturer's written instructions.
 - 1. Use water-reducing high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
 - 2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
 - 3. Use water-reducing admixture in pumped concrete, concrete for parking structure slabs, and concrete with a w/cm below 0.50.

2.08 CONCRETE MIXTURES

- A. Class A : Normal-weight concrete used for footings, grade beams, and tie beams.
 - 1. Exposure Class: ACI 318 F1 S0 W1 C1 .
 - 2. Minimum Compressive Strength: 4000 psi at 28 days.
 - 3. Maximum w/cm: 0.50 .
 - 4. Slump Limit: 4 inches , plus or minus 1 inch 8 inches , plus or minus 1 inch for concrete with verified slump of 3 inches plus or minus 1 inch before adding high-range water-reducing admixture or plasticizing admixture at Project site .
 - 5. Air Content:
 - a. Exposure Class F1: 5.0 percent, plus or minus 1.5 percent at point of delivery for concrete containing 3/4-inch nominal maximum aggregate size .
 - 6. Limit water-soluble, chloride-ion content in hardened concrete to 0.30 percent by weight of cement.
- B. Class B : Normal-weight concrete used for foundation walls.
 - 1. Exposure Class: ACI 318 F2 S0 W1 C1 .
 - 2. Minimum Compressive Strength: 4500 psi at 28 days.
 - 3. Maximum w/cm: 0.45 .
 - 4. Slump Limit: 5 inches , plus or minus 1 inch 8 inches , plus or minus 1 inch for concrete with verified slump of 3 inches plus or minus 1 inch before adding high-range water-reducing admixture or plasticizing admixture at Project site .

5. Air Content:
 - a. Exposure Classes F2 and F3: 6 percent, plus or minus 1.5 percent at point of delivery for concrete containing 3/4-inch nominal maximum aggregate size.
 6. Limit water-soluble, chloride-ion content in hardened concrete to 0.30 percent by weight of cement.
- C. Class C : Normal-weight concrete used for interior slabs-on-ground.
1. Exposure Class: ACI 318 F0 S0 W0 C0 .
 2. Minimum Compressive Strength: 4000 psi at 28 days.
 3. Maximum w/cm: 0.50 .
 4. Minimum Cementitious Materials Content: 540 lb/cu. yd. .
 5. Slump Limit: 5 inches , plus or minus 1 inch .
 6. Air Content:
 - a. Do not use an air-entraining admixture or allow total air content to exceed 3 percent for concrete used in trowel-finished floors.
 7. Limit water-soluble, chloride-ion content in hardened concrete to 1.00 percent by weight of cement.
- D. Class D : Normal-weight concrete used for interior suspended slabs including tunnel slabs.
1. Exposure Class: ACI 318 F0 S0 W0 C0 .
 2. Minimum Compressive Strength: 4000 psi at 28 days.
 3. Maximum w/cm: 0.50 .
 4. Minimum Cementitious Materials Content: 540 lb/cu. yd. .
 5. Slump Limit: 5 inches , plus or minus 1 inch 8 inches , plus or minus 1 inch for concrete with verified slump of 3 inches plus or minus 1 inch before adding high-range water-reducing admixture or plasticizing admixture at Project site .
 6. Air Content:
 - a. Do not use an air-entraining admixture or allow total air content to exceed 3 percent for concrete used in trowel-finished floors.
 7. Limit water-soluble, chloride-ion content in hardened concrete to 1.00 percent by weight of cement.
- E. Class G : Normal-weight concrete used for building frame members (columns and beams).
1. Exposure Class: ACI 318 F2 S0 W1 C1.
 2. Minimum Compressive Strength: 5000 psi at 28 days.
 3. Maximum w/cm: 0.40 .
 4. Slump Limit: 5 inches , plus or minus 1 inch 8 inches , plus or minus 1 inch for concrete with verified slump of 3 inches plus or minus 1 inch before adding high-range water-reducing admixture or plasticizing admixture at Project site .
 5. Air Content:
 - a. Exposure Classes F2 and F3: 6 percent, plus or minus 1.5 percent at point of delivery for concrete containing 3/4-inch nominal maximum aggregate size .
 6. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

2.09 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94/C94M, and furnish batch ticket information.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions:
- B. Before placing concrete, verify that installation of concrete forms, accessories, and reinforcement, and embedded items is complete and that required inspections have been performed.
- C. Do not proceed until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Provide reasonable auxiliary services to accommodate field testing and inspections, acceptable to testing agency, including the following:
 - 1. Daily access to the Work.
 - 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 - 3. Secure space for storage, initial curing, and field curing of test samples, including source of water and continuous electrical power at Project site during site curing period for test samples.
 - 4. Security and protection for test samples and for testing and inspection equipment at Project site.

3.03 INSTALLATION OF EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining Work that is attached to or supported by cast-in-place concrete.
 - 1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of ANSI/AISC 303.
 - 3. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.

3.04 INSTALLATION OF VAPOR RETARDER

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder in accordance with ASTM E1643 and manufacturer's written instructions.
 - 1. Install vapor retarder with longest dimension parallel with direction of concrete pour.
 - 2. Face laps away from exposed direction of concrete pour.
 - 3. Lap vapor retarder over footings and grade beams not less than 6 inches, sealing vapor retarder to concrete.
 - 4. Lap joints 6 inches and seal with manufacturer's recommended tape.
 - 5. Terminate vapor retarder at the top of floor slabs, grade beams, and pile caps, sealing entire perimeter to floor slabs, grade beams, foundation walls, or pile caps.
 - 6. Seal penetrations in accordance with vapor retarder manufacturer's instructions.
 - 7. Protect vapor retarder during placement of reinforcement and concrete.
 - a. Repair damaged areas by patching with vapor retarder material, overlapping damages area by 6 inches on all sides, and sealing to vapor retarder.

3.05 JOINTS

- A. Construct joints true to line, with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Coordinate with floor slab pattern and concrete placement sequence.

1. Install so strength and appearance of concrete are not impaired, at locations indicated on Drawings or as approved by Architect.
 2. Place joints perpendicular to main reinforcement.
 - a. Continue reinforcement across construction joints unless otherwise indicated.
 - b. Do not continue reinforcement through sides of strip placements of floors and slabs.
 3. Locate joints for beams, slabs, joists, and girders at third points of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
 4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
 5. Space vertical joints in walls as indicated on Drawings . Unless otherwise indicated on Drawings, locate vertical joints beside piers integral with walls, near corners, and in concealed locations where possible.
 6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 7. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Control Joints in Slabs-on-Ground: Form weakened-plane control joints, sectioning concrete into areas as indicated. Construct control joints for a depth equal to at least one-fourth of concrete thickness as follows:
1. Sawn Joints: Form control joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random cracks.
- D. Isolation Joints in Slabs-on-Ground: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated on Drawings.
 2. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

3.06 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, embedded items, and vapor retarder is complete and that required inspections are completed.
 1. Immediately prior to concrete placement, inspect vapor retarder for damage and deficient installation, and repair defective areas.
 2. Provide continuous inspection of vapor retarder during concrete placement and make necessary repairs to damaged areas as Work progresses.
- B. Notify Architect and testing and inspection agencies 24 hours prior to commencement of concrete placement.
- C. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect in writing, but not to exceed the amount indicated on the concrete delivery ticket.
 1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- D. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301, but not to exceed the amount indicated on the concrete delivery ticket.
 1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

- E. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness.
 - 1. If a section cannot be placed continuously, provide construction joints as indicated.
 - 2. Deposit concrete to avoid segregation.
- F. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
- G. Consolidate placed concrete with mechanical vibrating equipment in accordance with ACI 301.
 - a. Do not use vibrators to transport concrete inside forms.
 - b. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer.
 - c. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.
 - d. At each insertion, limit duration of vibration to time necessary to consolidate concrete, and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- H. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
 - 1. Do not place concrete floors and slabs in a checkerboard sequence.
 - 2. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 - 3. Maintain reinforcement in position on chairs during concrete placement.
 - 4. Screed slab surfaces with a straightedge and strike off to correct elevations.
 - 5. Level concrete, cut high areas, and fill low areas.
 - 6. Slope surfaces uniformly to drains where required.
 - 7. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface.
 - 8. Do not further disturb slab surfaces before starting finishing operations.

3.07 FINISHING FORMED SURFACES

- A. As-Cast Surface Finishes:
 - 1. ACI 301 Surface Finish SF-1.0: As-cast concrete texture imparted by form-facing material.
 - a. Patch voids larger than 1-1/2 inches wide or 1/2 inch deep.
 - b. Remove projections larger than 1 inch.
 - c. Tie holes do not require patching.
 - d. Surface Tolerance: ACI 117 Class D.
 - e. Apply to concrete surfaces not exposed to public view .
 - 2. ACI 301 Surface Finish SF-2.0: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams.
 - a. Patch voids larger than 3/4 inch wide or 1/2 inch deep.
 - b. Remove projections larger than 1/4 inch.
 - c. Patch tie holes.
 - d. Surface Tolerance: ACI 117 Class B.
 - e. Locations: Apply to concrete surfaces exposed to public view, to receive a rubbed finish, or to be covered with a coating or covering material applied directly to concrete .
- B. Related Unformed Surfaces:
 - 1. At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a color and texture matching adjacent formed surfaces.

2. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.08 FINISHING FLOORS AND SLABS

- A. Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Float Finish:
 1. When bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operation of specific float apparatus, consolidate concrete surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats.
 2. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture and complies with ACI 117 tolerances for conventional concrete.
 3. Apply float finish to surfaces to receive trowel finish .
- C. Trowel Finish:
 1. After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel.
 2. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance.
 3. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
 4. Do not add water to concrete surface.
 5. Do not apply hard-troweled finish to concrete, which has a total air content greater than 3 percent.
 6. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system .
 7. Finish surfaces to the following tolerances, in accordance with ASTM E1155, for a randomly trafficked floor surface:
 - a. Slabs on Ground:
 - 1) Finish and measure surface so gap at any point between concrete surface and an unlevelled, freestanding, 10-ft.- long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/8 inch and also no more than 1/16 inch in 2 feet.
- D. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated on Drawings . While concrete is still plastic, slightly scarify surface with a fine broom perpendicular to main traffic route.
 1. Coordinate required final finish with Architect before application.
 2. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.
- E. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and locations indicated on Drawings.
 1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.
 2. Coordinate required final finish with Architect before application.

3.09 INSTALLATION OF MISCELLANEOUS CONCRETE ITEMS

- A. Filling In:
 1. Fill in holes and openings left in concrete structures after Work of other trades is in place unless otherwise indicated.

2. Mix, place, and cure concrete, as specified, to blend with in-place construction.
 3. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations:
1. Coordinate sizes and locations of concrete bases with actual equipment provided.
 2. Construct concrete bases 6 inches high unless otherwise indicated on Drawings, and extend base not less than 6 inches in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated on Drawings, or unless required for seismic anchor support.
 3. Minimum Compressive Strength: 4000 psi at 28 days.
 4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
 5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete substrate.
 6. Prior to pouring concrete, place and secure anchorage devices.
 - a. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - b. Cast anchor-bolt insert into bases.
 - c. Install anchor bolts to elevations required for proper attachment to supported equipment.

3.010 CONCRETE CURING

- A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
1. Comply with ACI 301 and ACI 306.1 for cold weather protection during curing.
 2. Comply with ACI 301 and ACI 305.1 for hot-weather protection during curing.
 3. Maintain moisture loss no more than 0.2 lb/sq. ft. x h before and during finishing operations.
- B. Curing Formed Surfaces: Comply with ACI 308.1 as follows:
1. Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces.
 2. Cure concrete containing color pigments in accordance with color pigment manufacturer's instructions.
 3. If forms remain during curing period, moist cure after loosening forms.
 4. If removing forms before end of curing period, continue curing for remainder of curing period, as follows:
 - a. Continuous Fogging: Maintain standing water on concrete surface until final setting of concrete.
 - b. Continuous Sprinkling: Maintain concrete surface continuously wet.
 - c. Absorptive Cover: Pre-dampen absorptive material before application; apply additional water to absorptive material to maintain concrete surface continuously wet.
 - d. Water-Retention Sheeting Materials: Cover exposed concrete surfaces with sheeting material, taping, or lapping seams.
 - e. Membrane-Forming Curing Compound: Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
 - 1) Recoat areas subject to heavy rainfall within three hours after initial application.
 - 2) Maintain continuity of coating and repair damage during curing period.
- C. Curing Unformed Surfaces: Comply with ACI 308.1 as follows:

1. Begin curing immediately after finishing concrete.
2. Interior Concrete Floors:
 - a. Floors to Receive Floor Coverings Specified in Other Sections: Contractor has option of the following:
 - 1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
 - a) Lap edges and ends of absorptive cover not less than 12 inches.
 - b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
 - 2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive.
 - a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
 - b) Cure for not less than seven days.
 - 3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
 - a) Water.
 - b) Continuous water-fog spray.
 - b. Floors to Receive Penetrating Liquid Floor Treatments: Contractor has option of the following:
 - 1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
 - a) Lap edges and ends of absorptive cover not less than 12 inches.
 - b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
 - 2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive.
 - a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
 - b) Cure for not less than seven days.
 - 3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
 - a) Water.
 - b) Continuous water-fog spray.
 - c. Floors to Receive Polished Finish: Contractor has option of the following:
 - 1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
 - a) Lap edges and ends of absorptive cover not less than 12 inches.
 - b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
 - 2) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
 - a) Water.
 - b) Continuous water-fog spray.
 - d. Floors to Receive Chemical Stain:

- 1) As soon as concrete has sufficient set to permit application without marring concrete surface, install curing paper over entire area of floor.
 - 2) Install curing paper square to building lines, without wrinkles, and in a single length without end joints.
 - 3) Butt sides of curing paper tight; do not overlap sides of curing paper.
 - 4) Leave curing paper in place for duration of curing period, but not less than 28 days.
- e. Floors to Receive Urethane Flooring:
- 1) As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
 - 2) Rewet absorptive cover, and cover immediately with polyethylene moisture-retaining cover with edges lapped 6 inches and sealed in place.
 - 3) Secure polyethylene moisture-retaining cover in place to prohibit air from circulating under polyethylene moisture-retaining cover.
 - 4) Leave absorptive cover and polyethylene moisture-retaining cover in place for duration of curing period, but not less than 28 days.
- f. Floors to Receive Curing and Sealing Compound:
- 1) Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller in accordance with manufacturer's written instructions.
 - 2) Recoat areas subjected to heavy rainfall within three hours after initial application.
 - 3) Repeat process 24 hours later, and apply a second coat. Maintain continuity of coating, and repair damage during curing period.

3.011 TOLERANCES

- A. Conform to ACI 117.

3.012 JOINT FILLING

- A. Prepare, clean, and install joint filler in accordance with manufacturer's written instructions.
1. Defer joint filling until concrete has aged at least one month(s).
 2. Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.
- C. Install semirigid joint filler full depth in saw-cut joints and at least **2 inches** deep in formed joints.
- D. Overfill joint, and trim joint filler flush with top of joint after hardening.

3.013 CONCRETE SURFACE REPAIRS

- A. Defective Concrete:
1. Repair and patch defective areas when approved by Architect.
 2. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete.
 - a. Limit cut depth to 3/4 inch.
 - b. Make edges of cuts perpendicular to concrete surface.
 - c. Clean, dampen with water, and brush-coat holes and voids with bonding agent.
 - d. Fill and compact with patching mortar before bonding agent has dried.

- e. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
 - 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement, so that, when dry, patching mortar matches surrounding color.
 - a. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching.
 - b. Compact mortar in place and strike off slightly higher than surrounding surface.
 - 3. Repair defects on concealed formed surfaces that will affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces:
- 1. Test unformed surfaces, such as floors and slabs, for finish, and verify surface tolerances specified for each surface.
 - a. Correct low and high areas.
 - b. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
 - 2. Repair finished surfaces containing surface defects, including spalls, popouts, honeycombs, rock pockets, crazing, and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
 - 3. After concrete has cured at least 14 days, correct high areas by grinding.
 - 4. Correct localized low areas during, or immediately after, completing surface-finishing operations by cutting out low areas and replacing with patching mortar.
 - a. Finish repaired areas to blend into adjacent concrete.
 - 5. Correct other low areas scheduled to receive floor coverings with a repair underlayment.
 - a. Prepare, mix, and apply repair underlayment and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 - b. Feather edges to match adjacent floor elevations.
 - 6. Correct other low areas scheduled to remain exposed with repair topping.
 - a. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations.
 - b. Prepare, mix, and apply repair topping and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 - 7. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete.
 - a. Remove defective areas with clean, square cuts, and expose steel reinforcement with at least a 3/4-inch clearance all around.
 - b. Dampen concrete surfaces in contact with patching concrete and apply bonding agent.
 - c. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate.
 - d. Place, compact, and finish to blend with adjacent finished concrete.
 - e. Cure in same manner as adjacent concrete.
 - 8. Repair random cracks and single holes 1 inch or less in diameter with patching mortar.
 - a. Groove top of cracks and cut out holes to sound concrete, and clean off dust, dirt, and loose particles.
 - b. Dampen cleaned concrete surfaces and apply bonding agent.
 - c. Place patching mortar before bonding agent has dried.
 - d. Compact patching mortar and finish to match adjacent concrete.
 - e. Keep patched area continuously moist for at least 72 hours.

- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.014 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a special inspector to perform field tests and inspections and prepare testing and inspection reports.
- B. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
 - 1. Testing agency to be responsible for providing curing container for composite samples on Site and verifying that field-cured composite samples are cured in accordance with ASTM C31/C31M.
 - 2. Testing agency to immediately report to Architect, Contractor, and concrete manufacturer any failure of Work to comply with Contract Documents.
 - 3. Testing agency to report results of tests and inspections, in writing, to Owner, Architect, Contractor, and concrete manufacturer within 48 hours of inspections and tests.
 - a. Test reports to include reporting requirements of ASTM C31/C31M, ASTM C39/C39M, and ACI 301, including the following as applicable to each test and inspection:
 - 1) Project name.
 - 2) Name of testing agency.
 - 3) Names and certification numbers of field and laboratory technicians performing inspections and testing.
 - 4) Name of concrete manufacturer.
 - 5) Date and time of inspection, sampling, and field testing.
 - 6) Date and time of concrete placement.
 - 7) Location in Work of concrete represented by samples.
 - 8) Date and time sample was obtained.
 - 9) Truck and batch ticket numbers.
 - 10) Design compressive strength at 28 days.
 - 11) Concrete mixture designation, proportions, and materials.
 - 12) Field test results.
 - 13) Information on storage and curing of samples before testing, including curing method and maximum and minimum temperatures during initial curing period.
 - 14) Type of fracture and compressive break strengths at seven days and 28 days.
- C. Batch Tickets: For each load delivered, submit three copies of batch delivery ticket to testing agency, indicating quantity, mix identification, admixtures, design strength, aggregate size, design air content, design slump at time of batching, and amount of water that can be added at Project site.
- D. Inspections:
 - 1. Headed bolts and studs.
 - 2. Verification of use of required design mixture.
 - 3. Concrete placement, including conveying and depositing.
 - 4. Curing procedures and maintenance of curing temperature.
 - 5. Verification of concrete strength before removal of shores and forms from beams and slabs.
 - 6. Batch Plant Inspections: On a random basis, as determined by Architect.
- E. Concrete Tests: Testing of composite samples of fresh concrete obtained in accordance with ASTM C 172/C 172M to be performed in accordance with the following requirements:
 - 1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.

2. Slump: ASTM C143/C143M:
 - a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - b. Perform additional tests when concrete consistency appears to change.
3. Slump Flow: ASTM C1611/C1611M:
 - a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - b. Perform additional tests when concrete consistency appears to change.
4. Air Content: ASTM C231/C231M pressure method, for normal-weight concrete; .
 - a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
5. Concrete Temperature: ASTM C1064/C1064M:
 - a. One test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample.
6. Compression Test Specimens: ASTM C31/C31M:
 - a. Cast and laboratory cure two sets of two 4-inch by 8-inch cylinder specimens for each composite sample.
 - b. Cast, initial cure, and field cure two sets of two standard cylinder specimens for each composite sample.
7. Compressive-Strength Tests: ASTM C39/C39M.
 - a. Test one set of two laboratory-cured specimens at seven days and one set of two specimens at 28 days.
 - b. Test one set of two field-cured specimens at seven days and one set of two specimens at 28 days.
 - c. A compressive-strength test to be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
8. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor to evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
9. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength, and no compressive-strength test value falls below specified compressive strength by more than 500 psi if specified compressive strength is 5000 psi, or no compressive strength test value is less than 10 percent of specified compressive strength if specified compressive strength is greater than 5000 psi.
10. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
11. Additional Tests:
 - a. Testing and inspecting agency to make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.
 - b. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42/C42M or by other methods as directed by Architect.
 - 1) Acceptance criteria for concrete strength to be in accordance with ACI 301, Section 1.6.6.3.

12. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
13. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

3.015 PROTECTION

- A. Protect concrete surfaces as follows:
 1. Protect from petroleum stains.
 2. Diaper hydraulic equipment used over concrete surfaces.
 3. Prohibit vehicles from interior concrete slabs.
 4. Prohibit use of pipe-cutting machinery over concrete surfaces.
 5. Prohibit placement of steel items on concrete surfaces.
 6. Prohibit use of acids or acidic detergents over concrete surfaces.
 7. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.
 8. Protect concrete surfaces scheduled to receive surface hardener or polished concrete finish using Floor Slab Protective Covering.

END OF SECTION

SECTION 03 3511 - CONCRETE FLOOR FINISHES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface treatments.
- B. Polished concrete.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Finishing of concrete surface to tolerance; floating, troweling, and similar operations; curing.
- B. Section 03 3000 - Cast-in-Place Concrete: Curing compounds that also function as sealers.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
- B. Coordinate the work with concrete floor placement and concrete floor curing.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's published data on each finishing product, including information on compatibility of different products and limitations.
- C. Maintenance Data: Provide data on maintenance and renewal of applied finishes.

1.05 MOCK-UPS

- A. For coatings, construct mock-up area under conditions similar to those that will exist during application, with coatings applied.
- B. Locate where directed.
- C. Mock-up may remain as part of the work.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's sealed packaging, including application instructions.

1.07 FIELD CONDITIONS

- A. Maintain light level equivalent to a minimum 200 W light source at 8 feet (2.5 m) above the floor surface over each 20 foot (6 m) square area of floor being finished.
- B. Do not finish floors until interior heating system is operational.
- C. Maintain ambient temperature of 50 degrees F (10 degrees C) minimum.

PART 2 PRODUCTS

2.01 CURING MATERIALS

- A. Curing and Sealing Compound, Low Gloss (CSLR-1): Liquid, membrane-forming, clear, non-yellowing acrylic; complying with ASTM C1315 Type 1 Class A.
 - 1. Apply in accordance with manufacturer's instructions during concrete curing.
 - 2. Near Substantial Completion, apply a final coat(s) to produce a consistent, uniform low gloss finish to floor areas indicated to receive (CSLR-1).
 - 3. Solids by Mass: 25 percent, minimum.
 - 4. Products:

- a. Dayton Superior Corporation; Cure & Seal 1315 J22WB: www.daytonsuperior.com.
- b. TCC Materials; Tenon Cure & Seal WB 1315: www.tccmaterials.com.
- c. W. R. Meadows, Inc; VOCOMP-25: www.wrmeadows.com.
- d. BASF; Kure 1315: www.buildingsystems.basf.com].
- e. Scofield; Cureseal-W: www.scofield.com.
- f. Substitutions: See Section 01 6000-Product Requirements.

2.02 POLISHED CONCRETE SYSTEM

- A. Polished Concrete System (PCONC-1): Materials, equipment, and procedures designed and furnished by a single manufacturer to produce dense polished concrete of the specified sheen; including edge conditions:
 - 1. Level of Cut:
 - a. Mechanical grind off existing glue:
 - 1) Class B – Fine Aggregate (Salt/Pepper) Finish - Expose the fine aggregate such as sand and small aggregate with the concrete. The depth of grind will depend greatly on the placement and finishing procedures. Generally, this level of cut can be achieved within 1/16" of the surface.
 - 2. Level of Sheen:
 - a. Level 1 Sheen, Flat Appearance as determined by a gloss reading of 0 – 10. (100 grit); honed 200 grit finish.
 - 3. Edge Conditions: Polished along with main body.
 - 4. Products:
 - a. L&M Construction Chemicals, Inc, a subsidiary of Laticrete International, Inc; FGS Permashine Concrete Polishing System: www.lmcc.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that floor surfaces are acceptable to receive the work of this section.
- B. Verify that flaws in concrete have been patched and joints filled with methods and materials suitable for further finishes.

3.02 GENERAL

- A. Apply materials in accordance with manufacturer's instructions.

3.03 PREPARATION

- A. Ensure surfaces are clean and free of dirt and other foreign matter harmful to performance of concrete finishing materials.
- B. Remove surface contamination

3.04 CONCRETE POLISHING

- A. Provide consistent finish in all contiguous areas.
- B. Apply floor finish prior to installation of fixtures and accessories.
- C. Diamond polish concrete floor surfaces with power disc machine recommended by floor finish manufacturer. Sequence with coarse to fine grit. Installer to determine the optimum starting grit in order to achieve the specified aggregate exposure.

1. Comply with manufacturer's recommended polishing grits for each sequence to achieve desired finish level. Following the initial passes of metal bond diamonds, the installer shall drop back a minimum of one grit level when transitioning to resin bond diamonds. The separation in grit designation shall be a minimum of 50 for the transitioning step. The installer shall refine each abrasive grit to its fullest potential before moving on to the next level. Floor shall be thoroughly scrubbed between each grit pass to remove all loose material. Level of sheen shall match that of mock-up.
 2. Expose aggregate in concrete surface only as determined by approved mock-up.
 3. All concrete surfaces shall be as uniform in appearance as possible.
- D. Apply manufacturer's recommended densifier, hardener as recommended for polishing system.
1. Basis of Design: FGS Hardener Plus; two coats.
 - a. First Coat: Install at 250 sf/gal, following 400 grit level.
 - b. Second Coat: Install at 350 sf/gal, prior to the final polishing pass.
 - c. Follow manufacturer's recommendations for drying time between successive coats.
- E. Remove defects and re-polish defective areas.
- F. Finish edges of floor finish adjoining other materials in a clean and sharp manner.
- G. Apply EP80 joint filler at polished concrete by Metzger/McGuire: www.metzgermcguire.com.

3.05 ADJUSTMENTS

- A. Re-polish those areas not meeting specified gloss levels per mock-up.
- B. Fill joints flush to surface prior to the start of polishing operations.

3.06 PROTECTION

- A. Protect installed product from damage during construction.

END OF SECTION

SECTION 03 4100 - PRECAST STRUCTURAL CONCRETE - FOR REFERENCE ONLY

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Columns and bearing saddles.
- B. Beams, spandrels, girders, purlins.
- C. Grout packing.

1.02 REFERENCE STANDARDS

- A. ACI CODE-318 - Building Code Requirements for Structural Concrete and Commentary; 2019 (Reapproved 2022).
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- C. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2024.
- D. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2017.
- E. ASTM C150/C150M - Standard Specification for Portland Cement; 2018.
- F. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2025.
- G. PCI MNL-116 - Manual for Quality Control for Plants and Production of Structural Precast Concrete Products; 2021.
- H. PCI MNL-123 - Connections Manual: Design and Typical Details of Connections for Precast and Prestressed Concrete; 1988.
- I. PCI MNL-135 - Tolerance Manual for Precast and Prestressed Concrete Construction; 2000.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Indicate standard component configurations, design loads, deflections, cambers, and bearing requirements.
- C. Shop Drawings: Indicate layout, unit locations, fabrication details, unit identification marks, reinforcement, connection details, support items, dimensions, openings, and relationship to adjacent materials. Indicate design loads, deflections, cambers, bearing requirements, and special conditions.
- D. Design Data: Submit design data reports indicating calculations for loadings and stresses of fabricated, designed framing.

1.04 QUALITY ASSURANCE

- A. Designer Qualifications: Design precast concrete members under direct supervision of a Professional Structural Engineer experienced in design of precast concrete and licensed in the State in which the Project is located.
- B. Fabricator Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- C. Erector Qualifications: Company specializing in erecting products of this section with not less than three years experience.
- D. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and no more than 12 months before start of scheduled welding work.

1.05 MOCK-UP

- A. Stadia Mock-Up: Provide a mock-up of a stadia section indicating finish, chamfers, and smoothness. Mock-up shall be available for view at the precast plant.
 - 1. Mock-up shall be approved by Architect prior to manufacturing remaining stadia sections. The mockup shall represent the finish standard for the remaining sections.
 - 2. Mock-up may be used in construction.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Handle precast members in position consistent with their shape and design. Lift and support only from support points.
- B. Lifting or Handling Devices: Capable of supporting member in positions anticipated during manufacture, storage, transportation, and erection.
- C. Protect members to prevent staining, chipping, or spalling of concrete.
- D. Mark each member with date of production and final position in structure.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Structural Precast Concrete:
 - 1. Gage Brothers Concrete Products, Inc: gagebrothers.com.
 - 2. Wells Concrete Products: www.wellsconcrete.com.
 - 3. Molin Concrete Products: www.molin.com.
 - 4. Taracon Precast: www.taraconprecast.com.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PRECAST UNITS

- A. Precast Structural Concrete Units: Comply with PCI MNL-116, PCI MNL-120, PCI MNL-123, PCI MNL-135, ACI CODE-318, and applicable codes.
 - 1. Design components to withstand dead loads and design loads in the configuration indicated on the drawings.
 - 2. Calculate structural properties of framing members in accordance with ACI CODE-318.
 - 3. Replace as much Portland cement as possible with fly ash, ground granulated blast furnace slag, silica fume, or rice hull ash as is consistent with strength requirements.
 - 4. Design members exposed to the weather to provide for movement of components without damage, failure of joint seals, undue stress on fasteners or other detrimental effects, when subject to seasonal or cyclic day/night temperature ranges.
 - 5. Design system to accommodate construction tolerances, deflection of other building structural members and clearances of intended openings.

2.03 MATERIALS

- A. Cement: White Portland type, complying with ASTM C150/C150M, Type I.
- B. Aggregate, Sand, Water, Admixtures: Determined by precast fabricator as appropriate to design requirements and PCI MNL-116.

2.04 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi) (420 MPa).
 - 1. Plain billet-steel bars.
 - 2. Unfinished.

- B. Steel Welded Wire Reinforcement: ASTM A1064/A1064M plain type or deformed type; in flat sheets; unfinished.

2.05 FABRICATION

- A. Comply with fabrication procedures specified in PCI MNL-116.
- B. Maintain plant records and quality control program during production of precast members. Make records available upon request.
- C. Ensure reinforcing steel, anchors, inserts, plates, angles, and other cast-in items are embedded and located as indicated on shop drawings.
- D. Provide required openings with a dimension larger than 10 inches (250 mm) and embed accessories provided under other sections of the specifications, at indicated locations.

2.06 FABRICATION TOLERANCES

- A. Comply with fabrication tolerances specified in PCI MNL-135, except as specifically amended below.
 - 1. Variation From Nominal Dimension: Plus or minus 1/2 inch (12.5 mm).
 - 2. Variation From Intended Camber: Plus or minus 1/4 in per 10 ft (6 mm per 3 m), plus or minus 5/8 inch (15 mm) maximum.
 - 3. Variation from End Squareness: Plus or minus 1/8 inch/12 in (3 mm/300 mm), maximum 3/8 in (9 mm).
 - 4. Maximum Misalignment of Anchors, Inserts, Openings: Plus or minus 1/8 inch (3 mm).
 - 5. Sweep: Plus or minus 1/4 inch (6 mm).

2.07 FINISHES

- A. Ensure exposed-to-view finish surfaces of precast concrete members are uniform in color and appearance.
- B. Cure members under identical conditions to develop required concrete quality, and minimize appearance blemishes such as non-uniformity, staining, or surface cracking.
- C. Architectural Finish: Surface holes or bubbles over 1/4 inch (6 mm) filled with matching cementitious paste, fins or protrusions removed and surface ground smooth.

2.08 ACCESSORIES

- A. Connecting and Supporting Devices; Anchors and Inserts: Plates, angles, items cast into concrete, items connected to steel framing members, and inserts complying with PCI MNL-123 and as follows:
 - 1. Material: Carbon steel complying with ASTM A36/A36M.
 - 2. Finish: Prime painted, except where device surfaces will be in contact with concrete or will require field welding.
- B. Grout: Non-shrink, non-metallic, minimum yield strength of 10,000 psi (69 MPa) at 28 days.
- C. Bearing Pads: High density plastic, Vulcanized elastomeric compound molded to size, Neoprene (Chloroprene), or Tetrafluoroethylene(TFE); Shore A Durometer as recommended by manufacturer; 1/8 inch (3 mm) thick, smooth both sides.
- D. Bolts, Nuts and Washers: High strength steel type recommended for structural steel joints.
- E. Prime Paint: Zinc rich alkyd type.

2.09 SOURCE QUALITY CONTROL

- A. Section 01 4000 - Quality Requirements: Provide mix design for concrete.
- B. Test samples in accordance with applicable ASTM standard.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that site conditions are ready to receive work and field measurements are as indicated on shop drawings.

3.02 PREPARATION

- A. Prepare support equipment for the erection procedure, temporary bracing, and induced loads during erection.

3.03 ERECTION

- A. Erect members without damage to structural capacity, shape, or finish. Replace or repair damaged members.
- B. Align and maintain uniform horizontal and vertical joints, as erection progresses.
- C. Maintain temporary bracing in place until final support is provided. Protect members from staining.
- D. Provide temporary lateral support to prevent bowing, twisting, or warping of members.
- E. Adjust differential camber between precast members to tolerance before final attachment.
- F. Install bearing pads.
- G. Level differential elevation of adjoining horizontal members with grout to maximum slope of 1:12.
- H. Set vertical units dry, without grout, attaining joint dimension with lead or plastic spacers.
- I. Grout underside of column bearing plates.
- J. Secure units in place. Perform welding in accordance with AWS D1.1/D1.1M.

3.04 TOLERANCES

- A. Erect members level and plumb within allowable tolerances.
- B. Conform to PCI MNL-135 for erection tolerances.
- C. When members cannot be adjusted to comply with design or tolerance criteria, cease work and advise Architect. Execute modifications as directed.

3.05 PROTECTION

- A. Protect members from damage caused by field welding or erection operations.
- B. Provide non-combustible shields during welding operations.

3.06 CLEANING

- A. Clean weld marks, dirt, or blemishes from surface of exposed members.

END OF SECTION

SECTION 03 4500 - PRECAST ARCHITECTURAL CONCRETE - FOR REFERENCE ONLY

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Architectural precast concrete wall panels.
- B. Supports, anchors, and attachments.
- C. Grouting under panels.

1.02 RELATED REQUIREMENTS

- A. Section 07 9200 - Joint Sealants: Sealing perimeter and intermediate joints.

1.03 REFERENCE STANDARDS

- A. ACI CODE-318 - Building Code Requirements for Structural Concrete and Commentary; 2019 (Reapproved 2022).
- B. ACI SPEC-301 - Specifications for Concrete Construction; 2020.
- C. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- E. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- F. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- G. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2021.
- H. ASTM A563/A563M - Standard Specification for Carbon and Alloy Steel Nuts (Inch and Metric); 2021a.
- I. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2024.
- J. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete; 2012.
- K. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2016, with Editorial Revision (2016).
- L. ASTM C150/C150M - Standard Specification for Portland Cement; 2018.
- M. ASTM C330/C330M - Standard Specification for Lightweight Aggregates for Structural Concrete; 2023.
- N. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2025.
- O. PCI MNL-117 - Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products; 2013.
- P. PCI MNL-120 - PCI Design Handbook; 2025.
- Q. PCI MNL-122 - Architectural Precast Concrete; 2007.
- R. PCI MNL-123 - Connections Manual: Design and Typical Details of Connections for Precast and Prestressed Concrete; 1988.
- S. PCI MNL-135 - Tolerance Manual for Precast and Prestressed Concrete Construction; 2000.

1.04 SUBMITTALS

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

- B. Product Data: Manufacturer's information on accessory products, including pigments, admixtures, inserts, plates, etc.
- C. Shop Drawings: Indicate layout, unit locations, configuration, unit identification marks, reinforcement, integral insulation, insulated panel system connectors, connection details, support items, location of lifting devices, dimensions, openings, and relationship to adjacent materials. Provide erection drawings.
 - 1. Include details of mix designs.
 - 2. Include structural design calculations.
- D. Fabricator's Qualification Statement: Provide documentation showing precast concrete fabricator is accredited under IAS AC157.
- E. Delegated-Design Submittal: For architectural precast concrete indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer, licensed in the state of Minnesota, responsible for their preparation.
 - 1. Show governing panel types, connections, types of reinforcement, including special reinforcement, and concrete cover on reinforcement. Indicate location, type, magnitude, and direction of loads imposed on the building structural frame from architectural precast concrete.

1.05 QUALITY ASSURANCE

- A. Design Engineer Qualifications: Design precast concrete units under direct supervision of a Professional Structural Engineer experienced in design of precast concrete and licensed in the State in which the Project is located.
- B. Fabricator Qualifications:
 - 1. Firm having at least 2 years of experience in production of precast concrete of the type required.
 - 2. Plant certified under Precast/Prestressed Concrete Institute Plant Certification Program; product group and Category AA.
- C. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and no more than 12 months before start of scheduled welding work.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Handling: Lift and support precast units only from support points.
- B. Blocking and Lateral Support During Transport and Storage: Use materials that are clean, non-staining, and non-harmful to exposed surfaces. Provide temporary lateral support to prevent bowing and warping.
- C. Protect units to prevent staining, chipping, or spalling of concrete.
- D. Mark units with date of production in location that will be concealed after installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Architectural Precast Concrete:
 - 1. Gage Brothers Concrete Products, Inc: gagebrothers.com.
 - 2. Molin Concrete Products: www.molin.com.
 - 3. Taracon Precast: www.taraconprecast.com.
 - 4. Wells Concrete Products: www.wellsconcrete.com.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 4000 "Quality Requirements," to design architectural precast concrete units.
- B. Design Standards: Comply with ACI 318 and with design recommendations in PCI MNL 120, "PCI Design Handbook - Precast and Prestressed Concrete," applicable to types of architectural precast concrete units indicated. Structure to comply with ICC 500-14 Storm Shelter requirements as indicated on the structural drawings.
- C. Structural Performance: Architectural precast concrete units and connections shall withstand design loads indicated within limits and under conditions indicated.
- D. Structural Performance: Provide architectural precast concrete units and connections capable of withstanding the design loads indicated within limits and under conditions indicated:
 - 1. Design architectural precast concrete framing system and connections to maintain clearances at openings, to allow for fabrication and construction tolerances, to accommodate live-load deflection, shrinkage and creep of primary building structure, and other building movements. Maintain architectural precast concrete deflections within limits of ACI 318.
 - a. Thermal Movements: Allow for in-plane thermal movements resulting from annual ambient temperature changes of 120 deg F.

2.03 PRECAST UNITS, GENERAL

- A. Precast Architectural Concrete Units: Comply with PCI MNL-120, PCI MNL-122, PCI MNL-123, PCI MNL-135, and ACI CODE-318.
 - 1. Concrete Face Mix: Minimum 5000 psi (34 MPa), 28 day strength, air entrained to 5 to 7 percent; comply with ACI SPEC-301.
 - 2. Design Loads: Static loads, anticipated dynamic loading, including positive and negative wind loads, thermal movement loads, and erection forces as defined by applicable code.
 - 3. Calculate structural properties of units in accordance with ACI CODE-318.
 - 4. Accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.
 - 5. Provide connections that accommodate building movement and thermal movement and adjust to misalignment of structure without unit distortion or damage.
 - 6. Control joints in individual panels are NOT acceptable.
- B. Insulated Wall Panel (PC PNL-1): Precast concrete wall panel with foam insulation sandwiched by interior and exterior concrete. See drawings for thicknesses.
- C. Wall Panel without Insulation (PC PNL-2): Precast concrete wall panel without insulation. See drawings for thicknesses.
- D. No Integral Color:
 - 1. (PCFIN-20): Finish: None.
 - 2. (PCFIN-21): Finish: Brick formliner.
 - 3. (PCFIN-22): Finish: Concrete formliner.
- E. Integral Color:
 - 1. (PCFIN-23): Finish: Acid etched.
 - 2. (PCFIN-24): Finish: Sandblast.
 - 3. (PCFIN-25): Finish: Brick Formliner.
 - 4. Basis of Design: Wells Concrete Sample ID#AA992B:
 - a. Federal White PLC-700

- b. Evenson 3/8 inch Pea Gravel-1907
 - c. Evenson Torpedo Sand - 1167
 - d. #0051 Sandy Buff 3%
- F. Standard Float Finish (PCFIN-1): As-cast surface finish: Provide surfaces to match accepted sample or mockup units for acceptable surface air voids, sand streaks and honeycombs.
 - G. Acid Etch Finish: Use acid and hot-water solution, equipment, application techniques, and cleaning procedures to expose aggregate and surrounding matrix surfaces. Protect hardware, connections, and insulation from acid attack. Provide joints and reveals as indicated in drawings. Architect to select final finish from manufacturer's samples.
 - H. Sandblast Finish: Sandblast exposed-to-view precast unit surfaces to expose aggregate. Protect adjacent surfaces. Provide joints and reveals as indicated in drawings. Architect to select final finish from manufacturer's samples.

2.04 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi) (420 MPa).
 - 1. Deformed billet-steel bars.

2.05 CONCRETE MATERIALS

- A. Cement: ASTM C150/C150M, Type I - Normal Portland type.
- B. Fine and Coarse Structural Aggregates: ASTM C33/C33M.
- C. Lightweight Structural Aggregate: ASTM C330/C330M.
- D. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.
- E. Grout:
 - 1. Non-shrink, non-metallic, minimum 10,000 psi (70 MPa), 28 day strength.

2.06 FORM LINERS

- A. Basis of Design:
 - 1. (PCFIN-21), (PCFIN-25) Urethane Formliner: #115 Old Brick by Scott Systems: www.scottsystem.com.
 - 2. (PCFIN-22) Concrete Formliner: 515-S Old Timer Form by Architectural Polymers: www.apformliner.com.

2.07 SUPPORT DEVICES

- A. Connecting and Support Devices; Anchors and Inserts: ASTM A36/A36M steel; hot-dip galvanized in accordance with ASTM A153/A153M.
 - 1. Clean surfaces of rust, scale, grease, and foreign matter.
 - 2. Galvanize after fabrication in accordance with requirements of ASTM A123/A123M.
 - 3. Items not below grade or exposed to the elements, or areas of high moisture or chemical content need not be galvanized. Coordinate with Architect.
- B. Bolts, Nuts, and Washers: ASTM A307 heavy hex bolts, Type A, hot-dip galvanized, with matching ASTM A563/A563M nuts and matching washers.
- C. Primer: Zinc rich type.

2.08 INSULATION

- A. Integral Insulation: Rigid extruded polystyrene (XPS) board insulation.

1. Design and construct panels to maintain overall R-value of 15.2 (RSI-value of 2.7), with less than one percent change due to penetrations and connections, when calculated in accordance with ASHRAE Std 90.1 I-P, isothermal planes method.

2.09 FABRICATION

- A. Fabricate in compliance with PCI MNL-117 and PCI MNL-135.
- B. Maintain plant records and quality control program during production of precast units. Make records available upon request.
- C. Use rigid molds, constructed to maintain precast unit uniform in shape, size, and finish.
- D. Use form liners in accordance with manufacturer's instructions.
- E. Place thin brick in form liner in accordance with manufacturer's instructions. Mix bricks from several cartons for uniform distribution of color variations.
- F. Maintain consistent quality during manufacture.
- G. Fabricate connecting devices, plates, angles, items fit to steel framing members, inserts, bolts, and accessories. Fabricate to permit initial placement and final attachment.
- H. Embed reinforcing steel, anchors, inserts plates, angles, and other cast-in items.
- I. Locate hoisting devices to permit removal after erection.
- J. Cure units to develop concrete quality, and to minimize appearance blemishes such as non-uniformity, staining, or surface cracking.
- K. Minor patching in plant is acceptable, providing structural adequacy and appearance of units is not impaired.

2.10 FABRICATION TOLERANCES

- A. Conform to PCI MNL-117 and PCI MNL-135.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that building structure, anchors, devices, and openings are ready to receive work of this section.
- B. Do not install precast concrete units until supporting cast-in-place concrete has attained minimum allowable design compressive strength and supporting steel or other structure is structurally ready to receive loads from precast concrete units.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Provide for erection procedures and induced loads during erection. Maintain temporary bracing in place until final support is provided.

3.03 ERECTION

- A. Erect units without damage to shape or finish. Replace or repair damaged panels.
- B. Erect units level and plumb within allowable tolerances.
- C. Align and maintain uniform horizontal and vertical joints as erection progresses.
- D. When units require adjustment beyond design or tolerance criteria, discontinue affected work; advise Architect.
- E. Weld units in place. Perform welding in accordance with AWS D1.1/D1.1M.
- F. Provide non-combustible shields during welding operations.
- G. Touch-up field welds and scratched or damaged primed painted surfaces.

- H. Set vertical units dry, without grout, attaining joint dimension with lead or plastic spacers. Pack grout to base of unit.
- I. Exposed Joint Dimension: 1/2 inch (12 mm). Adjust units so that joint dimensions are within tolerances.

3.04 TOLERANCES

- A. Erect members level and plumb within allowable tolerances. Conform to PCI MNL-135.

3.05 FIELD QUALITY CONTROL

- A. Coordinate all field quality control with the Storm Shelter Quality Assurance Plan.
- B. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
 - 1. Erection of loadbearing precast concrete members.
- C. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- D. Visually inspect field welds and test according to ASTM E 165 or to ASTM E 709 and ASTM E 1444. High-strength bolted connections are subject to inspections.
- E. Testing agency will report test results promptly and in writing to Contractor and Architect.
- F. Repair or remove and replace work where tests and inspections indicate that it does not comply with specified requirements.
- G. Additional testing and inspecting, at Contractor's expense, shall be performed to determine compliance of replaced or additional work with specified requirements.
- H. Prepare test and inspection reports.

END OF SECTION

SECTION 04 2000 - UNIT MASONRY

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Concrete block.
- B. Clay facing brick.
- C. Mortar and grout.
- D. Reinforcement and anchorage.
- E. Accessories.

1.02 RELATED REQUIREMENTS

- A. Section 07 9200 - Joint Sealants: Sealing control and expansion joints.

1.03 REFERENCE STANDARDS

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- B. ASTM A951/A951M - Standard Specification for Steel Wire for Masonry Joint Reinforcement; 2022.
- C. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2017.
- D. ASTM C67/C67M - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile; 2023.
- E. ASTM C90 - Standard Specification for Dry-Cast Loadbearing Concrete Masonry Units; 2024a.
- F. ASTM C91/C91M - Standard Specification for Masonry Cement; 2012.
- G. ASTM C129 - Standard Specification for Dry-Cast Nonloadbearing Concrete Masonry Units; 2025.
- H. ASTM C140/C140M - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units; 2025.
- I. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2017.
- J. ASTM C150/C150M - Standard Specification for Portland Cement; 2018.
- K. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2006 (Reapproved 2011).
- L. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale); 2024.
- M. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2014a.
- N. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2011.
- O. ASTM C476 - Standard Specification for Grout for Masonry; 2018.
- P. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2017.
- Q. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2016.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.
- C. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.

- D. Manufacturer's Certificate: Certify that water repellent admixture manufacturer has certified masonry unit manufacturer as an approved user of water repellent admixture in the manufacture of concrete block.
- E. Sustainability Design Documentation: Provide applicable sustainability documentation for each product as described in Section 01 3329 - Sustainable Design Requirements.

1.05 MOCK-UPS

- A. Construct a masonry wall as a mock-up panel sized 8 feet (2.4 m) long by 6 feet (1.8 m) high; include mortar, accessories, structural backup, wall openings, flashings (with lap joint, corner, and end dam), and wall insulation in mock-up.
- B. Locate where directed.
- C. Mock-up may not remain as part of the Work.

1.06 DELIVERY, STORAGE, AND HANDLING

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

PART 2 PRODUCTS

2.01 PRODUCT REQUIREMENTS

- A. Products listed as Basis of Design have been selected using sustainability criteria. Products from other manufacturer's listed herein, and/or substitutions will only be accepted if they meet, or exceed, the performance of the Basis of Design. Manufacturer must be able to provide sustainability documentation showing that the product meets, or exceeds, the Basis of Design.

2.02 CONCRETE MASONRY UNITS

- A. Concrete Block: Comply with referenced standards and as follows:
 - 1. Size: Standard units with nominal face dimensions of 16 by 8 inches (400 by 200 mm) and nominal depths as indicated on drawings for specific locations.
 - 2. Special Shapes: Provide nonstandard blocks configured for corners.
 - 3. Load-Bearing Units: ASTM C90, normal weight.
 - a. Hollow block.
 - 4. Nonloadbearing Units: ASTM C129.
 - a. Hollow block.
 - 5. Patterns and Faces:
 - a. (CMU-1): Manufacturer's standard color and texture.
 - b. (BMU-20): Single vertical score in face(s).
 - 1) Basis of Design: AmCon Concrete Products: www.amconconcreteproducts.com.
 - 2) Color: #504 Cinnamon.
 - 3) Provide manufacturer's standard factory applied sealer (such as TK 192 by TK Products) on each ground surface to facilitate cleaning.
 - 4) Provide special units for bullnosed corners and where multiple faces are visible.
 - c. Supplier of prefinished or integrally colored units shall guarantee that the finished product will not be stained or damaged due to iron or shale deposits in the face for a period of 5 years.

2.03 BRICK UNITS

- A. Facing Brick (BRK-1): ASTM C216, Type FBS Smooth, Grade SW.
 - 1. Basis of Design: Glen-Gary.

2. Color and texture: La Salle.
3. Nominal size: Modular.
4. Special shapes: Molded units as required by conditions indicated, unless standard units can be sawn to produce equivalent effect.

2.04 MORTAR AND GROUT MATERIALS

- A. Masonry Cement: ASTM C91/C91M, Type S.
- B. Portland Cement: ASTM C150/C150M, Type I.
- C. Hydrated Lime: ASTM C207, Type S.
- D. Mortar Aggregate: ASTM C144.
- E. Grout Aggregate: ASTM C404.
- F. Water: Clean and potable.
- G. Integral Water Repellent Admixture for Mortar: Polymeric liquid admixture added to mortar at the time of manufacture.
 1. Use only in combination with masonry units manufactured with integral water repellent admixture.
 2. Use only water repellent admixture for mortar from the same manufacturer as water repellent admixture in masonry units.
 3. Meet or exceed performance specified for water repellent admixture used in masonry units.

2.05 REINFORCEMENT AND ANCHORAGE

- A. Sustainability Requirements: Manufacturer's must be able to provide the following, or equivalent, product documentations:
 1. Environmental Product Declaration (EPD).
- B. Basis of Design: Hohmann & Barnard, Inc; www.h-b.com.
- C. Other Acceptable Products provided they meet or exceed the Basis of Design performance requirements:
 1. Blok-Lok Limited: www.blok-lok.com.
 2. WIRE-BOND www.wirebond.com/#sle.
 3. Substitutions: See Section 01 6000 - Product Requirements.
- D. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi) (420 MPa), deformed billet bars; galvanized.
- E. Joint Reinforcement: Use ladder type joint reinforcement where vertical reinforcement is involved and truss type elsewhere, unless otherwise indicated.
- F. Single Wythe Joint Reinforcement: ASTM A951/A951M.
 1. Type: Ladder.
 2. Material: ASTM A1064/A1064M steel wire, hot dip galvanized after fabrication to ASTM A153/A153M Class B.
 3. Size: 0.1483 inch (3.8 mm) side rods with 0.1483 inch (3.8 mm) cross rods; width as required to provide not less than 5/8 inch (16 mm) of mortar coverage on each exposure.
- G. Adjustable Multiple Wythe Joint Reinforcement: ASTM A951/A951M.
 1. Type: Truss, with adjustable ties or tabs spaced at 16 in (406 mm) on center.
 2. Material: ASTM A1064/A1064M steel wire, hot dip galvanized after fabrication to ASTM A153/A153M Class B.

3. Size: 0.1875 inch (4.8 mm) side rods with 0.1483 inch (3.8 mm) cross rods and adjustable components of 0.1875 inch (4.8 mm) wire, width of components as required to provide not less than 5/8 inch (16 mm) of mortar coverage from each masonry face.
4. Vertical adjustment: Not more than 1 1/4 inches (32 mm).
5. Insulation Clips: Provide clips at tabs or ties designed to secure insulation against outer face of inner wythe of masonry.

2.06 ACCESSORIES

- A. Preformed Control Joints (CJ-1): Rubber material. Provide with corner and tee accessories, fused joints.
- B. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.
 1. Acceptable Products: Contractor's option to achieve the specified results without damage to masonry or surrounding materials, such as Sure Klean by Prosoco or other product with similar properties.
 2. Use in strict accordance with manufacturer's written instructions.

2.07 MORTAR AND GROUT MIXING

- A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.
- B. Grout: ASTM C476; consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches (50 mm) or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches (50 mm).
- C. Admixtures: Add to mixture at manufacturer's recommended rate and in accordance with manufacturer's instructions; mix uniformly.
- D. Mixing: Use mechanical batch mixer and comply with referenced standards.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive masonry.
- B. Verify that related items provided under other sections are properly sized and located.
- C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.02 COLD AND HOT WEATHER REQUIREMENTS

- A. Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.

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. Mortar Joints: Concave.
- D. Brick Units:
 1. Bond: Running.
 2. 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.

- C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- D. Remove excess mortar and mortar smears as work progresses.
- E. Remove excess mortar with water repellent admixture promptly. Do not use acids, sandblasting or high pressure cleaning methods.
- F. Interlock intersections and external corners, except for units laid in stack bond.
- G. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- H. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- I. Isolate masonry partitions from vertical structural framing members with a control joint.
- J. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

3.05 REINFORCEMENT AND ANCHORAGE - GENERAL AND SINGLE WYTHE MASONRY

- A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches (400 mm) on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches (400 mm) each side of opening.
- C. Lap joint reinforcement ends minimum 6 inches (150 mm).

3.06 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

- A. Masonry Back-Up: Embed anchors to bond veneer at maximum 16 inches (400 mm) on center vertically and 36 inches (900 mm) on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches (200 mm) on center.
- B. Stud Back-Up: Secure veneer anchors to stud framed back-up and embed into masonry veneer at maximum 16 inches (400 mm) on center vertically and 24 inches (600 mm) on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches (200 mm) on center.

3.07 LINTELS

- A. Install loose steel lintels over openings.
- B. Install reinforced unit masonry lintels over openings where steel or precast concrete lintels are not scheduled.
 1. Openings over 48 inches not scheduled: Contact Structural Engineer.

3.08 GROUTED COMPONENTS

- A. Follow lap splice requirements as indicated in Structural drawings.

3.09 CONTROL AND EXPANSION JOINTS

- A. Do not continue horizontal joint reinforcement through control or expansion joints.
- B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.
- C. Size control joints as indicated on drawings; if not indicated, 3/4 inch (19 mm) wide and deep.

3.10 TOLERANCES

- A. Maximum Variation From Unit to Adjacent Unit: 1/16 inch (1.6 mm).
- B. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft (6 mm/3 m) and 1/2 inch in 20 ft (13 mm/6 m) or more.

- C. Maximum Variation from Plumb: 1/4 inch (6 mm) per story non-cumulative; 1/2 inch (13 mm) in two stories or more.
- D. Maximum Variation from Level Coursing: 1/8 inch in 3 ft (3 mm/m) and 1/4 inch in 10 ft (6 mm/3 m); 1/2 inch in 30 ft (13 mm/9 m).
- E. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch (minus 6.4 mm, plus 9.5 mm).
- F. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch (6 mm).

3.11 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.
- B. Clay Masonry Unit Tests: Test each variety of clay masonry in accordance with ASTM C67/C67M requirements, sampling 5 randomly chosen units for each 50,000 installed.
- C. Concrete Masonry Unit Tests: Test each variety of concrete unit masonry in accordance with ASTM C140/C140M for compliance with requirements of this specification.
- D. Mortar Tests: Test each type of mortar in accordance with ASTM C780, testing with same frequency as masonry samples.

3.12 CLEANING

- A. Remove excess mortar and mortar droppings.
- B. Clean soiled surfaces with cleaning solution.

3.13 PROTECTION

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

END OF SECTION

SECTION 042200 – CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Concrete masonry units.
 - 2. Lintels.
 - 3. Mortar and grout materials.
 - 4. Reinforcement.
 - 5. Mortar and grout mixes.
- B. Products Installed but not Furnished under This Section:
 - 1. Steel lintels in unit masonry.
 - 2. Steel shelf angles for supporting unit masonry.
 - 3. Cavity wall insulation adhered to masonry backup.
- C. Related Requirements:
 - 1. Section 031000 "Concrete Forms and Accessories" for dovetail or channel slots for masonry-veneer anchors.
 - 2. Section 051200 "Structural Steel Framing" for installing anchor sections of adjustable masonry anchors for connecting to structural steel frame.

1.02 DEFINITIONS

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

1.03 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.04 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For the following:
 - 1. Masonry Units: Indicate sizes, profiles, coursing, and locations of special shapes.
 - 2. Reinforcing Steel: Indicate bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315R. Indicate elevations of reinforced walls.

1.05 INFORMATIONAL SUBMITTALS

- A. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.
 - 1. Submittal is for information only. Receipt of list does not constitute approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.
- B. Material Certificates: For each type of the following:
 - 1. Masonry units.
 - a. Include data on material properties.
 - b. For brick, include size-variation data verifying that actual range of sizes falls within specified tolerances.
 - c. For exposed brick, include test report for efflorescence in accordance with ASTM C67/C67M.
 - d. For masonry units, include data and calculations establishing average net-area compressive strength of units.

2. Cementitious materials. Include name of manufacturer, brand name, and type.
 3. Mortar admixtures.
 4. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
 5. Grout mixes. Include description of type and proportions of ingredients.
 6. Reinforcing bars.
 7. Joint reinforcement.
- C. Qualification Statements: For testing agency.
- D. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
1. Include test reports for mortar mixes required to comply with property specification. Test in accordance with ASTM C109/C109M for compressive strength, ASTM C1506 for water retention, and ASTM C91/C91M for air content.
- E. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined in accordance with TMS 602.
- F. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.06 QUALITY ASSURANCE

- A. Qualifications:
1. Testing Agency Qualifications: Qualified in accordance with ASTM C1093 for testing indicated.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.08 FIELD CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
1. Extend cover a minimum of 24 inches down both sides of walls, and hold cover securely in place.
 2. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe, and hold cover in place.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
 2. Protect sills, ledges, and projections from mortar droppings.
 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602.
 - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.
- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602.

PART 2 - PRODUCTS

2.01 SOURCE LIMITATIONS

- A. Obtain exposed masonry units of a uniform texture and color, or a uniform blend within ranges accepted for these characteristics, from single source or manufacturer for each product required.
- B. For exposed masonry units and cementitious mortar components, obtain each color and grade from single source with resources to provide materials of consistent quality in appearance and physical properties.

2.02 UNIT MASONRY, GENERAL

- A. Masonry Standard: Comply with TMS 602, except as modified by requirements in the Contract Documents.
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work and will be within 20 ft. vertically and horizontally of a walking surface.

2.03 CONCRETE MASONRY UNITS

- A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
 - 1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
 - 2. Provide bullnose units above standard square-edge CMU first course at outside corners, end of walls, at door and window jambs and heads, and as indicated on Drawings.
- B. CMUs: ASTM C90, normal weight unless otherwise indicated.
 - 1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 3250psi.
 - 2. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.
 - 3. Exposed Faces: Provide color and texture matching the range represented by Architect's sample.

2.04 LINTELS

- A. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs matching adjacent CMUs in color, texture, and density classification, with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.05 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C150/C150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
 - 1. Alkali content will not be more than 0.1 percent when tested in accordance with ASTM C114.
- B. Hydrated Lime: ASTM C207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- D. Aggregate for Mortar: ASTM C144.
 - 1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
 - 2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
- E. Aggregate for Grout: ASTM C404.

- F. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C494/C494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
- G. Water: Potable.

2.06 REINFORCEMENT

- A. Uncoated-Steel Reinforcing Bars: ASTM A615/A615M or ASTM A996/A996M, Grade 60.
- B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from 0.148-inch steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Dur-O-Wal; a Hohmann & Barnard Company; D/A 810, D/A 812, or D/A 817.
 - b. Heckmann Building Products, Inc., No. 376 Rebar Positioner.
 - c. Hohmann & Barnard, Inc., #RB or #RB-Twin Rebar Positioner.
 - d. Wire-Bond, O-Ring or Double O-Ring Positioner.
 - e. Or Approved Equal.
- C. Masonry-Joint Reinforcement, General: ASTM A951/A951M.
 - 1. Interior Walls: Hot-dip galvanized carbon steel.
 - 2. Exterior Walls: Hot-dip galvanized carbon steel.
 - 3. Wire Size for Side Rods: 0.148-inch diameter.
 - 4. Wire Size for Cross Rods: 0.148-inch diameter.
 - 5. Wire Size for Veneer Ties: 0.148-inch diameter.
 - 6. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.
 - 7. Provide in lengths of not less than 10 ft., with prefabricated corner and tee units.
- D. Masonry-Joint Reinforcement for Single-Wythe Masonry: Ladder type with single pair of side rods.
- E. Masonry-Joint Reinforcement for Multiwythe Masonry:
 - 1. Adjustable (two-piece) type, either ladder or truss design, with one side rod at each face shell of backing wythe and with separate adjustable ties with pintle-and-eye connections having a maximum horizontal play of 1/16 inch and maximum vertical adjustment of 1-1/4 inches. Size ties to extend at least halfway through facing wythe but with at least 5/8-inch cover on outside face.

2.07 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
 - 1. Do not use calcium chloride in mortar or grout.
 - 2. Use portland cement-lime mortar unless otherwise indicated.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C270, Property Specification. Provide the following types of mortar for applications stated unless another type is indicated.
 - 1. For masonry below grade or in contact with earth, use Type M.
 - 2. For reinforced masonry, use Type S.
 - 3. For exterior, above-grade, load-bearing, nonload-bearing walls, and parapet walls; for interior load-bearing walls; for interior nonload-bearing partitions; and for other applications where another type is not indicated, use Type N.
 - 4. For interior nonload-bearing partitions, Type O may be used instead of Type N.
- D. Grout for Unit Masonry: Comply with ASTM C476.
 - 1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602 for dimensions of grout spaces and pour height.
 - 2. Proportion grout in accordance with ASTM C476, paragraph 4.2.1.2 for specified 28-day compressive strength indicated, but not less than 2500 psi.

3. Provide grout with a slump of 8 to 11 inches as measured in accordance with ASTM C143/C143M.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
 2. Verify that foundations are within tolerances specified.
 3. Verify that reinforcing dowels are properly placed.
 4. Verify that substrates are free of substances that impair mortar bond.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION, GENERAL

- A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.
- B. Build chases and recesses to accommodate items specified in this and other Sections.
- C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.
- D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.
- F. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.

3.03 TOLERANCES

- A. Dimensions and Locations of Elements:
 1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch or minus 1/4 inch.
 2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.
 3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.
- B. Lines and Levels:
 1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 ft., or 1/2-inch maximum.
 2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 ft., 1/4 inch in 20 ft., or 1/2-inch maximum.
 3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 ft., 3/8 inch in 20 ft., or 1/2-inch maximum.
 4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 ft., 1/4 inch in 20 ft., or 1/2-inch maximum.
 5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 ft., 3/8 inch in 20 ft., or 1/2-inch maximum.
 6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 ft., or 1/2-inch maximum.
 7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.

- C. Joints:
1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
 2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
 3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
 4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.
 5. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch from one masonry unit to the next.

3.04 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less-than-nominal 8-inch horizontal face dimensions at corners or jambs.
- C. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- E. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- F. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.
- G. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.
- H. Build nonload-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.
 1. Install compressible filler in joint between top of partition and underside of structure above.

3.05 MORTAR BEDDING AND JOINTING

- A. Lay CMUs as follows:
 1. Bed face shells in mortar and make head joints of depth equal to bed joints.
 2. Bed webs in mortar in all courses of piers, columns, and pilasters.
 3. Bed webs in mortar in grouted masonry, including starting course on footings.
 4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
 5. Fully bed units and fill cells with mortar at anchors and ties as needed to fully embed anchors and ties in mortar.
- B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

3.06 CAVITY WALLS

- A. Bond wythes of cavity walls together using one of the following methods:
 1. Individual Metal Ties: Provide ties as indicated installed in horizontal joints, but not less than one metal tie for 2.67 sq. ft. of wall area spaced not to exceed 24 inches o.c. horizontally and 16 inches o.c. vertically. Stagger ties in alternate courses. Provide additional ties within 12 inches of openings and space not more than 36 inches apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 24 inches o.c. vertically.
 2. Where bed joints of wythes do not align, use adjustable-type (two-piece-type) ties.

3. Where one wythe is of clay masonry and the other of concrete masonry, use adjustable-type (two-piece-type) ties to allow for differential movement regardless of whether bed joints align.
4. Masonry-Joint Reinforcement: Installed in horizontal mortar joints.
 - a. Where bed joints of both wythes align, use ladder-type reinforcement extending across both wythes.
 - b. Where bed joints of wythes do not align, use adjustable-type (two-piece-type) reinforcement.
 - c. Where one wythe is of clay masonry and the other of concrete masonry, use adjustable-type (two-piece-type) reinforcement to allow for differential movement regardless of whether bed joints align.
5. Masonry-Veneer Anchors: Comply with requirements for anchoring masonry veneers.

3.07 MASONRY-JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
 1. Space reinforcement not more than 16 inches o.c. unless noted otherwise in wall schedule.
 2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
 3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings in addition to continuous reinforcement.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.
- E. Cut and bend reinforcing units as directed by manufacturer for continuity at corners, returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.08 CONTROL AND EXPANSION JOINTS

- A. General: Install control- and expansion-joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
- B. Form control joints in concrete masonry using one of the following methods:
 1. Fit bond-breaker strips into hollow contour in ends of CMUs on one side of control joint. Fill resultant core with grout, and rake out joints in exposed faces for application of sealant.
 2. Install preformed control-joint gaskets designed to fit standard sash block.
 3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar, or rake out joint for application of sealant.

3.09 LINTELS

- A. Install steel lintels where indicated.
- B. Provide masonry or lintels where indicated and where openings of more than 12 inches for brick-size units and 24 inches for block-size units are indicated without structural steel or other supporting lintels.
- C. Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.

3.010 REINFORCED UNIT MASONRY

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
 1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and that of other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in TMS 602.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Comply with requirements in TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
2. Limit height of vertical grout pours to not more than 60 inches.

3.011 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements will be at Contractor's expense.
- B. Inspections: Special inspections in accordance with Level 2 in TMS 402.
 1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
 2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
 3. Place grout only after inspectors have verified proportions of site-prepared grout.
- C. Testing Prior to Construction: One set of tests.
- D. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof.
- E. Mortar Test (Property Specification): For each mix provided, in accordance with ASTM C780. Test mortar for compressive strength.
- F. Grout Test (Compressive Strength): For each mix provided, in accordance with ASTM C1019.

3.012 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
 3. Protect adjacent stone and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
 4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
 5. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
 6. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.

3.013 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
- B. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION

SECTION 051200 – STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Structural steel.
 - 2. Shrinkage-resistant grout.
- B. Related Requirements:
 - 1. Section 055000 "Metal Fabrications" for steel lintels and shelf angles not attached to structural-steel frame miscellaneous steel fabrications and other steel items not defined as structural steel.
 - 2. Section 099123 "Interior Painting" for painting requirements.

1.3 DEFINITIONS

- A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in ANSI/AISC 303.
- B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. Shrinkage-resistant grout.
- B. Shop Drawings: Show fabrication of structural-steel components.
 - 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
 - 2. Include embedment Drawings.
 - 3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
 - 4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections.

5. Identify members not to be shop primed.
- C. Delegated-Design Submittal: For structural-steel connections indicated on Drawings to comply with design loads, include analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- C. Mill test reports for structural-steel materials, including chemical and physical properties.
- D. Field quality-control reports.

1.6 QUALITY ASSURANCE

- A. Special inspections of the steel fabrication are required in accordance with “International Building Code” Section 1704.2 unless the steel fabrication is done by an approved steel fabricator in accordance with “International Building Code” Section 1704.2.2.
- B. AISC Certified Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category BU.
 1. The following fabricator is certified in the State of Minnesota. Certified fabricators not listed may also bid on the Project, see AISC Certified fabricator’s list for all listings.
 - a. Ben’s Structural Fabrication, Waite Park, MN.
- D. Non AISC Certified: In lieu of AISC certification provide the following:
 1. Submit letter to building official to review fabricator’s ability to fabricate steel, with a copy to the Architect. Letter shall, at a minimum, identify the following:
 - a. Provide written procedural and quality control manuals.
 - b. Provide audits of fabrication practiced by an approved special inspection agency.
 - c. Provide a statement that steel will be fabricated in accordance with the AISC quality certification program. If in-plant special inspection is used, refer to subparagraph “e”.
 - 1) Identify new requirements in current quality control procedures that occur.
 - 2) Submit a certificate of compliance to the building official and Architect that work completed meets AISC quality requirements and conforms to the contract documents.
 - d. In lieu of subparagraph “c”, fabricator to provide in-plant special inspections as required by IBC and by AISC.

- 1) Identify special inspection agency to provides service
 - 2) Submit special inspection reports to the building official (with copies to the Architect).
- E. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.
- B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.
1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
 2. Clean and relubricate bolts and nuts that become dry or rusty before use.
 3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F3125/F3125M, Grade F1852 bolt assemblies and for retesting bolt assemblies after lubrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Comply with applicable provisions of the following specifications and documents:
1. ANSI/AISC 303.
 2. ANSI/AISC 360.
 3. RCSC's "Specification for Structural Joints Using High-Strength Bolts."
- B. Connection Design Information:
1. Fabricator's experienced steel detailer shall select or complete connections in accordance with ANSI/AISC 303.
 - a. Select and complete connections using schematic details indicated and ANSI/AISC 360.

2.2 STRUCTURAL-STEEL MATERIALS

- A. W-Shapes: ASTM A992/A992M.
- B. Channels, Angles-Shapes: ASTM A36/A36M.

- C. Plate and Bar: ASTM A36/A36M.
- D. Cold Formed Hollow Structural Sections: ASTM A500/A500M, Grade C structural tubing.
- E. Welding Electrodes: Comply with AWS requirements.

2.3 BOLTS AND CONNECTORS

- A. High-Strength A325 Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325, Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers; all with plain finish.
 - 1. Direct Tension Indicators (where SC type connection is specified): ASTM F959, Type 325-1, compressible washer type with plain finish.

2.4 PRIMER

- A. Steel Primer:
 - 1. Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.

2.5 SHRINKAGE-RESISTANT GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.6 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate in accordance with ANSI/AISC 303 and to ANSI/AISC 360.
 - 1. Camber structural-steel members where indicated.
 - 2. Fabricate beams with rolling camber up.
 - 3. Identify high-strength structural steel in accordance with ASTM A6/A6M and maintain markings until structural-steel framing has been erected.
 - 4. Mark and match-mark materials for field assembly.
 - 5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
 - 1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.
- C. Bolt Holes: Cut, drill or punch standard bolt holes perpendicular to metal surfaces.
- D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

- E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted in accordance with SSPC-SP 3.
- F. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel members.
 - 1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
 - 2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
 - 3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.7 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for type of bolt and type of joint specified.
 - 1. Joint Type: Snug tightened.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
 - 1. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in ANSI/AISC 303 for mill material.

2.8 SHOP PRIMING

- A. Shop prime steel surfaces, except the following:
 - 1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
 - 2. Surfaces to be field welded.
 - 3. Surfaces of high-strength bolted, slip-critical connections.
 - 4. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
 - 5. Galvanized surfaces.
 - 6. Surfaces enclosed in interior construction.
- B. Surface Preparation of Steel: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces in accordance with the following specifications and standards:
 - 1. SSPC-SP 2.
- C. Priming: Immediately after surface preparation, apply primer in accordance with manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

2.9 SOURCE QUALITY CONTROL

- A. Testing Agency: An independent testing agency will perform source quality control tests as required by IBC Chapter 17.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated on Drawings.
 - 1. Do not remove temporary shoring supporting composite deck construction and structural-steel framing until cast-in-place concrete has attained its design compressive strength.

3.3 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and in accordance with ANSI/AISC 303 and ANSI/AISC 360.
- B. Baseplates Bearing Plates and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
 - 1. Set plates for structural members on wedges, shims, or setting nuts as required.
 - 2. Weld plate washers to top of baseplate.
 - 3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
 - 4. Promptly pack shrinkage-resistant grout solidly between bearing surfaces and plates, so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for grouting.
- C. Maintain erection tolerances of structural steel within ANSI/AISC 303.
- D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that are in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure. Slope roof framing members to slopes indicated on Drawings.
 2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.
- E. Splice members only where indicated.
- F. Do not use thermal cutting during erection unless approved by Architect. Finish thermally cut sections within smoothness limits in AWS D1.1/D1.1M.
- G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

3.4 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for bolt and joint type specified.
1. Joint Type: Snug tightened.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
1. Comply with ANSI/AISC 303 and ANSI/AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
 2. Remove backing bars or runoff tabs where indicated, back gouge, and grind steel smooth.

3.5 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a special inspector to perform the following special inspections:
1. Verify structural-steel materials and inspect steel frame joint details.
 2. Verify weld materials and inspect welds.
 3. Verify connection materials and inspect high-strength bolted connections.
- B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
1. Bolted Connections: Inspect and test bolted connections in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts."
 2. Welded Connections: Visually inspect field welds in accordance with AWS D1.1/D1.1M.
 - a. In addition to visual inspection, test and inspect full penetration field welds in accordance with AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
 - 1) Liquid Penetrant Inspection: ASTM E165/E165M.
 - 2) Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.

- 3) Ultrasonic Inspection: ASTM E164.
- 4) Radiographic Inspection: ASTM E94/E94M.

3.6 PROTECTION

- A. Touchup Painting: Immediately after erection, clean exposed areas where primer is damaged or missing, and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.

END OF SECTION

SECTION 052100 - STEEL JOIST FRAMING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Steel joists and joist girders.
 - 2. Primers.
 - 3. Steel joist accessories.

- B. Related Requirements:
 - 1. Section 033000 "Cast-in-Place Concrete" for installing bearing plates in concrete.
 - 2. Section 042000 "Unit Masonry" for installing bearing plates in unit masonry.
 - 3. Section 051200 "Structural Steel Framing" for field-welded shear connectors.

1.02 DEFINITIONS

- A. SJI's "Specifications": Steel Joist Institute's "Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders."

- B. Special Joists: Steel joists or joist girders requiring modification by manufacturer to support nonuniform, unequal, or special loading conditions that invalidate load tables in SJI's "Specifications."

1.03 ACTION SUBMITTALS

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

- B. Shop Drawings:
 - 1. Include layout, designation, number, type, location, and spacing of joists.
 - 2. Include joining and anchorage details; bracing, bridging, and joist accessories; splice and connection locations and details; and attachments to other construction.
 - 3. Indicate locations and details of bearing plates to be embedded in other construction.

- C. Delegated Design Submittals: For steel joist framing, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.04 INFORMATIONAL SUBMITTALS

- A. Welding certificates.

- B. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- C. Mill Certificates: For each type of bolt.
- D. Comprehensive engineering analysis of special joists signed and sealed by the qualified professional engineer responsible for its preparation.
- E. Field quality control reports.
- F. Delegated Design Engineer Qualifications: For steel joist framing.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A manufacturer certified by SJI to manufacture joists complying with applicable standard specifications and load tables in SJI's "Specifications."
 - 1. Manufacturer's responsibilities include providing professional engineering services for designing special joists to comply with performance requirements.
- B. Erector Qualifications: An experienced Erector who specializes in erecting and installing work similar in material, design, and extent to that indicated for this Project and who is acceptable to manufacturer.
- C. Delegated Design Engineer Qualifications: A professional engineer who is legally qualified to practice in state where Project is located and who is experienced in providing engineering services of the type indicated.
- D. Welding Qualifications: Qualify field-welding procedures and personnel in accordance with AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle joists as recommended in SJI's "Specifications."
- B. Protect joists from corrosion, deformation, and other damage during delivery, storage, and handling.

1.07 SEQUENCING

- A. Deliver steel bearing plates to be built into cast-in-place concrete and masonry construction.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide special joists and connections capable of withstanding design loads indicated on Drawings.
 - 1. Use ASD; data are given at service-load level.
 - 2. Design special joists to withstand design loads with live-load deflections no greater than the following:
 - a. Roof Joists: Vertical deflection of 1/360 of the span.

2.02 STEEL JOISTS AND JOIST GIRDERS

- A. K-Series Steel Joist: Manufactured steel joists of type indicated in accordance with "Standard Specification for Open Web Steel Joists, K-Series" in SJI's "Specifications," with steel-angle top- and bottom-chord members, underslung ends, and parallel top chord.
 - 1. Joist Type: K-series steel joists.
 - 2. K-Series Steel Joist Substitutes: Manufactured in accordance with "Standard Specifications for Open Web Steel Joists, K-Series" in SJI's "Specifications," with steel-angle or -channel members.
 - 3. Provide holes in chord members for connecting and securing other construction to joists.
 - 4. Top-Chord Extensions: Extend top chords of joists with SJI's Type S top-chord extensions where indicated on Drawings, complying with SJI's "Specifications."
 - 5. Extended Ends: Extend bearing ends of joists with SJI's Type R extended ends as indicated on Drawings, complying with SJI's "Specifications."
 - 6. Camber joists in accordance with SJI's "Specifications."
 - 7. Equip bearing ends of joists with manufacturer's standard beveled ends or sloped shoes if joist slope exceeds 1/4 inch per 12 inches.

2.03 PRIMERS

- A. Primer:
 - 1. SSPC-Paint 15, or manufacturer's standard shop primer complying with performance requirements in SSPC-Paint 15.
 - 2. Provide shop primer that complies with Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

2.04 STEEL JOIST ACCESSORIES

- A. Bridging:
 - 1. Provide bridging anchors and number of rows of horizontal or diagonal bridging of material, size, and type required by SJI's "Specifications" for type of joist, chord size, spacing, and span. Furnish additional erection bridging if required for stability.
 - 2. Detail and fabricate in accordance with SJI's "Specifications ." Furnish additional erection bridging if required for stability.
 - 3. Fabricate as indicated on Drawings and in accordance with SJI's "Specifications ." Furnish

additional erection bridging if required for stability.

- B. Fabricate steel bearing plates from ASTM A36/A36M steel with integral anchorages of sizes and thicknesses indicated on Drawings. Shop prime paint.
- C. Steel bearing plates with integral anchorages are specified in Section 055000 "Metal Fabrications."
- D. Furnish ceiling extensions, either extended bottom-chord elements or a separate extension unit of enough strength to support ceiling construction.
 - 1. Extend ends to within 1/2 inch of finished wall surface unless otherwise indicated on Drawings.
 - 2. Finish: Plain, uncoated
- E. High-Strength Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325, Type 1, heavy-hex steel structural bolts; ASTM A563/A563M, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers.
 - 1. Finish: Plain.
- F. Welding Electrodes: Comply with AWS standards.
- G. Furnish miscellaneous accessories including splice plates and bolts required by joist manufacturer to complete joist assembly.

2.05 CLEANING AND SHOP PAINTING

- A. Clean and remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories by hand-tool cleaning, SSPC-SP 2.
- B. Do not prime paint joists and accessories to receive sprayed fire-resistive materials.
- C. Apply one coat of shop primer to joists and joist accessories to be primed to provide a continuous, dry paint film not less than 1 mil thick.
- D. Shop priming of joists and joist accessories is specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine supporting substrates, embedded bearing plates, and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION OF STEEL JOISTS AND JOIST GIRDERS

- A. Do not install joists until supporting construction is in place and secured.
- B. Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction in accordance with SJI's "Specifications," joist manufacturer's written instructions, and requirements in this Section.
 - 1. Before installation, splice joists delivered to Project site in more than one piece.
 - 2. Space, adjust, and align joists accurately in location before permanently fastening.
 - 3. Install temporary bracing and erection bridging, connections, and anchors to ensure that joists are stabilized during construction.
 - 4. Delay rigidly connecting bottom-chord extensions to columns or supports until dead loads are applied.
- C. Field weld joists to supporting steel bearing plates and framework. Coordinate welding sequence and procedure with placement of joists. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
- D. Bolt joists to supporting steel framework using carbon-steel bolts.
- E. Bolt joists to supporting steel framework using high-strength structural bolts. Comply with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for high-strength structural bolt installation and tightening requirements.
- F. Install and connect bridging concurrently with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords if terminating at walls or beams.

3.03 REPAIRS

- A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint in accordance with ASTM A780/A780M and manufacturer's written instructions.
- B. Touchup Painting:
 - 1. Immediately after installation, clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists, bearing plates, abutting structural steel, and accessories.
 - a. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool

- cleaning.
 - b. Apply a compatible primer of same type as primer used on adjacent surfaces.
2. Cleaning and touchup painting are specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

3.04 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Visually inspect field welds in accordance with AWS D1.1/D1.1M.
- C. Visually inspect bolted connections.
- D. Prepare test and inspection reports.

END OF SECTION 052100

SECTION 053100 - STEEL DECKING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Roof deck.
 - 2. Acoustical roof deck.
 - 3. Noncomposite form deck.
- B. Related Requirements:
 - 1. Division 05 Section "Metal Fabrications" for framing deck openings with miscellaneous steel shapes.
 - 2. Division 09 painting Sections for repair painting of primed deck and finish painting of deck.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of deck, accessory, and product indicated, including noise reduction coefficients.
- B. Shop Drawings:
 - 1. Include layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that each of the following complies with requirements:
 - 1. Power-actuated mechanical fasteners.

1.5 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.3, "Structural Welding Code - Sheet Steel."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."

2.2 ROOF DECK

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Canam United States; Canam Group Inc.
 - 2. New Millennium Building Systems, LLC.
 - 3. Nucor Corp.; Vulcraft Group.
 - 4. Verco Manufacturing Co.

2.3 ACOUSTICAL ROOF DECK

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Basis-of-Design Product: Subject to compliance with requirements, provide Toris 5.5A Acoustical by Epic Metals, Rankin, PA, or approved equal.
- C. Acoustical Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 31, and with the following:
 - 1. Galvanized and Shop-Primed Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 40, G60 zinc coating; cleaned, pretreated, and primed with manufacturer's standard baked-on, rust-inhibitive primer.
 - a. Color: Gray top surface with white underside.
 - 2. Deck Profile: As indicated.
 - 3. Profile Depth: 5.5 inches.
 - 4. Design Uncoated-Steel Thickness: As indicated.
 - 5. Span Condition: Triple span or more.
 - 6. Side Laps: Interlocking seam.
 - 7. Acoustical Perforations: Deck units with manufacturer's standard perforated bottom.
 - 8. Sound-Absorbing Insulation: Manufacturer's standard premolded roll or strip of glass or mineral fiber. Sound-absorbing insulation shall be provided for installation above the perforated holes in the bottom flat area between the dovetail-shaped ribs. To facilitate field painting of the

perforated surfaces, the sound absorbing elements shall be supported above the surface on corrosion resistant spacers. Sound absorbing elements and spacers shall be factory installed.

9. Acoustical Performance: NRC 1.0, tested according to ASTM C 423.

2.4 ACCESSORIES

- A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.
- B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.
- C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 minimum diameter.
- D. Wedge bolt hanging devices (Toris Deck) or Ankore hanging devices (with included locks) shall be installable and relocatable along the length of the interior ribs of the Acoustical Roof Deck panels. Manufacturer's product data shall be consulted for minimum spacing, load capacities, and proper installation procedure.
- E. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.
- F. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, not less than 0.0359-inch design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.
- G. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck unless otherwise indicated.
- H. Recessed Sump Pans: Single-piece steel sheet, 0.0747 inch thick, of same material and finish as deck, with 3-inch- wide flanges and level recessed pans of 1-1/2-inch minimum depth. For drains, cut holes in the field.
- I. Galvanizing Repair Paint: ASTM A 780.
- J. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 31, manufacturer's written instructions, and requirements in this Section.
- B. Install temporary shoring before placing deck panels if required to meet deflection limitations.
- C. Locate deck bundles to prevent overloading of supporting members.
- D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.
- E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.
- F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.
- G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.
- H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.
- I. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's written instructions.

3.3 ACOUSTIC ROOF DECK INSTALLATION

- A. Before Installation the supporting frame and other work relating to the Acoustic Roof Deck shall be examined to determine if this work has been properly completed.
- B. Before being permanently fastened, Acoustical Roof Deck panels shall be placed with ends accurately aligned and adequately bearing on supporting members. Proper coverage of the Acoustical Roof Deck panels shall be maintained. Care must be taken by the erector to maintain uniform spacing of the bottom rib opening (equal to the opening in the profiled sheet) at the sidelaps. Consistent coverage shall be maintained so that panels located in adjacent bays will be properly aligned.
- C. Fasten roof-deck panels to steel supporting members as indicated on drawings.:
- D. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals as indicated on drawings.
- E. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches, with end joints as follows:
 - 1. End Joints:
 - a. Butted (acoustic deck)
 - b. Lapped (standard roof deck)

- F. Miscellaneous Roof-Deck Accessories: Install finish strips, end closures, and reinforcing channels according to deck manufacturer's written instructions. Weld or mechanically fasten to substrate to provide a complete deck installation as indicated by supplier.

3.4 FLOOR-DECK INSTALLATION

- A. Fasten floor-deck panels to steel supporting members as indicated on drawings.
- B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, as indicated on drawings.
- C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches , with end joints as follows:
 - 1. End Joints: Lapped or butted at Contractor's option.
- D. Pour Stops and Girder Fillers: Weld steel sheet pour stops and girder fillers to supporting structure according to SDI recommendations unless otherwise indicated.
- E. Floor-Deck Closures: Weld steel sheet column closures, cell closures, and Z-closures to deck, according to SDI recommendations, to provide tight-fitting closures at open ends of ribs and sides of deck.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: An independent testing agency will perform field quality control tests as specified in section 01 4533 Code-Required Special Inspections and Procedures.
- B. Additional inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

3.6 PROTECTION

- A. Construction loads that could damage the deck, such as heavy concentrated loads and impact loads shall be avoided.
- B. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- C. Repair Painting: Wire brushing, cleaning, and repair painting of rust spots, welds, and abraded areas of both deck surfaces are included in Division 09.
- D. Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

END OF SECTION 053100

SECTION 054000 - COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Exterior non-load-bearing wall framing.
- B. Related Requirements:
 - 1. Section 055000 "Metal Fabrications" for miscellaneous steel shapes, masonry shelf angles, and connections used with cold-formed metal framing.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings:
 - 1. Include layout, spacings, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners.
 - 2. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.
- C. Delegated-Design Submittal: For cold-formed steel framing.

1.4 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Product Certificates: For each type of code-compliance certification for studs and tracks.
- C. Evaluation Reports: For nonstandard cold-formed steel framing post-installed anchors and power-actuated fasteners, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM E329 for testing indicated.
- B. Product Tests: Mill certificates or data from a qualified independent testing agency, or in-house testing with calibrated test equipment, indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.
- C. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of the Steel Stud Manufacturers Association.
- D. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 - 2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design cold-formed steel framing.
- B. Structural Performance: Provide cold-formed steel framing capable of withstanding design loads within limits and under conditions indicated.
 - 1. Design Loads: As indicated on Drawings (normal wind load only).
 - 2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:
 - a. Exterior Non-Load-Bearing Framing: Horizontal deflection of 1/360 of the wall height .
 - 3. Design framing systems to provide for movement of framing members located outside the insulated building envelope without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F.
 - 4. Design exterior non-load-bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.
- C. Cold-Formed Steel Framing Standards: Unless more stringent requirements are indicated, framing shall comply with AISI S100, AISI S200, and the following:
 - 1. Floor and Roof Systems: AISI S210.
 - 2. Wall Studs: AISI S211.
 - 3. Headers: AISI S212.
 - 4. Lateral Design: AISI S213.

- D. Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency acceptable to authorities having jurisdiction.

2.2 COLD-FORMED STEEL FRAMING MATERIALS

- A. Steel Sheet: ASTM A1003/A1003M, Structural Grade, Type H, metallic coated, of grade and coating designation as follows:
 - 1. Grade: As required by structural performance.
 - 2. Coating: G90 for exterior wall applications.
- B. Steel Sheet for Vertical Deflection and Drift Clips: ASTM A653/A653M, structural steel, zinc coated, of grade and coating as follows:
 - 1. Grade: As required by structural performance.
 - 2. Coating: G60 (G90 for exterior wall applications).

2.3 EXTERIOR NON-LOAD-BEARING WALL FRAMING

- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
 - 1. Minimum Base-Metal Thickness: 0.0428 inch.
 - 2. Flange Width: 1 5/8 inches.
- B. Zee Sections: Manufacturer's standard Z-shaped steel girt sections, of web depths indicated, and as follows:
 - 1. Minimum Base-Metal Thickness: as indicated.
 - 2. Flange Width: 2 1/2 inches.
- C. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:
 - 1. Minimum Base-Metal Thickness: Matching steel studs.
 - 2. Flange Width: 1-1/4 inches.
- D. Vertical Deflection Clips: Manufacturer's standard head clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.
- E. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:
 - 1. Minimum Base-Metal Thickness: 0.0428 inch.

2. Flange Width: 1 inch plus twice the design gap for other applications.
- F. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure through positive mechanical attachment to stud web and structure.

2.4 FRAMING ACCESSORIES

- A. Fabricate steel-framing accessories from ASTM A1003/A1003M, Structural Grade, Type H, metallic coated steel sheet, of same grade and coating designation used for framing members.
- B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
1. Supplementary framing.
 2. Bracing, bridging, and solid blocking.
 3. Web stiffeners.
 4. Anchor clips.
 5. End clips.
 6. Foundation clips.
 7. Gusset plates.
 8. Stud kickers and knee braces.
 9. Joist hangers and end closures.
 10. Hole-reinforcing plates.
 11. Backer plates.

2.5 ANCHORS, CLIPS, AND FASTENERS

- A. Steel Shapes and Clips: ASTM A36/A36M, zinc coated by hot-dip process according to ASTM A123/A123M.
- B. Anchor Bolts: ASTM F1554, Grade 36, threaded carbon-steel hex-headed bolts, carbon-steel nuts, and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A153/A153M, Class C .
- C. Post-Installed Anchors: Fastener systems with bolts of same basic metal as fastened metal, if visible, unless otherwise indicated; with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01 ICC-ES AC193 ICC-ES AC58 or ICC-ES AC308 as appropriate for the substrate.
1. Uses: Securing cold-formed steel framing to structure.
 2. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941, Class Fe/Zn 5, unless otherwise indicated.
 3. Material for Exterior or Interior Locations and Where Stainless Steel Is Indicated: Alloy Group 2 stainless-steel bolts, ASTM F593, and nuts, ASTM F594.
- D. Power-Actuated Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

- E. Mechanical Fasteners: ASTM C1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.
 - 1. Head Type: Low-profile head beneath sheathing; manufacturer's standard elsewhere.
- F. Welding Electrodes: Comply with AWS standards.

2.6 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: ASTM A780/A780M or SSPC-Paint 20.
- B. Cement Grout: Portland cement, ASTM C150/C150M, Type I; and clean, natural sand, ASTM C404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.
- C. Shims: Load-bearing, high-density, multimonomer, nonleaching plastic; or cold-formed steel of same grade and metallic coating as framing members supported by shims.
- D. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to match width of bottom track or rim track members as required.

2.7 FABRICATION

- A. Fabricate cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.
 - 1. Fabricate framing assemblies using jigs or templates.
 - 2. Cut framing members by sawing or shearing; do not torch cut.
 - 3. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, pneumatic pin fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
 - a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners and install according to Shop Drawings, with screws penetrating joined members by no fewer than three exposed screw threads.
 - 4. Fasten other materials to cold-formed steel framing by welding, bolting, pneumatic pin fastening, or screw fastening, according to Shop Drawings.
- B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies by means that prevent damage or permanent distortion.
- C. Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable variation of 1/8 inch in 10 feet and as follows:

1. Spacing: Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
2. Squareness: Fabricate each cold-formed steel framing assembly to a maximum out-of-square tolerance of 1/8 inch.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, conditions, and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.
- B. Install load-bearing shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab at locations with a gap larger than 1/4 inch to ensure a uniform bearing surface on supporting concrete or masonry construction.
- C. Install sealer gaskets at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

3.3 INSTALLATION, GENERAL

- A. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.
- B. Install cold-formed steel framing according to AISI S200, AISI S202, and manufacturer's written instructions unless more stringent requirements are indicated.
- C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.
 1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch.
- D. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.
 1. Cut framing members by sawing or shearing; do not torch cut.
 2. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.

- a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners, install according to Shop Drawings, and comply with requirements for spacing, edge distances, and screw penetration.
- E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.
- F. Install temporary bracing and supports to secure framing and support loads equal to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
- G. Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.
- H. Install insulation, specified in Section 072100 "Thermal Insulation," in framing-assembly members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.
- I. Fasten hole-reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.

3.4 EXTERIOR NON-LOAD-BEARING WALL INSTALLATION

- A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure.
- B. Fasten both flanges of studs to top and bottom track unless otherwise indicated. Space studs as follows:
 - 1. Stud Spacing: 16 inches.
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.
- D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
 - 1. Install single deep-leg deflection tracks and anchor to building structure.
 - 2. Connect vertical deflection clips to infill studs and anchor to building structure.
- E. Install horizontal bridging in wall studs, spaced vertically in rows indicated on Shop Drawings but not more than 48 inches apart. Fasten at each stud intersection.
 - 1. Channel Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
 - 2. Strap Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
 - 3. Bar Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.

- F. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 12 inches of single deflection track. Install a combination of bridging and stud or stud-track solid blocking of width and thickness matching studs, secured to stud webs or flanges.
 - 1. Install solid blocking at centers indicated on Shop Drawings.
- G. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.5 ERECTION TOLERANCES

- A. Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
 - 1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.6 FIELD QUALITY CONTROL

- A. Testing: An independent testing agency will perform field quality control tests as specified in section 01 4533 Code-Required Special Inspections and Procedures..
- B. Field and shop welds will be subject to testing and inspecting.
- C. Testing agency will report test results promptly and in writing to Contractor and Architect.
- D. Cold-formed steel framing will be considered defective if it does not pass tests and inspections.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.7 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A780/A780M and manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 054000

SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Miscellaneous framing and supports.
 - 2. Metal bollards.
 - 3. Vehicular barrier cable systems.
 - 4. Loose bearing and leveling plates.
- B. Products furnished, but not installed, under this Section include the following:
 - 1. Loose steel lintels.
 - 2. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.
 - 3. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
- C. Related Requirements:
 - 1. Section 042000 "Unit Masonry" for installing loose lintels, anchor bolts, and other items built into unit masonry.
 - 2. Section 051200 "Structural Steel Framing" for steel framing, supports, elevator machine beams, hoist beams, divider beams, door frames, and other steel items attached to the structural-steel framing.

1.02 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.03 ACTION SUBMITTALS

- A. Product Data:
 - 1. Fasteners.
 - 2. Shop primers.
 - 3. Shrinkage-resisting grout.
 - 4. Slotted channel framing.
 - 5. Manufactured metal ladders.
 - 6. Metal bollards.
- B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide Shop Drawings for the following:
 - 1. Miscellaneous framing and supports for applications where framing and supports are not specified in other Sections.

2. Metal ladders.
3. Metal bollards
4. Loose steel lintels.

1.04 INFORMATIONAL SUBMITTALS

- A. Mill Certificates: Signed by stainless steel manufacturers, certifying that products furnished comply with requirements.
- B. Welding certificates.
- C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- D. Research Reports: For post-installed anchors.
- E. Delegated design engineer qualifications.

1.05 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel in accordance with the following welding codes:
 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."

1.06 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls, floor slabs, decks, and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Structural Performance of Aluminum Ladders: Ladders, including landings, are to withstand the effects of loads and stresses within limits and under conditions specified in ANSI/ASC A14.3.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.02 METALS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
- C. Steel Tubing: ASTM A500/A500M, cold-formed steel tubing.
- D. Steel Pipe: ASTM A53/A53M, Standard Weight (Schedule 40) unless otherwise indicated.
- E. Aluminum Plate and Sheet: ASTM B209, Alloy 6061-T6.
- F. Aluminum Extrusions: ASTM B221, Alloy 6063-T6.

2.03 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
 1. Provide stainless steel fasteners for fastening aluminum.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A; with hex nuts, ASTM A563; and, where indicated, flat washers.

- C. High-Strength Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325, Type 3, heavy-hex steel structural bolts; ASTM A563, Grade DH3, heavy-hex carbon-steel nuts; and where indicated, flat washers.
- D. Anchor Bolts: ASTM F1554, Grade 36, of dimensions indicated; with nuts, ASTM A563; and, where indicated, flat washers.
 - 1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
- E. Anchors, General: Capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing in accordance with ASTM E488/E488M, conducted by a qualified independent testing agency.
- F. Cast-in-Place Anchors in Concrete: Either threaded or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A47/A47M malleable iron or ASTM A27/A27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F2329/F2329M.
- G. Post-Installed Anchors: Torque-controlled expansion anchors.
 - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.
 - 2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless steel bolts, ASTM F593, and nuts, ASTM F594.

2.04 MISCELLANEOUS MATERIALS

- A. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
 - 1. Use primer that contains pigments that make it easily distinguishable from zinc-rich primer.
- B. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.
- C. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- D. Shrinkage-Resistant Grout: Factory-packaged, nonmetallic, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- E. Concrete: Comply with requirements in Section 033000 "Cast-in-Place Concrete" for normal-weight, air-entrained concrete with a minimum 28-day compressive strength of 3000 psi.

2.05 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
- J. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

2.06 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
1. Fabricate units from slotted channel framing where indicated.
 2. Furnish inserts for units installed after concrete is placed.
- C. Galvanize miscellaneous framing and supports where indicated.
- D. Prime miscellaneous framing and supports with zinc-rich primer where indicated.

2.07 SHELF ANGLES

- A. Fabricate shelf angles from steel angles of sizes indicated and for attachment to concrete framing. Provide horizontally slotted holes to receive 3/4-inch bolts, spaced not more than 6 inches from ends and 24 inches o.c., unless otherwise indicated.
1. Provide mitered and welded units at corners.
 2. Provide open joints in shelf angles at expansion and control joints. Make open joint approximately 2 inches larger than expansion or control joint.
- B. For cavity walls, provide vertical channel brackets to support angles from backup masonry and concrete.
- C. Galvanize shelf angles located in exterior walls.
- D. Prime shelf angles located in exterior walls with zinc-rich primer.
- E. Furnish wedge-type concrete inserts, complete with fasteners, to attach shelf angles to cast-in-place concrete.

2.08 METAL LADDERS

- A. General:
1. Comply with ANSI A14.3.

- B. Aluminum Ladders:
 - 1. Basis-of-Design Product: The design is based on the following:
 - 2. O'Keeffe's Inc., Model 500. (Interior wall mounted ladder to roof hatch)
 - 3. O'Keeffe's Inc., Model 503. (Exterior wall mounted ladder from low roof to gym roof)
- C. Subject to compliance with requirements, provide named product or comparable product by one of the following:
 - 1. Halliday Products.
 - 2. Precision Ladders, LLC.
- D. Source Limitations: Obtain aluminum ladders from single source from single manufacturer.
 - 1. Support each ladder at top and bottom and not more than 60 inches o.c. with welded or bolted aluminum brackets.
 - 2. Model 500: Provide standard floor mounted bracket with intermediate wall brackets as required.
 - 3. Model 503: Provide off floor mounting brackets, each access ladder.

2.09 MISCELLANEOUS STEEL TRIM

- A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.
- B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.
 - 1. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.
- C. Galvanize and prime exterior miscellaneous steel trim.

2.010 LOOSE STEEL LINTELS

- A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.
- B. Size loose lintels to provide bearing length at each side of openings equal to one-twelfth of clear span, but not less than 8 inches unless otherwise indicated.
- C. Galvanize and prime loose steel lintels located in exterior walls.

2.011 STEEL WELD PLATES AND ANGLES

- A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

2.012 GENERAL FINISH REQUIREMENTS

- A. Finish metal fabrications after assembly.
- B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.013 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153/A153M for steel and iron hardware and with ASTM A123/A123M for other steel and iron products.
 - 1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.

- B. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean galvanized surfaces of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.
- C. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
 - 1. Shop prime with universal shop primer indicated.
- D. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:
 - 1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 2. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 3. Items Indicated to Receive Primers Specified in Section 099600 "High-Performance Coatings": SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 4. Other Steel Items: SSPC-SP 3, "Power Tool Cleaning."
 - 5. Galvanized-Steel Items: SSPC-SP 16, "Brush-off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals."
- E. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
- F. Stripe paint corners, crevices, bolts, welds, and sharp edges.

2.014 ALUMINUM FINISHES

- A. As-Fabricated Finish: AA-M12.
- B. Clear Anodic Finish: AAMA 611, Class I, AA-M12C22A41.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- F. Corrosion Protection: Coat concealed surfaces of aluminum that come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:

1. Extruded Aluminum: Two coats of clear lacquer.

3.02 INSTALLATION OF MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
- B. Anchor shelf angles securely to existing construction with expansion anchors
- C. Support steel girders on solid grouted masonry, concrete, or steel pipe columns. Secure girders with anchor bolts embedded in grouted masonry or concrete or with bolts through top plates of pipe columns.
 1. Where grout space under bearing plates is indicated for girders supported on concrete or masonry, install as specified in "Installing Bearing and Leveling Plates" Article.
- D. Install pipe columns on concrete footings with grouted baseplates. Position and grout column baseplates as specified in "Installation of Bearing and Leveling Plates" Article.
 1. Grout baseplates of columns supporting steel girders after girders are installed and leveled.

3.03 INSTALLATION OF SHELF ANGLES

- A. Install shelf angles as required to keep masonry level, at correct elevation, and flush with vertical plane.

3.04 INSTALLATION OF METAL LADDERS

- A. Secure ladders to adjacent construction with the clip angles attached to the stringer.
- B. Install brackets as required for securing of ladders welded or bolted to structural steel or built into masonry or concrete.

3.05 INSTALLATION OF MISCELLANEOUS STEEL TRIM

- A. Anchor to concrete construction to comply with manufacturer's written instructions.

3.06 REPAIRS

- A. Touchup Painting:
 1. Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 2. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.
 3. Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.

END OF SECTION

SECTION 05 5133 - METAL LADDERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Shop-fabricated metal ladders.
- B. Prefabricated ladders.
- C. Prefabricated ship ladders.

1.02 REFERENCE STANDARDS

- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).
- B. ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements; 2008 (Reaffirmed 2018).
- C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- D. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2021.
- E. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
- F. ASTM B210/B210M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes; 2019a.
- G. ASTM B211/B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire; 2019.
- H. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.
- I. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2025.
- J. AWS D1.2/D1.2M - Structural Welding Code - Aluminum; 2014, with Errata (2020).
- K. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 2004.
- L. SSPC-SP 2 - Hand Tool Cleaning; 2024.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
 - 1. Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
 - 2. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.
- C. Mechanical Fasteners: Same material or compatible with materials being fastened; type consistent with design and specified quality level.
- D. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- E. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

2.02 MATERIALS - ALUMINUM

- A. Extruded Aluminum: ASTM B211/B211M, 6063 alloy, T6 temper.
- B. Sheet Aluminum: ASTM B209/B209M, 5052 alloy, H32 or H22 temper.
- C. Aluminum-Alloy Drawn Seamless Tubes: ASTM B210/B210M, 6061 alloy, T6 temper.
- D. Aluminum-Alloy Bars: ASTM B211/B211M, 6061 alloy, T6 temper.
- E. Bolts, Nuts, and Washers: Stainless steel.
- F. Welding Materials: AWS D1.2/D1.2M; type required for materials being welded.

2.03 FABRICATION

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- D. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.04 PREFABRICATED LADDERS

- A. Prefabricated Ladder (LADDER-1): Welded metal unit complying with ANSI A14.3; factory fabricated to greatest degree practical and in the largest components possible.
 - 1. Components: Manufacturer's standard rails, rungs, treads, handrails, returns, platforms and safety devices complying with the requirements of the MATERIALS article of this section.
 - 2. Materials: Aluminum; 6063 alloy, T52 temper.
 - 3. Finish: Mill finish aluminum.
 - 4. Manufacturers:
 - a. O'Keeffe's Inc: Model 503: www.okeeffes.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- B. Prefabricated Ship Ladder (SHIP LADDER-1#): Welded metal unit complying with ANSI A14.3; factory fabricated to greatest degree practical and in the largest components possible.
 - 1. Components: Manufacturer's standard rails, rungs, treads, handrails, returns, platforms and safety devices complying with the requirements of the MATERIALS article of this section.
 - 2. Materials: Aluminum; ASTM B211/B211M 6063 alloy, T52 temper.
 - 3. Incline: 60 degrees.
 - 4. Treads: Minimum 6 inches deep and 18 inches wide.
 - 5. Risers: Maximum 9-1/2 inches high.
 - 6. Handrail: Between 30 and 34 inches high as measured from tread nosing.
 - 7. Finish: Mill finish aluminum.
 - 8. Manufacturers:
 - a. O'Keeffe's Inc; Model 523A: www.okeeffes.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.

2.05 FINISHES - STEEL

- A. Prime paint steel items.
 - 1. Do not prime surfaces in direct contact with concrete.
 - 2. Do not prime surfaces where field welding is required.
- B. Prepare surfaces to be primed in accordance with SSPC-SP2.
- C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

- D. Prime Painting: One coat.

2.06 FINISHES - ALUMINUM

- A. Exterior Aluminum Surfaces: Class I natural anodized.
- B. Interior Aluminum Surfaces: Class I natural anodized.
- C. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils (0.018 mm) thick.

2.07 FABRICATION TOLERANCES

- A. Squareness: 1/8 inch (3 mm) maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch (1.5 mm).
- C. Maximum Misalignment of Adjacent Members: 1/16 inch (1.5 mm).
- D. Maximum Bow: 1/8 inch (3 mm) in 48 inches (1.2 m).
- E. Maximum Deviation From Plane: 1/16 inch (1.5 mm) in 48 inches (1.2 m).

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.

3.03 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Field weld components as indicated on drawings.
- D. Perform field welding in accordance with AWS D1.1/D1.1M.
- E. Obtain approval prior to site cutting or making adjustments not scheduled.
- F. After erection, prime welds, abrasions, and surfaces not shop primed , except surfaces to be in contact with concrete.

3.04 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch (6 mm) per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch (6 mm).
- C. Maximum Out-of-Position: 1/4 inch (6 mm).

END OF SECTION

SECTION 05 5305 - METAL GRATINGS AND FLOOR PLATES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Formed metal mezzanine and stair tread gratings.
- B. Flat surface floor and stair tread plating.
- C. Perimeter closure.

1.02 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- D. ASTM A786/A786M - Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates; 2015 (Reapproved 2025).
- E. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.
- F. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2025.
- G. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.
- H. SSPC-SP 2 - Hand Tool Cleaning; 2024.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide span and deflection tables.
- C. Shop Drawings: Indicate details of component supports, openings, perimeter construction details, and tolerances.
 - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- D. Manufacturer's Installation Instructions: Indicate special requirements for opening and perimeter framing.

1.04 QUALITY ASSURANCE

- A. Designer Qualifications: Design gratings and plates under direct supervision of a licensed Professional Engineer experienced in design of this type of work.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Design Live (Pedestrian) Load: Uniform load of 100 lb/sq ft (4.7 kPa) minimum; concentrated load of 300 lbs (1330 N).
- B. Maximum Allowable Deflection Under Live Load: 1/240 of span; size components by single support design.
- C. Maximum Spacing Between Bars: To restrict pedestrian shoe heels.

2.02 MATERIALS

- A. Metal Grating System (MET FAB-30): Cold rolled carbon steel:

1. Basis of Design: Steel grating 19W4: 3/4 inch deep with 1/8 inch thick bearing bars. Cross rods at 4 feet on center. 80% open area.
- B. Steel Floor Plate: ASTM A786/A786M; manufacturer's standard pattern.
- C. Steel For Welding or Riveting: ASTM A36/A36M unfinished, of shapes indicated.
- D. Steel Framing: ASTM A36/A36M shapes, unfinished.
- E. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- F. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20 Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.03 ACCESSORIES

- A. Perimeter Closure: Of same material as grating.

2.04 FABRICATION

- A. Fabricate grates and plates to accommodate design loads.
- B. Fabricate support framing for openings.
- C. Top Surface: Serrated.

2.05 FINISHES

- A. Prepare surfaces to be primed in accordance with SSPC-SP 2.
- B. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- C. Do not prime surfaces in direct contact with concrete or where field welding is required.
- D. Prime paint items with one coat.
- E. Galvanizing for Steel Shapes: ASTM A123/A123M.
- F. Galvanizing for Steel Hardware: ASTM A153/A153M.
- G. Non-Slip Surfacing: Aluminum oxide.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated on drawings.
- B. Verify that opening sizes and dimensional tolerances are acceptable.
- C. Verify that supports are correctly positioned.

3.02 INSTALLATION

- A. Install components in accordance with manufacturer's instructions.
- B. Place frames in correct position, plumb and level.
- C. Mechanically cut galvanized finish surfaces. Do not flame cut.
- D. Anchor by welding.
- E. Set perimeter closure flush with top of grating and surrounding construction.
- F. Secure to prevent movement.

END OF SECTION

SECTION 05 7000 - DECORATIVE METAL

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Railing and guardrail assemblies.
- B. Wall-mounted handrails.

1.02 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- B. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes; 2025.
- C. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.
- D. 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; 2016.
- E. 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; 2023.
- F. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2025.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Submit manufacturer's product data, including description of materials, components, finishes, fabrication details, anchors, and accessories.
- C. Shop Drawings: Indicate elevations and sections, details of profile, dimensions, sizes, connection attachments, anchorage, size and type of fasteners, and accessories. Indicate anchor and joint locations, brazed connections, transitions, and terminations.
- D. Maintenance Data: Manufacturer's instructions for care and cleaning.
- E. Executed warranty.

1.04 QUALITY ASSURANCE

- A. Templates: Supply installation templates, reinforcing, and required anchorage devices.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in factory-provided protective coverings and packaging.
- B. Protect materials against damage during transit, delivery, storage, and installation at site.
- C. Inspect materials for damage upon delivery. Replace damaged and unrepairable materials. Ensure replacement materials are indistinguishable from undamaged parts and finishes.
- D. Prior to installation, store materials and components under cover in a dry location.

1.06 FIELD CONDITIONS

- A. Maintain ambient temperature of space at minimum 65 degrees F (18.3 degrees C) and maximum 95 degrees F (35 degrees C) for 24 hours before, during, and after installation.

1.07 WARRANTY

- A. Manufacturer Warranty: Provide 2-year manufacturer warranty for defects in materials, fabrication, finishes, and installation. Complete forms in St. Cloud School District 742's name and register with manufacturer.

PART 2 PRODUCTS

2.01 MATERIALS

- A. General: Provide sheet metal without pitting, seam marks, roller marks, stains, discolorations, or other imperfections exposed to view on finished units.
- B. Steel Components:
 - 1. Sections, Shapes, Plate and Bar: ASTM A36/A36M.
 - 2. Ungalvanized Steel Sheet: Hot- or cold-rolled, except use cold-rolled where finished work will be exposed to view.
 - a. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Designation CS (commercial steel).
 - b. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Designation CS (commercial steel).
 - 3. Welding Materials: Comply with AWS D1.1/D1.1M.
- C. Stainless Steel Components:
 - 1. Section, Plates: ASTM A666/A666M, Type 304.
 - 2. Stainless Steel Bars, Shapes and Moldings: ASTM A276/A276M, Type 304.

2.02 RAILING SYSTEMS

- A. Railing Systems - General: Factory- or shop-fabricated in design indicated, to suit specific project conditions, and for proper connection to building structure, and in largest practical sizes for delivery to site.
 - 1. Performance Requirements: Design and fabricate railings and anchorages to resist the following loads without failure, damage, or permanent set; loads do not need to be applied simultaneously.
 - a. Lateral Force: 75 lb (333 N) minimum, at any point, when tested in accordance with ASTM E935.
 - b. Distributed Load: 50 lb/ft (0.73 kN per m) minimum, applied in any direction at the top of the handrail, when tested in accordance with ASTM E935.
 - c. Concentrated Loads on Intermediate Rails: 50 psf (0.22 kgs per sq m), minimum.
 - d. Concentrated Load: 200 lbs (888 N) minimum, applied in any direction at any point along the handrail system, when tested in accordance with ASTM E935.
 - e. Handrails: Comply with applicable accessibility requirements of ADA Standards.
 - 2. Assembly: Join lengths, seal open ends, and conceal exposed mounting bolts and nuts using slip-on non-weld mechanical fittings, flanges, escutcheons, and wall brackets.
 - 3. Joints: Tightly fitted and secured, machined smooth with hairline seams.
 - 4. Field Connections: Provide sleeves to accommodate site assembly and installation.
 - 5. Welded and Brazed Joints: Make visible joints butt tight, flush, and hairline; use methods that avoid discoloration and damage of finish; grind smooth, polish, and restore to required finish.
 - a. Ease exposed edges to a small uniform radius.
 - b. Welded Joints:
 - 1) Carbon Steel: Perform welding in accordance with AWS D1.1/D1.1M.
 - 2) Stainless Steel: Perform welding in accordance with AWS D1.6/D1.6M.
- B. Metal Railing (GUARD-#): Engineered, post-supported railing system.

1. Configuration: See drawings for shapes, sizes and materials.
- C. Wall-Mounted Handrail (RAIL-2):
 1. 1-1/2 inch (38 mm) diameter steel, field painted.
 2. Handrail Brackets: Manufacturer's standard steel brackets.
 - a. Finish: Steel, field painted.
 3. Comply with ADA Standards.
- D. Floor-Mounted Handrail (RAIL-1):
 1. 1-1/2 inch (38 mm) diameter painted steel.
 2. See drawings for anchoring requirements at floor.
 3. Comply with ADA Standards.

2.03 ACCESSORIES

- A. Welding Fittings: Factory- or shop-welded from matching pipe or tube; joints and seams ground smooth.
- B. Anchors and Fasteners: Provide anchors, fasteners, and other attachment devices required to attach to structure. Ensure attachment devices are of same material as components unless indicated otherwise.
- C. Anchors and Fasteners: Provide anchors and other materials as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.
 1. For anchorage to concrete, provide inserts to be cast into concrete for bolt anchors.
 2. For anchorage to masonry, provide brackets to be embedded in masonry for bolt anchors.
 3. For anchorage to stud walls, provide backing plates for bolt anchors.
 4. Exposed Fasteners: No exposed bolts or screws.
- D. Carbon Steel Bolts and Nuts: ASTM A307.
- E. Bituminous Coating: Cold-applied asphalt mastic, noncorrosive compound free of asbestos, sulfur, and other deleterious impurities; 0.015 inch (0.4 mm) dry film thickness per coat.
- F. Finish Touch-Up Materials: As recommended by manufacturer for field application.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate and site conditions are acceptable and ready to receive work.
- B. Verify field dimensions of locations and areas to receive work.
- C. Notify Architect immediately of conditions that would prevent satisfactory installation.
- D. Do not proceed with work until detrimental conditions have been corrected.
- E. Furnish components to be installed in other work to installer of that other work, including but not limited to blocking, sleeves, inserts, anchor bolts, embedded plates, and supports for attachment of anchors.

3.02 PREPARATION

- A. Protect existing work.
- B. Review installation drawings before beginning installation. Coordinate diagrams, templates, instructions, and directions for installation of anchorages and fasteners.
- C. Clean surfaces to receive units. Remove materials and substances detrimental to installation.

3.03 INSTALLATION

- A. Comply with manufacturer's drawings and written instructions.

- B. Install components plumb and level, accurately fitted, free from distortion or defects, and with tight joints, except where necessary for expansion.
- C. Anchor securely to structure.
- D. Conceal anchor bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.
- E. Isolate dissimilar materials with bituminous coating, bushings, grommets, or washers to prevent electrolytic corrosion.

3.04 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch (6 mm) per floor level, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch (6 mm).
- C. Maximum Out-of-Position: 1/4 inch (6 mm).

3.05 CLEANING

- A. Remove protective film from exposed metal surfaces.
- B. Metal: Clean exposed metal finishes with potable water and mild detergent, in accordance with manufacturer recommendations; do not use abrasive materials or chemicals, detergents, or other substances that may damage the material or finish.

3.06 PROTECTION

- A. Protect installed components and finishes from damage after installation.
- B. Repair damage to exposed finishes to be indistinguishable from undamaged areas.
 - 1. If damage to finishes and components cannot be repaired to be indistinguishable from undamaged finishes and components, replace damaged items.

END OF SECTION

SECTION 06 1000 - ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Structural dimension lumber framing.
- B. Structural composite lumber framing.
- C. Rough opening framing for doors, windows, and roof openings.
- D. Sheathing.
- E. Roof-mounted curbs.
- F. Preservative treated wood materials.
- G. Miscellaneous framing and sheathing.
- H. Concealed wood blocking, nailers, and supports.

1.02 RELATED REQUIREMENTS

- A. Section 09 2116 - Gypsum Board Assemblies: Gypsum-based sheathing.

1.03 REFERENCE STANDARDS

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- B. ASTM D2898 - Standard Test Methods for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing; 2010 (Reapproved 2017).
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018.
- D. AWPA U1 - Use Category System: User Specification for Treated Wood; 2017.
- E. ITS (DIR) - Directory of Listed Products; current edition.
- F. PS 1 - Structural Plywood; 2023.
- G. PS 2 - Performance Standard for Wood Structural Panels; 2019.
- H. PS 20 - American Softwood Lumber Standard; 2025.
- I. SPIB (GR) - Grading Rules; 2014.
- J. UL (DIR) - Online Certifications Directory; Current Edition.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.
- B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, and installation.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
 - 1. If no species is specified, provide species graded by the agency specified; if no grading agency is specified, provide lumber graded by grading agency meeting the specified requirements.
 - 2. Grading Agency: Grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee at www.alsc.org, and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

- B. Wood sourced from a sustainably harvested location. Submit any documentation available.

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

- A. Grading Agency: Southern Pine Inspection Bureau, Inc; SPIB (GR).
- B. Sizes: Nominal sizes as indicated on drawings, S4S.
- C. Moisture Content: S-dry or MC19.
- D. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring (WD BLKG):
 - 1. Lumber: S4S, No. 2 or Standard Grade.
 - 2. Boards: Standard or No. 3.

2.03 CONSTRUCTION PANELS

- A. Wall Sheathing: Plywood, PS 1, Grade C-D, Exposure I.
 - 1. (WD SHTG-30): 1/2 inch.
 - 2. (WD SHTG-30F): 1/2 inch; fire retardant treated.
 - 3. (WD SHTG-31): 5/8 inch.
 - 4. (WD SHTG-31F): 5/8 inch fire retardant treated.
 - 5. (WD SHTG-32): 3/4 inch.
 - 6. (WD SHTG-32F): 3/4 inch fire retardant treated.
- B. Other Applications:
 - 1. Plywood Concealed From View But Located Within Exterior Enclosure: PS 1, C-C Plugged or better, Exterior grade.
 - 2. Plywood Exposed to View But Not Exposed to Weather: PS 1, A-D, or better.
 - 3. Other Locations: PS 1, C-D Plugged or better.

2.04 FIRE-RETARDANT TREATMENT (FRT)

- A. Products:
 - 1. Arxada; Dricon FS: www.arxada.com/#sle.
 - 2. Lonza Group: www.wolmanizedwood.com/#sle.
 - 3. Hoover Treated Wood Products, Inc: www.frtw.com/#sle.
 - 4. Koppers, Inc: www.koppersperformancechemicals.com/#sle.
 - 5. T2EARTH, LLC; OnWood: www.t2earth.com/#sle.
 - 6. UFP Industries; ProWood FR Lumber: www.ufpi.com/#sle.
 - 7. Viance, LLC; D-Blaze: www.treatedwood.com/#sle.
 - 8. Substitutions: See Section 01 6000 - Product Requirements.
- B. Factory-treat wood members in accordance with AWWPA U1 and use category indicated.
- C. Fire-Retardant Treatment: Interior Type A, Use Category UCFA (HT), High Temperature.
 - 1. Treat wood and plywood used in roof framing and attic spaces.
- D. Kiln-dry after treatment (KDAT) to maximum moisture content of 19 percent for sawn material and 15 percent for plywood.
- E. Fabrication of FRT Wood:
 - 1. Ripping or milling of boards, lumber, and timber after treatment is not permitted.
 - 2. Field cutting to length and drilling of holes in boards, lumber, and timber are permitted without additional treatment.
 - 3. Field cutting and drilling of holes in plywood are permitted.

- F. Label or brand FRT wood with classification mark of UL (DIR) or ITS (DIR) or other approved inspection agency, the treatment plant, name of treatment, species of wood, flame spread and smoke developed index, method of drying after treatment, and treating standard.

2.05 ACCESSORIES

- A. Metal and Finish of Fasteners:
 - 1. Fire-Retardant-Treated Wood:
 - a. Nails, timber rivets, wood screws, and lag screws: Hot-dip galvanized steel complying with ASTM A153/A153M Class D.
 - 2. High Humidity Wood Locations: Hot-dip galvanized steel complying with ASTM A153/A153M.
 - 3. Untreated Wood: Unfinished steel.

PART 3 EXECUTION

3.01 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.

3.02 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 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.

3.03 CLEANING

- A. Waste Disposal: See Section 01 7419 - Construction Waste Management and Disposal.
 - 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.
- B. Do not leave wood, shavings, sawdust, etc. on the ground or buried in fill.
- C. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

SECTION 06 4100 - ARCHITECTURAL WOOD CASEWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Specially fabricated cabinet units.
- B. Hardware.

1.02 RELATED REQUIREMENTS

- A. Section 12 3600 - Countertops.

1.03 REFERENCE STANDARDS

- A. ANSI A208.1 - American National Standard for Particleboard; 2022.
- B. BHMA A156.9 - American National Standard for Cabinet Hardware; 2015.
- C. 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 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. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS), unless noted otherwise.
- B. Plastic Laminate Faced Cabinets (PLAM-#):
 - 1. Basis of Design: See drawings for product information.
 - 2. Finish - Exposed Exterior Surfaces: Decorative laminate.
 - 3. Finish - Exposed Interior Surfaces: Decorative laminate.
 - 4. Finish - Semi-Exposed Surfaces: Decorative laminate
 - 5. Finish - Concealed Surfaces: Manufacturer's option.
 - 6. Door and Drawer Front Edge Profiles: Square edge with thick applied band.
 - 7. Casework Construction Type: Type A - Frameless.

- 8. Interface Style for Cabinet and Door: Style 1 - Overlay; flush overlay.
- 9. Layout for Cabinet and Door Fronts: Flush panel.
- 10. Adjustable Shelf Loading: 40 psf (19.5 gm/sq cm).
 - a. Deflection: L/144.
- C. Hook (HK-2):
 - 1. Basis of Design: As indicated on drawings.

2.02 WOOD-BASED COMPONENTS

- A. Wood fabricated from old growth timber is not permitted.
- B. Wood sourced from a sustainably harvested location. Submit any documentation available.
- C. Provide composite wood containing no added formaldehyde. See Section 01 6116.

2.03 PANEL CORE MATERIALS

- A. Particleboard: Composite panel composed of cellulosic particles, additives, and bonding system; comply with ANSI A208.1.
 - 1. Grade: M-2; moisture resistance: MR10.

2.04 THERMALLY FUSED LAMINATE PANELS

- A. Thermally Fused Laminate (TFL): Melamine-resin-saturated decorative papers; for fusion to composite wood substrates under heat and pressure.
 - 1. Panel Core Substrate: Particleboard.

2.05 LAMINATE MATERIALS (PLAM-#)

- A. Manufacturers:
 - 1. Formica Corporation: www.formica.com.
 - 2. Panolam Industries International, Inc: www.panolam.com/#sle.
 - 3. Wilsonart LLC: www.wilsonart.com/#sle.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications. See drawings for (PLAM-#) finish.
- C. Provide specific types as follows:
 - 1. Horizontal Surfaces: HGS, 0.048 inch (1.22 mm) nominal thickness.
 - 2. Vertical Surfaces: VGS, 0.028 inch (0.71 mm) nominal thickness.
 - 3. Cabinet Liner: CLS, 0.020 inch (0.51 mm) nominal thickness.
 - 4. Laminate Backer: BKL, 0.020 inch (0.51 mm) nominal thickness, undecorated; for application to concealed backside of panels faced with high pressure decorative laminate.

2.06 COUNTERTOPS

- A. Countertops: See Section 12 3600.

2.07 ACCESSORIES

- A. Adhesive: Type recommended by fabricator to suit application.
- B. Plastic Edge Banding: Extruded 3 mm PVC, flat 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.
 - 1. Grommet Locations: As indicated on drawings.

2.08 HARDWARE

- A. Cabinet Hardware: Comply with BHMA A156.9 for hardware types and grades indicated below:
 - 1. Hardware Types: As indicated on drawings.
 - 2. Product Grade: As required by specified woodworking quality grade.
- 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. Hook (HK-2):
 - 1. Basis of Design: As indicated on drawings.
- E. 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. Hettich America, LP: www hettich.com.
 - d. Knappe & Vogt Manufacturing Company: www knapeandvogt.com.
 - e. Substitutions: See Section 01 6000 - Product Requirements.
- F. Hinges: European style concealed self-closing type, steel with nickel-plated finish.
 - 1. Manufacturers:
 - a. Blum, Inc: www blum.com/#sle.
 - b. Grass America Inc: www grassusa.com/#sle.
 - c. Hardware Resources: www hardwareresources.com.
 - d. Hettich America, LP: www hettich.com/sle.
 - e. Substitutions: See Section 01 6000 - Product Requirements.

2.09 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. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs. (Locate counter butt joints minimum 600 mm from sink cut-outs.)
 - 1. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.
- 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. Install work in accordance with AWI/AWMAC/WI (AWS) requirements for grade indicated.
- B. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.
- C. Use fixture attachments in concealed locations for wall mounted components.
- D. Use concealed joint fasteners to align and secure adjoining cabinet units.
- E. 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.
- F. Secure cabinets to floor using appropriate angles and anchorages.
- G. 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 06 4200 - WOOD PANELING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Custom wood veneer paneling.

1.02 REFERENCE STANDARDS

- A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).
- B. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.1; 2016, with Errata (2017).

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on fire-retardant treatment materials and application instructions.
- C. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Protect work from moisture damage.
- B. Do not deliver wood materials to project site until building is fully enclosed and interior temperature and humidity are in accordance with recommendations of AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).

PART 2 PRODUCTS

2.01 PANELING

- A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless otherwise indicated.
- B. Slotted Wood Paneling (SLTPNL-#)
 - 1. Basis of Design: See drawings for product information.
 - 2. Hardware: Provide the following hardware with slotted wood panel system.
 - a. 8 inch long slatwall hooks. Chrome finish. Qty-25.
 - b. 4 inch long pegs: Qty-25.
 - c. Acrylic Hoisery Bins: Qty-12.
- C. Flat Paneling (WDP-#):
 - 1. Basis of Design: See drawings for product information.
 - 2. Panels: Veneer of full width and balanced sequence matched.
 - 3. Visible Edges and Reveals: Filled and painted.
 - 4. Outside Corners: Mitered and splined.

2.02 WOOD-BASED MATERIALS - GENERAL

- A. Wood sourced from a sustainably harvested location. Submit any documentation available.

2.03 FABRICATION

- A. Prepare panels for delivery to site, permitting passage through building openings.
- B. Finish exposed edges of panels as specified by grade requirements.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade indicated.
- B. Do not begin installation until wood materials have been fully acclimated to interior conditions.
- C. Set and secure materials and components in place, plumb and level, using concealed fasteners wherever possible.
- D. (WDP-#) panels to be installed with finish nails in quantity and spacing required to fully anchor to substrate. Fill nail holes with putty to match. See drawings for locations where (WDP-#) panels are to be installed on a z-clip hanger system.

END OF SECTION

SECTION 06 8316 - FIBERGLASS REINFORCED PANELING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fiberglass reinforced plastic panels.
- B. Trim.

1.02 REFERENCE STANDARDS

- A. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2021.
- B. ASTM D5319 - Standard Specification for Glass-Fiber Reinforced Polyester Wall and Ceiling Panels; 2022.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018.
- D. FDA Food Code - Chapter 6 - Physical Facilities; Current Edition.
- E. FM 4880 - Examination Standard for Class 1 Fire Rating of Building Panels or Interior Finish Materials; 2022.

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. Samples: Submit two samples 6 by 6 inch (150 by 150 mm) in size illustrating material and surface design of panels.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Store panels flat, indoors, on a clean, dry surface. Remove packaging and allow panels to acclimate to room temperature for 48 hours prior to installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Fiberglass Reinforced Plastic Panels:
 - 1. Valto Engineered Materials; Glasbord: www.valtoem.com.
 - 2. Marlite, Inc; Standard FRP: www.marlite.com.
 - 3. Nudo Products, Inc; FiberLite FRP: www.nudo.com.
 - 4. Panolam Industries International, Inc: www.panolam.com.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PANEL SYSTEMS

- A. Wall Panels (FRP-#):
 - 1. Basis of Design: As indicated on drawings.
 - 2. Attachment Method: See drawings for trim and sealant locations.
- B. Wall Panels (WP-#)
 - 1. Basis of Design: As indicated on drawings.
 - 2. Attachment Method: Adhesive only for large swings in relative humidity. See drawings for trim and sealant locations.

2.03 MATERIALS

- A. Panels: Fiberglass reinforced plastic (FRP), complying with ASTM D5319.
 - 1. Surface Burning Characteristics: Maximum flame spread index of 25 and smoke developed index of 450; when system tested in accordance with ASTM E84.
 - 2. Class 1 fire rated when tested in accordance with FM 4880.
 - 3. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - 4. Surface Characteristics and Cleanability: Provide products that are smooth, durable, and easily cleanable, in compliance with FDA Food Code, Chapter 6 - Physical Facilities.
- B. Trim: As indicated on drawings.
- C. Adhesive: Type recommended by panel manufacturer.
 - 1. (WP-1): Type recommended by panel manufacturer for large swings.
- D. Sealant: Type recommended by panel manufacturer; white.
 - 1. (WP-1): Type recommended by panel manufacturer for large swings.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions and substrate flatness before starting work.
- B. Verify that substrate conditions are ready to receive the work of this section.

3.02 INSTALLATION - WALLS

- A. Install panels in accordance with manufacturer's instructions.
- B. Cut and drill panels with carbide tipped saw blades, drill bits, or snips.
- C. Apply adhesive to the back side of the panel using trowel as recommended by adhesive manufacturer.
- D. Apply panels to wall with seams plumb and pattern aligned with adjoining panels.
- E. Install panels with manufacturer's recommended gap for panel field and corner joints.
- F. Place trim on panel before fastening edges, as required.
- G. Fill channels in trim with sealant before attaching to panel.
- H. Install trim with adhesive and screws or nails, as required.
- I. Seal gaps at floor, ceiling, and between panels with applicable sealant to prevent moisture intrusion.
- J. Remove excess sealant after paneling is installed and prior to curing.

END OF SECTION

SECTION 07 1900 - WATER REPELLENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Water repellents applied to exterior and interior, masonry and concrete surfaces.

1.02 RELATED REQUIREMENTS

- A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 03 3000 - Cast-in-Place Concrete.

1.03 REFERENCE STANDARDS

- A. ASTM C642 - Standard Test Method for Density, Absorption, and Voids in Hardened Concrete; 2021.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide product description, details of tests performed, limitations, and chemical composition.
- C. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention; cautionary procedures required during application.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years documented experience.
- B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience

1.06 FIELD CONDITIONS

- A. Protect liquid materials from freezing.
- B. Do not apply water repellent when ambient temperature is lower than 40 degrees F (4 degrees C) or higher than 110 degrees F (43 degrees C).

1.07 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Provide one year manufacturer warranty for manufacturing defects.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Silane, Siloxane, Silane-Siloxane Blend, and Siliconate Water Repellents:
 - 1. BASF Construction Chemicals: www.basf.com.
 - 2. Concrete Sealers USA: www.concretesealersusa.com.
 - 3. Pecora Corporation: www.pecora.com.
 - 4. PROSOCO, Inc: www.prosoco.com/#sle.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 MATERIALS

- A. Water Repellent (REPEL-1): Non-glossy, colorless, penetrating, water-vapor-permeable, non-yellowing sealer, that dries invisibly leaving appearance of substrate unchanged.

1. Applications: As indicated on Drawings.
2. Number of Coats: Two.
3. VOC Content: See Section 01 6116.
4. Moisture Absorption When Applied to Concrete: Two percent, maximum, when tested in accordance with ASTM C642 concrete sample completely coated with water repellent.
5. Water-based siloxane, silane, or blend that reacts chemically with concrete and masonry.
 - a. Basis of Design:
 - 1) PROSOCO, Inc; Sure Klean Weather Seal Siloxane PD: www.prosoco.com/#sle.
 - 2) Substitutions: See Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify surfaces to be coated are dry, clean, and free of efflorescence, oil, or other matter detrimental to application of water repellent.

3.02 PREPARATION

- A. Prepare surfaces to be coated as recommended by water repellent manufacturer for best results.
- B. Do not start work until concrete substrate is cured to 80% of design strength.
- C. Remove loose particles and foreign matter.
- D. Remove oil and foreign substances with a chemical solvent that will not affect water repellent.
- E. Scrub and rinse surfaces with water and let dry.

3.03 APPLICATION

- A. Apply water repellent in accordance with manufacturer's instructions, using procedures and application methods recommended as producing the best results.
- B. Apply two coats, minimum.
- C. Remove water repellent from unintended surfaces immediately by a method instructed by water repellent manufacturer.

END OF SECTION

SECTION 07 2100 - THERMAL INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Board insulation at cavity wall construction, perimeter foundation wall, and exterior wall behind exterior wall finish.
- B. Batt insulation in exterior wall, ceiling, and roof 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 2600 - Vapor Retarders: Separate vapor retarder materials.
- B. Section 09 2116 - Gypsum Board Assemblies: Acoustic insulation inside walls and partitions.

1.03 REFERENCE STANDARDS

- A. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2024.
- B. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2023.
- C. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2014 (Reapproved 2019).
- D. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2024.
- E. ASTM C726 - Standard Specification for Mineral Wool Roof Insulation Board; 2024.
- F. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2025.
- G. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018.
- H. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components; 2025.

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 PRODUCT REQUIREMENTS

- A. Products listed as Basis of Design have been selected using sustainability criteria. Products from other manufacturer's listed herein, and/or substitutions will only be accepted if they meet, or exceed, the performance of the Basis of Design. Manufacturer must be able to provide sustainability documentation showing that the product meets, or exceeds, the Basis of Design.

2.02 FOAM BOARD INSULATION MATERIALS

- A. Extruded Polystyrene (XPS) Board Insulation: Comply with ASTM C578 with either natural skin or cut cell surfaces.
 - 1. Type and Compressive Resistance: Type IV, 25 psi (173 kPa), minimum.
 - a. (INSUL-1): Type IV, 25 psi. Provide drainage channels.
 - 2. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
 - 3. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
 - 4. Type and Thermal Resistance, R-value (RSI-value): Type IV, 5.0 (0.88), minimum, per 1 inch (25.4 mm) thickness at 75 degrees F (24 degrees C) mean temperature.
 - 5. Board Edges: Square.
 - 6. Sustainability Requirements: Manufacturer's must be able to provide the following, or equivalent, product documentations:
 - a. Environmental Product Declaration (EPD).
 - b. Health Product Declaration (HPD).
 - 7. Basis of Design: Owens Corning Corporation; FOAMULAR Extruded Polystyrene (XPS) Insulation: www.ocbuildingspec.com.
 - 8. Other Acceptable Products provided they meet or exceed the Basis of Design performance requirements:
 - a. DuPont de Nemours, Inc; Styrofoam Brand Square Edge: building.dupont.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.

2.03 MINERAL FIBER BOARD INSULATION MATERIALS

- A. Mineral Wool Block, Board, or Blanket Thermal Insulation: Complying with ASTM C612 or ASTM C553.
 - 1. Smoke Developed Index: 0 (zero), when tested in accordance with ASTM E84.
 - 2. Thermal Resistance: R-value (RSI-value) of 4.2 (0.74) per inch at 75 degrees F (24 C), minimum, when tested according to ASTM C518.
 - 3. Maximum Density: 8 pcf (128 kg/cu m), nominal.
 - 4. Sustainability Requirements: Manufacturer's must be able to provide the following, or equivalent, product documentations:
 - a. Environmental Product Declaration (EPD) or Declare Label.
 - b. Living Building Challenge Red List Free or Compliant.
 - c. Health Product Declaration (HPD).
 - 5. (INSUL-26) Basis of Design: Thermafiber, Inc; RainBarrier: www.thermafiber.com.
 - 6. Other Acceptable Products provided they meet or exceed the Basis of Design performance requirements:
 - a. ROCKWOOL; CAVITYROCK: www.rockwool.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.

2.04 ACCESSORIES

- A. Sheet Vapor Retarder: See Section 07 2600.
- B. Tape joints of rigid insulation in accordance with roofing and insulation manufacturers' instructions.
- C. Insulation Fasteners: Appropriate for purpose intended.
- 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.
- 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. 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.
- B. Extend boards over expansion joints, unbonded to foundation on one side of joint.
- C. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.03 BOARD INSTALLATION AT EXTERIOR WALLS

- A. Install boards vertically on walls.
 - 1. Butt edges and ends tightly to adjacent boards and 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.

3.04 BOARD INSTALLATION AT CAVITY WALLS

- A. Install boards to fit snugly between wall ties.
- B. Install boards horizontally on walls.
- C. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.05 PROTECTION

- A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

SECTION 07 2119 - FOAMED-IN-PLACE INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Foamed-in-place insulation.
- B. Protective intumescent coating.

1.02 REFERENCE STANDARDS

- A. ASTM D2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics; 2025.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2024.
- C. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2024a.
- D. ASTM E2178 - Standard Test Method for Determining Air Leakage Rate and Calculation of Air Permeance of Building Materials; 2021a.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide product description, insulation properties, and preparation requirements.
- C. Manufacturer's Installation Instructions: Indicate special procedures, and perimeter conditions requiring special attention.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with not less than three years of experience.
- B. Applicator Qualifications: Company specializing in performing work of the type specified, with minimum three years experience.

1.05 FIELD CONDITIONS

- A. Do not apply foam when temperature is below that specified by the manufacturer for ambient air and substrate.
- B. Do not apply foam when temperature is within 5 degrees F (2.78 degrees C) of dew point.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Foamed-In-Place Insulation (INSUL-36): Medium-density, rigid or semi-rigid, closed cell polyurethane foam; foamed on-site, using blowing agent of water or non-ozone-depleting gas.
 - 1. Surface Burning Characteristics: Flame spread/smoke developed index of 25/450, maximum, when tested in accordance with ASTM E84.
 - 2. Products:
 - a. BASF Corporation; SPRAYTITE 81206: www.spf.basf.com.
 - b. Enverge; NexSeal: www.envergesprayfoam.com.
 - c. Henry, a Carlisle Company; PERMAX 2.0: www.henry.com/#sle.
 - d. Johns Manville; JM IV HFO Closed-cell: www.jm.com/#sle.
 - e. Substitutions: See Section 01 6000 - Product Requirements.

2.02 ACCESSORIES

- A. Primer: As required by insulation manufacturer.
- B. Protective Coating: Intumescent coating of type recommended by insulation manufacturer and as required to comply with applicable codes.
 - 1. Coating Type: Single component, water-based.
 - 2. Protected Insulation Type: Spray polyurethane foam (SPF).
 - 3. Application: Apply using brush, roller, or airless sprayer.
 - 4. Surface Burning Characteristics: Flame spread/smoke developed index of 25/450, maximum, when tested in accordance with ASTM E84.
 - 5. Color: As indicated on drawings.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify work within construction spaces or crevices is complete before insulation application.

3.02 PREPARATION

- A. Mask and protect adjacent surfaces from over spray or dusting.
- B. Apply primer in accordance with manufacturer's instructions.

3.03 APPLICATION

- A. Apply insulation in accordance with manufacturer's instructions.
- B. Apply insulation by spray method, to a uniform monolithic density without voids.
- C. Patch damaged areas.
- D. Where applied to voids and gaps assure space for expansion to avoid pressure on adjacent materials that may bind operable parts.

3.04 PROTECTION

- A. Do not permit subsequent construction work to disturb applied insulation.

END OF SECTION

SECTION 07 2600 - VAPOR RETARDERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Vapor retarders.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Vapor retarder under concrete slabs on grade.
- B. Section 07 6200 - Sheet Metal Flashing and Trim: Metal flashings installed in conjunction with vapor retarders.

1.03 DEFINITIONS

- A. Vapor Retarder: Airtight barrier made of material that is relatively water vapor impermeable, to degree specified, with seams and joints sealed to adjacent surfaces.
- B. Vapor Retarder Class: A measure of a material or assembly's ability to limit the amount of moisture that passes through that material or assembly. Vapor retarder class is defined using Procedure A, Desiccant Method at 73 degrees F (23 degrees C) and 50 percent Relative Humidity (RH), in accordance with ASTM E96/E96M and ICC (IBC)-2018, as follows:
 - 1. Class I: 0.1 perm or less.
 - 2. Class II: Greater than 0.1 perm to 1.0 perm.
 - 3. Class III: Greater than 1.0 perm to 10 perms.

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 D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2021.
- C. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2024a.
- D. ICC (IBC)-2018 - International Building Code; 2018.
- E. ICC-ES AC148 - Acceptance Criteria for Flexible Flashing Materials; 2017, with Editorial Revision (2021).

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.
- E. Sustainability Design Documentation: Provide applicable sustainability documentation for each product as described in Section 01 3329 - Sustainable Design Requirements.

1.06 FIELD CONDITIONS

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

PART 2 PRODUCTS

2.01 PRODUCT REQUIREMENTS

- A. Products listed as Basis of Design have been selected using sustainability criteria. Products from other manufacturer's listed herein, and/or substitutions will only be accepted if they meet, or exceed, the performance of the Basis of Design. Manufacturer must be able to provide sustainability documentation showing that the product meets, or exceeds, the Basis of Design.

2.02 VAPOR RETARDERS

- A. Underslab Vapor Retarders: See Section 03 3000.
- B. (VPR RET-10): Contractor's option to provide a self-adhesive or liquid applied membrane as described in the following paragraphs:
 - 1. Vapor Retarder, Self-Adhering Membranes (VPR RET-10): Rubberized asphalt bonded to aluminum foil facer.
 - a. Thickness: 40 mil, 0.04 inch (1.0 mm), nominal.
 - b. Vapor Retarder Class I: 0.1 perm (5.72 ng/(Pa s sq m)) or less, when tested in accordance with ASTM E96/E96M, Procedure A.
 - c. Nail Sealability: Passed nail sealability test in accordance with ASTM D1970/D1970M.
 - d. System Accessory Products: As recommended by membrane manufacturer.
 - e. Sustainability Requirements: Manufacturer's must be able to provide the following, or equivalent, product documentations:
 - 1) Environmental Product Declaration (EPD) or Declare Label.
 - 2) Living Building Challenge Red List Free or Compliant.
 - f. Basis of Design: Henry Company; Blueskin SA LT (Low Temp): www.henry.com/#sle.
 - g. Other Acceptable Products provided they meet or exceed the Basis of Design performance:
 - 1) Carlisle Coatings and Waterproofing; Fire Resist 705FR-A: www.carlisleccw.com/#sle.
 - 2) GCP Applied Technologies; Perm-A-Barrier Low Temperature Wall Membrane: www.gcpat.com.
 - 3) W. R. Meadows, Inc; Air-Shield: www.wrmeadows.com/#sle.
 - 4) Substitutions: See Section 01 6000 - Product Requirements.
 - 2. Vapor Retarder Coating (VPR RET-10): Liquid applied, resilient, ultra-violet (UV) light resistant coating; associated joint treatment.
 - a. Water Vapor Permeance: 1.0 perm (57 ng/(Pa s sq m)), maximum, when tested in accordance with ASTM E96/E96M.
 - b. VOC Content: Less than 6.68 oz/gal (50 g/L), when tested in accordance with 40 CFR 59, Subpart D - EPA Method 24.
 - c. Suitable for use on concrete, masonry, plywood, and gypsum sheathing.
 - d. Joint Preparation Treatment: Provide coating manufacturer's recommended method, either tape or reinforcing mesh saturated with coating material.
 - e. Joint Filler: As recommended by coating manufacturer and suitable to the substrate.
 - f. Sustainability Requirements: Manufacturer's must be able to provide the following, or equivalent, product documentations:
 - 1) Environmental Product Declaration (EPD).
 - 2) Health Product Declaration (HPD).
 - g. Basis of Design: Henry Company; Air-Bloc 16MR: www.henry.com/#sle.

- h. Other Acceptable Products provided they meet or exceed the Basis of Design performance, including sustainability requirements:
 - 1) Carlisle Coatings and Waterproofing; Fire Resist Barritech NP: www.carlisleccw.com/#sle.
 - 2) GCP Applied Technologies; Perm-A-Barrier NPL 10 LT: www.gcpat.com.
 - 3) W. R. Meadows, Inc; Air-Shield LSR: www.wrmeadows.com/#sle.
 - 4) Substitutions: See Section 01 6000 - Product Requirements.

2.03 ACCESSORIES

- A. Sealants, Tapes, and Accessories for Sealing Vapor Retarder and Adjacent Substrates: As indicated, complying with vapor retarder manufacturer's installation instructions.
- B. Sealant for Cracks and Joints in Substrates: Resilient elastomeric joint sealant compatible with substrates and vapor retarder materials.
 - 1. Application: Apply at 30 to 40 mil, 0.030 to 0.040 inch (0.76 to 1.02 mm), nominal thickness.
 - 2. All flashing materials shall be compatible with, and approved by, the membrane manufacturer.
- C. Flexible Flashing: Self-adhering or mechanically-attached flashing used for wall penetrations in accordance with ICC-ES AC148 requirements.
- D. Thinners and Cleaners: As recommended by vapor retarder manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces and conditions comply with requirements 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 installation instructions.

3.03 INSTALLATION

- A. Install materials in accordance with manufacturer's installation instructions.
- B. Vapor Retarders: Install continuous airtight barrier over surfaces indicated, with sealed seams and sealed joints to adjacent surfaces.
- C. Apply sealants and adhesives within recommended temperature range in accordance with manufacturer's installation instructions.
- D. Mechanically Fastened Sheets - Vapor Retarder On Exterior:
 - 1. Install sheets shingle fashion to shed water, with seams generally horizontal.
 - 2. Overlap seams as recommended by manufacturer, 6 inches (152 mm), minimum.
 - 3. Overlap at outside and inside corners as recommended by manufacturer, 12 inches (305 mm), minimum.
 - 4. For applications indicated to be airtight, seal seams, laps, penetrations, tears, and cuts with self-adhesive tape; use only large-headed, gasketed fasteners as recommended by manufacturer.
 - 5. Where stud framing rests on concrete or masonry substrate, extend lower edge of vapor retarder sheet at least 4 inches (102 mm) below bottom of framing and seal to substrate with sealant or approved mounting tape.
 - 6. Install vapor retarder underneath jamb flashings.

7. At framed openings with frames having nailing flanges, extend sheet into opening and over flanges; at head of opening, seal sheet over flange and flashing.
- E. Mechanically Fastened Sheets - Vapor Retarder On Interior:
1. When insulation is installed within 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 metal substrate.
 4. Seal seams, laps, perimeter edges, penetrations, tears, and cuts with self-adhesive tape, providing an airtight seal.
 5. Locate laps at framing members; at laps fasten one sheet to framing member then tape overlapping sheet to first sheet in shingle fashion to shed water.
 6. Seal entire perimeter to structure, window and door frames, and other penetrations.
 7. Where conduits, pipes, wires, ducts, outlet boxes, and other items are installed within insulation cavity, pass vapor retarder sheet behind these items and over insulation to maintain airtight seal.
- F. Self-Adhered Sheets:
1. Prepare substrate in accordance with sheet manufacturer's installation instructions; fill and tape joints in substrate and between dissimilar materials.
 2. Lap sheets shingle fashion to shed water and seal laps airtight.
 3. Once sheets are in place, press firmly into substrate with resilient hand roller; ensure that laps are firmly adhered with no gaps or fishmouths.
 4. Use same material, or other material approved by sheet manufacturer, to seal sheets to adjacent substrates, and as flashing.
 5. At expansion joints, provide transition to joint assemblies approved by sheet manufacturer.
- G. Vapor Retarder Coatings:
1. Prepare substrate in accordance with coating manufacturer's installation instructions; treat joints in substrate and between dissimilar materials as indicated.
 2. Where exterior masonry veneer is being installed, install masonry anchors before installing vapor retarder over masonry; provide airtight seal around anchors.
 3. Apply bead or trowel coat of mastic sealant with minimum thickness of 1/4 inch (6 mm) along coating seams, rough cuts, and as recommended by manufacturer.
 4. Apply flashing to seal with adjacent construction and to bridge joints in coating substrate.
- H. Openings and Penetrations in Exterior Vapor Retarders:
1. Install flashing over sills, covering entire sill framing member, and extend at least 5 inches (127 mm) onto vapor retarder and at least 6 inches (152 mm) up jambs; mechanically fasten stretched edges.
 2. At openings with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with sealing tape at least 4 inches (100 mm) wide; do not seal sill flange.
 3. At openings with nonflanged frames, seal vapor retarder to each side of framing at opening using flashing at least 9 inches (230 mm) wide, and covering entire depth of framing.
 4. At head of openings, install flashing under vapor retarder extending at least 2 inches (50 mm) beyond face of jambs; seal vapor retarder to flashing.
 5. At interior face of openings, seal gaps between window/door frame and rough framing using appropriate joint sealant over backer rod.

6. Service and Other Penetrations: Form flashing around penetrating items and seal to surface of vapor retarder.

3.04 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements for additional requirements.
- B. St. Cloud School District 742's Inspection and Testing: Cooperate with St. Cloud School District 742's testing agency.
 1. Allow access to work areas and staging.
 2. Notify St. Cloud School District 742's testing agency in writing of schedule for work of this section to allow sufficient time for testing and inspection.
 3. Do not cover work of this section until testing and inspection is accepted.
- C. Obtain approval of installation procedures from vapor retarder manufacturer based on a mock-up installed in place, prior to proceeding with remainder of installation.
- D. Take digital photographs of each portion of installation prior to covering up vapor retarders.

3.05 PROTECTION

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

END OF SECTION

SECTION 07 4213.19 - INSULATED METAL WALL PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Factory-assembled metal panel system for walls and soffits, with trim, related flashings and accessory components.

1.02 RELATED REQUIREMENTS

- A. Section 05 4000 - Cold-Formed Metal Framing: Stud wall framing system.
- B. Section 05 5000 - Metal Fabrications: Weathered steel panels.
- C. Section 07 6200 - Sheet Metal Flashing and Trim.

1.03 REFERENCE STANDARDS

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2017.
- B. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014 (Reapproved 2021).

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide manufacturer documentation on tested structural, thermal, and fire resistance capabilities of assembled panel.
- C. Shop Drawings: Indicate dimensions, panel profile and layout, and methods of anchorage.
- D. Samples: Submit two samples of panel, 6 by 6 inch (150 by 150 mm) in size illustrating finish color, sheen, and texture.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum three years experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.
- B. Store pre-finished material off ground with weather protection to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- C. Prevent contact with materials that could cause discoloration or staining.

1.07 WARRANTY

- A. Finish Warranty: Provide 5-year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking. Complete forms in St. Cloud School District 742's name and register with warrantor.
- B. Special Warranty: Provide 2-year warranty covering water tightness and integrity of seals of metal plate wall panels. Complete forms in St. Cloud School District 742's name and register with warrantor.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Insulated Metal Wall Panels:

1. ATAS International, Inc: www.atas.com.
2. Centria, a Nucor Company: www.centria.com.
3. Kingspan Insulated Panels: www.kingspan.com.
4. Metl-Span, a Nucor Company: www.metlspan.com.
5. MBCI: www.mbc.com.
6. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PERFORMANCE / DESIGN CRITERIA

- A. Metal Panel System: Factory-assembled metal panel system, with trim, related flashings and accessory components.
 1. Provide positive drainage to exterior for moisture entering or condensation occurring within panel system.
 2. Accommodate tolerances of building structural framing.
- B. Performance Requirements:
 1. Thermal Performance: K-factor of 0.140 maximum.
 2. Structural Performance: Design and size to withstand all dead loads and wind loads caused by positive and negative wind pressure acting normal to plane of panel.
 - a. Verify structural performance in accordance with ASTM E330/E330M, using test pressure 1.5 times design wind pressure, with 10 seconds duration of maximum load.
 3. Movement: Accommodate the movement caused by the following without damage to system, components, or deterioration of seals:
 - a. Normal movement between system components.
 - b. Seasonal temperature cycling.
 - c. Deflection of structural support framing,

2.03 COMPONENTS

- A. Fire Rated Wall Panels: Exterior and interior metal sheet skin, factory-assembled, with foamed in place insulation; exterior and interior sheet interlocking at edges, fitted with continuous gaskets.
 1. Basis of Design: Kingspan Insulated Panels:
 - a. (MTL PNL-30): QuadCore KS.
 - b. (MTL PNL-31): K-Roc HF; 2 hour Fire Rating.
- B. Profile: Shadowline; vertical panels.
- C. Exterior Sheet: Pre-finished galvanized steel, 22 gauge, 0.0299 inch (0.76 mm) minimum base metal thickness; stucco embossed.
- D. Interior Sheet: Galvanized steel, pre-finished, 22 gauge, 0.0299 inch (0.76 mm) minimum base metal thickness.
- E. Panel Edge Profile: Tongue and groove, for flush seam.
- F. Fabricate panels in longest practicable lengths.
- G. Exterior Finish: Polyvinylidene fluoride (PVDF) coating; color as selected from manufacturer's standard range.
- H. Soffit Panels: Same as wall panels.
- I. Trim, Closure Pieces, Expansion Joints, and Flashings: Same material, thickness and finish as exterior sheets; factory-fabricated to required profiles; fabricated in longest practicable lengths.
 1. Exposed Fasteners: Not permitted.

2.04 MATERIALS

- A. Precoated Galvanized Steel Sheet: ASTM A653/A653M, Commercial Steel (CS) or Forming Steel (FS), with G90/Z275 coating; continuous-coil-coated with acrylic primer coat, polyvinyl fluoride (PVF) top coat, and polyester washcoat for panel back.
 - 1. Color of Exposed Exterior Surfaces: As selected by Architect from manufacturer's full range.
- B. Foamed-in-Place Insulation: Urethane type.

2.05 ACCESSORIES

- A. Anchors: Galvanized steel.
- B. Fasteners: Manufacturer's standard type to suit application; hot-dip galvanized steel with soft neoprene washers; provide with fastener cap same color as exterior panel.
- C. Bituminous Paint: Asphalt base.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that structural framing is ready to receive panel system.

3.02 INSTALLATION

- A. Install panel system on walls in accordance with manufacturer's instructions.
- B. Protect panel surfaces in contact with cementitious materials with bituminous paint; allow paint to dry prior to installation.
- C. Permanently fasten panel system to structural supports; aligned, level, and plumb, within specified tolerances.
- D. Locate panel joints over supports.
- E. Use concealed fasteners unless otherwise approved by Architect.
- F. Seal and place gaskets to prevent weather penetration. Maintain neat appearance.

3.03 TOLERANCES

- A. Maximum Offset From True Alignment Between Adjacent Members Butting or In Line: 1/16 inch (1.6 mm).
- B. Maximum Variation from Plane or Location Indicated on Drawings: 1/4 inch (6 mm).

3.04 CLEANING

- A. See Section 01 7000 - Execution and Closeout Requirements for additional requirements.
- B. Remove site cuttings from finish surfaces.
- C. Clean and wash prefinished surfaces with mild soap and water; rinse with clean water.

END OF SECTION

SECTION 07 4213.23 - METAL COMPOSITE MATERIAL WALL PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Exterior cladding consisting of formed metal composite material (MCM) sheet, secondary supports, and anchors to structure, attached to solid backup.
- B. Matching flashing and trim.

1.02 RELATED REQUIREMENTS

- A. Section 05 4000 - Cold-Formed Metal Framing: Panel support framing.
- B. Section 07 2500 - Weather Barriers: Water-resistive barrier behind wall panel system.
- C. Section 07 6200 - Sheet Metal Flashing and Trim: Metal flashing components integrated with this wall system.
- D. Section 07 9200 - Joint Sealants: Sealing joints between siding and adjacent construction and fixtures.

1.03 REFERENCE STANDARDS

- A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- E. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes; 2025.
- F. ASTM A480/A480M - Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip; 2017.
- G. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.
- H. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- I. ASTM D1781 - Standard Test Method for Climbing Drum Peel for Adhesives; 1998 (Reapproved 2021).
- J. ASTM D1929 - Standard Test Method for Determining Ignition Temperature of Plastics; 2023.
- K. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018.
- L. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.
- M. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014 (Reapproved 2021).
- N. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2016).
- O. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components; 2025.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Meeting: Convene one week before starting work of this section to verify project requirements, coordinate with installers of other work, establish condition and completeness of building substrate, and review manufacturers' installation instructions and warranty requirements.
 - 1. Require attendance by the installer and relevant sub-contractors.
 - 2. Include MCM sheet manufacturer's representative and wall system manufacturer's representative to review storage and handling procedures.
 - 3. Review in detail truck transportation, parking, vertical transportation, schedule, personnel, installation of adjacent materials and substrate.
 - 4. Review procedures for protection of work and other construction.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data - MCM Sheets: Manufacturer's data sheets on each product to be used, including thickness, physical characteristics, and finish, and:
 - 1. Finish manufacturer's data sheet showing physical and performance characteristics.
 - 2. Storage and handling requirements and recommendations.
 - 3. Fabrication instructions and recommendations.
 - 4. Specimen warranty for finish, as specified herein.
- C. Product Data - Wall System: Manufacturer's data sheets on each product to be used, including:
 - 1. Physical characteristics of components shown on shop drawings.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation instructions and recommendations.
 - 4. Specimen warranty for wall system, as specified herein.
- D. Shop Drawings: Show layout and elevations, dimensions and thickness of panels, connections, details and location of joints, sealants and gaskets, method of anchorage, support clips, exposed fasteners, number of anchors, supports, reinforcement, trim, flashings, and accessories.
 - 1. Indicate panel numbering system.
 - 2. Differentiate between shop and field fabrication.
 - 3. Indicate substrates and adjacent work with which the wall system must be coordinated.
 - 4. Include large-scale details of anchorages and connecting elements.
 - 5. Include large-scale details or schematic, exploded or isometric diagrams to fully explain flashing at a scale of not less than 1-1/2 inches per 12 inches (1:10).
 - 6. Include design engineer's stamp or seal on shop drawings for attachments and anchors.
- E. Verification Samples: For each finish product specified, submit at least three samples, minimum size 12 inch (305 mm) square, and representing actual product in color and texture.
- F. Design Data: Submit structural calculations stamped by design engineer, for Architect's information and project record.
- G. Test Report: Submit report of full-size mock-up tests for air infiltration, water penetration, and wind performance.
- H. Test Report: Submit test report verifying compliance with NFPA 285 for previously-tested exterior wall assembly.
- I. Manufacturer's Field Reports: Provide within 48 hours of field review. State what was observed and what changes, if any, were requested or required.
- J. Testing agency's qualification statement.

- K. Maintenance Data: Care of finishes and warranty requirements.

1.06 QUALITY ASSURANCE

- A. Design Engineer's Qualifications: Design structural supports and anchorages under direct supervision of a Structural Engineer experienced in design of this type of work and licensed in the State in which the Project is located.
- B. Testing Agency Qualifications: Independent agency experienced in testing assemblies of the type required for this project and having the necessary facilities for full-size mock-up testing of the type specified.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products in manufacturer's original, unopened, undamaged containers with identification labels intact.
 - 1. Protect finishes by applying heavy-duty removable plastic film during production.
 - 2. Package for protection against transportation damage.
 - 3. Provide markings to identify components consistently with drawings.
 - 4. Exercise care in unloading, storing, and installing panels to prevent bending, warping, twisting, and surface damage.
- B. Store products protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.
 - 1. Store in well-ventilated space out of direct sunlight.
 - 2. Protect from moisture and condensation with tarpaulins or other suitable weathertight covering installed to provide ventilation.
 - 3. Store at a slope to ensure positive drainage of accumulated water.
 - 4. Do not store in enclosed space where ambient temperature can exceed 120 degrees F (49 degrees C).
 - 5. Avoid contact with other materials that might cause staining, denting, or other surface damage.

1.08 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Special Warranty: Provide 2-year warranty covering water tightness and integrity of seals of wall panels. Complete forms in St. Cloud School District 742's name and register with warrantor.
- C. Finish Warranty: Provide 5-year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking. Complete forms in St. Cloud School District 742's name and register with warrantor.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Metal Composite Material (MCM) Sheet Manufacturers:
 - 1. 3A Composites USA: www.3acompositesusa.com.
 - 2. Laminators Inc: www.laminatorsinc.com.
 - 3. Substitutions: See Section 01 6000 - Product Requirements.

2.02 WALL PANEL SYSTEM

- A. Wall Panel System: Metal panels, fasteners, and anchors designed to be supported by framing or other substrate provided by others; provide installed panel system capable of maintaining specified performance without defects, damage, or failure.

1. Basis of Design: 3A Composites Alucobond Dry Reveal.
 - a. (MTL PNL-60): Exterior; Color: as selected by Architect.
 - b. (MTL PNL-61): Interior; Color: as selected by Architect.
2. Provide structural design by or under direct supervision of a Structural Engineer licensed in the State in which the Project is located.
3. Anchor panels to supporting framing without exposed fasteners.

2.03 PERFORMANCE REQUIREMENTS

- A. Thermal Movement: Provide for free and noiseless vertical and horizontal thermal movement due to expansion and contraction under material temperature range of minus 20 degrees F (minus 29 degrees C) to 180 degrees F (82 degrees C) without buckling, opening of joints, undue stress on fasteners, or other detrimental effects; allow for ambient temperature at time of fabrication, assembly, and erection procedures.
- B. Wind Performance: Provide system tested in accordance with ASTM E330/E330M without permanent deformation or failures of structural members under the following conditions:
 1. Maximum deflection of perimeter framing member of L/175 normal to plane of the wall; maximum deflection of individual panels of L/60.
 2. Maximum anchor deflection in any direction of 1/16 inch (1.6 mm) at connection points of framing members to anchors.
- C. Air Leakage: 0.10 cfm/sq ft (0.50 L/sec sq m) maximum leakage when tested at 1.57 psf (75 Pa) pressure difference in accordance with ASTM E283/E283M.
- D. Water Penetration: No water penetration under static pressure when tested in accordance with ASTM E331 at a differential of 10 percent of inward acting design load, 6.27 psf (300 Pa) minimum, after 15 minutes.
 1. Water penetration is defined as the appearance of uncontrolled water on the interior face of the wall.
 2. Design to drain leakage and condensation to the exterior face of the wall.
- E. Fire Performance: Use test method complying with NFPA 285.

2.04 PANELS

- A. Panels: 2-1/2-inch (63.5 mm) deep pans formed of metal composite material sheet by routing back edges of sheet, removing corners, and folding edges.
 1. Reinforce corners with riveted aluminum angles.
 2. Provide concealed attachment to supporting structure by adhering attachment members to back of panel; attachment members may also function as stiffeners.
 3. Maintain maximum panel bow of 0.8 percent of panel dimension in width and length; provide stiffeners of sufficient size and strength to maintain panel flatness without showing local stresses or read-through on panel face.
 4. Secure members to back face of panels using structural silicone sealant approved by MCM sheet manufacturer.
 5. Metallic Finished Panels: Maintain consistent grain of MCM sheet; specifically, do not rotate sheet purely to avoid waste.
 6. Fabricate panels under controlled shop conditions.
 7. Where final dimensions cannot be established by field measurement before commencement of manufacturing, make allowance for field adjustments without requiring field fabrication of panels.
 8. Fabricate as indicated on drawings and as recommended by MCM sheet manufacturer.

- a. Make panel lines, breaks, curves, and angles sharp and true.
 - b. Keep plane surfaces free from warp or buckle.
 - c. Keep panel surfaces free of scratches or marks caused during fabrication.
9. Provide joint details providing a watertight and structurally sound wall panel system that allows no uncontrolled water penetration on inside face of panel system.

2.05 MATERIALS

- A. Metal Composite Material (MCM) Sheet: Two sheets of aluminum sandwiching a core of extruded thermoplastic material; no foamed insulation material content.
 1. Overall Sheet Thickness: 0.157 inch (4 mm), minimum.
 2. Face Sheet Thickness: 0.019 inch (0.50 mm), minimum.
 3. Alloy: Manufacturer's standard, selected for best appearance and finish durability.
 4. Bond and Peel Strength: No adhesive failure of the bond between the core and the skin nor cohesive failure of the core itself below 22.4 inch-pound/inch (100 N-mm/mm) with no degradation in bond performance, when tested in accordance with ASTM D1781, simulating resistance to panel delamination, after 8 hours of submersion in boiling water and after 21 days of immersion in water at 70 degrees F (21 degrees C).
 5. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
 6. Flammability: Self-ignition temperature of 650 degrees F (343 degrees C) or greater when tested in accordance with ASTM D1929.
- B. Metal Framing Members: Include sub-girts, zee-clips, base and sill angles and channels, hat-shaped and rigid channels, and furring channels required for complete installation.
 1. Provide material strength, dimensions, configuration as required to meet applied loads and in compliance with applicable building code.

2.06 FINISHES

- A. Fluoropolymer Coil Coating System: Polyvinylidene fluoride (PVDF) multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent PVDF resin, with at least 80 percent of coil coated metal surfaces having minimum total dry film thickness (DFT) of 0.9 mil, 0.0009 inch (0.023 mm); color and gloss as selected by Architect from manufacturer's standard line.
- B. Color/Texture: As selected by Architect from manufacturer's full range.

2.07 ACCESSORIES

- A. Flashing: Sheet aluminum; 0.040 inch (1.0 mm) thick, minimum; finish and color to match MCM sheet; see Section 07 6200 for additional requirements.
- B. Anchors, Clips, and Accessories: Use one of the following:
 1. Stainless steel complying with ASTM A276/A276M, ASTM A480/A480M, or ASTM A666/A666M.
 2. Steel complying with ASTM A36/A36M and hot-dip zinc coating to ASTM A153/A153M.
 3. Steel complying with ASTM A36/A36M and hot-dip galvanized to ASTM A123/A123M, with Coating Thickness Grade of 100.
- C. Fasteners:
 1. Exposed Fasteners: Stainless steel; permitted only where absolutely unavoidable and subject to prior approval of the Architect.
 2. Screws: Self-drilling or self-tapping Type 410 stainless steel or zinc-alloy steel hex washer head, with EPDM or PVC washer under heads of fasteners bearing on weather side of metal wall panels.
 3. Bolts: Stainless steel.

- 4. Fasteners for Flashing and Trim: Blind fasteners of high-strength aluminum or stainless steel.
- D. Bituminous Coating: Cold-applied asphalt mastic, noncorrosive compound free of asbestos, sulfur, and other deleterious impurities; 15-mil (0.38 mm) dry film thickness per coat.
- E. Joint Sealer: Provide color to match wall panels silicone sealant of type approved by MCM sheet manufacturer, and in compliance with ASTM C920.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine dimensions, tolerances, and interfaces with other work.
- B. Examine substrate on-site to determine that conditions are acceptable for product installation in accordance with manufacturer's written instructions.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- D. Notify Architect in writing of conditions detrimental to proper and timely completion of work, and do not proceed with erection until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Protect adjacent work areas and finish surfaces from damage during installation.

3.03 INSTALLATION

- A. Do not install products that are defective, including warped, bowed, dented, and broken members, and members with damaged finishes.
- B. Comply with instructions and recommendations of MCM sheet manufacturer and wall system manufacturer, as well as with approved shop drawings.
- C. Install wall system securely allowing for necessary thermal and structural movement; comply with wall system manufacturer's instructions for installation of concealed fasteners.
- D. Do not handle or tool products during erection in manner that damages finish, decreases strength, or results in visual imperfection or failure in performance. Return component parts that require alteration to shop for refabrication, if possible, or for replacement with new parts.
- E. Do not form panels in field unless required by wall system manufacturer and approved by the Architect; comply with MCM sheet manufacturer's instructions and recommendations for field forming.
- F. Separate dissimilar metals; use gasket fasteners, isolation shims, or isolation tape where needed to eliminate possibility of electrolytic action between metals.
- G. Install flashings as indicated on shop drawings. At flashing butt joints, provide a lap strap under flashing and seal lapped surfaces with a full bed of non-hardening sealant.
- H. Install square, plumb, straight, and true, accurately fitted, with tight joints and intersections maintaining the following installation tolerances:
 - 1. Variation From Plane or Location: 1/2 inch in 30 feet (10 mm in 10 m) of length and up to 3/4 inch in 300 feet (20 mm in 100 m), maximum.
 - 2. Deviation of Vertical Member From True Line: 0.1 inch in 25 feet (3 mm in 9 m) run, maximum.
 - 3. Deviation of Horizontal Member From True Line: 0.1 inch in 25 feet (3 mm in 9 m) run, maximum.
 - 4. Offset From True Alignment Between Two Adjacent Members Abutting End To End, In Line: 0.03 inch (0.75 mm), maximum.
- I. Replace damaged products.

3.04 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements for additional requirements.
- B. Wall System Manufacturer's Field Services: Provide field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with instructions.

3.05 CLEANING

- A. Ensure weep holes and drainage channels are unobstructed and free of dirt and sealants.
- B. Remove protective film after installation of joint sealers, after cleaning of adjacent materials, and immediately prior to completion of work.
- C. Remove temporary coverings and protection of adjacent work areas.
- D. Clean installed products in accordance with manufacturer's instructions.

3.06 PROTECTION

- A. Protect installed panel system from damage until Date of Substantial Completion.

END OF SECTION

SECTION 07 4243 - COMPOSITE WALL PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Composite wall panel system and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 07 2600 - Vapor Retarders.
- B. Section 07 2700 - Air Barriers.
- C. Section 07 6200 - Sheet Metal Flashing and Trim.

1.03 REFERENCE STANDARDS

- A. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- B. ASTM C1186 - Standard Specification for Flat Fiber-Cement Sheets; 2022, with Editorial Revision (2023).
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide manufacturer's data sheets on each product.
- C. Shop Drawings: Indicate layout, panel locations, and configuration.
 - 1. Indicate size, spacing, and location of support and attachment components, connections, and types and locations of fasteners.
 - 2. Indicate necessary provisions for structural and thermal movement between wall panel system and adjacent materials.
- D. Samples: Submit two samples of each style and color panel, 12 by 12 inches (305 by 305 mm) in size and showing finish color, sheen, and texture.
- E. Manufacturer's Instructions: Include instructions for storage, handling, preparation, and product installation.
- F. Executed installation warranty.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. See Section 01 7419 - Construction Waste Management and Disposal for packaging waste requirements.
- B. Deliver and store materials with labels intact in manufacturer's unopened packaging until ready for installation.
- C. Store products under waterproof cover, well ventilated, and elevated above grade on flat surface.
- D. Protect materials from harmful environmental elements, construction dust, direct sunlight, and other potentially detrimental conditions.

1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Installation Warranty for Building Rainscreen Assembly: Provide 10-year warranty including, but not limited to, defective materials and workmanship, labor, and removal of materials to effect repairs and restore to watertight conditions.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Phenolic Resin Composite Panels:
 - 1. Parklex Prodema: www.parklexprodema.com
 - 2. Substitutions: Section 01 6000 - Product Requirements.

2.02 COMPOSITE WALL PANELS

- A. Panels, General: Fiber-cement sheets complying with ASTM C1186, Type A.
 - 1. Design Wind Loads: Comply with requirements indicated on the drawings.
 - 2. Maximum Allowable Deflection of Panel: L/240 for length (L) of span.
 - 3. Surface Burning Characteristics: Maximum flame spread index of 0 and maximum smoke developed index of 5 when tested in accordance with ASTM E84.
- B. Textured Panel Style (COMP PNL-20): Simulated flat metal or phenolic panel appearance.
 - 1. Basis of Design: Parklex NATURCLAD-B Cladding with Concealed Fasteners.
 - a. (COMP PNL-20): Exterior.
 - b. (COMP PNL-21): Interior.
 - 2. Color: Anise.

2.03 ACCESSORIES

- A. Flashing: Sheet aluminum; see Section 07 6200.
- B. Sealant: ASTM C920, Class 35, elastomeric, polyurethane or silyl-terminated polyether/polyurethane, and capable of being painted.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrate; clean and repair as required to eliminate conditions detrimental to proper installation.
- B. Verify that water-resistive barrier has been properly installed and approved.
- C. Do not begin installation until unacceptable conditions have been corrected.

3.02 INSTALLATION

- A. Install cladding in accordance with manufacturer's installation instructions and approved shop drawings.
- B. Wall Panels:
 - 1. Install in accordance with manufacturer's instructions.
 - 2. Install wall panels with manufacturer's recommended concealed attachment system.
 - 3. Do not install wall panels less than 6 inches (150 mm) above surface of ground or closer than 1 inch (25 mm) to surfaces where water may collect.
 - 4. Allow space for thermal movement at ends of wall panels that butt against trim; seal joint between panel and trim.
- C. Install control and expansion joints as detailed on drawings.
 - 1. Vertical Joints: Install at locations and with spacings recommended by wall panel manufacturer.
 - 2. Horizontal/Compression Joints: Install at locations and with spacings recommended by wall panel manufacturer.

- D. After installation, seal joints. Include joints around penetrations and between wall panels and adjacent construction.

3.03 CLEANING

- A. See Section 01 7000 - Execution and Closeout Requirements for additional requirements.
- B. Clean exposed work upon completion of installation; remove grease and oil films, excess joint sealer, handling marks, and debris. Leave work clean, unmarked, and free from dents, creases, waves, scratch marks, or other damage to finish.

3.04 PROTECTION

- A. Protect installed products until Date of Substantial Completion.

END OF SECTION

SECTION 07 5100 - BUILT-UP BITUMINOUS ROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Built-up roofing membrane, conventional and protected membrane application.
- B. Insulation, flat and tapered.
- C. Vapor retarders.
- D. Deck sheathing.
- E. Cover boards.

1.02 REFERENCES

- A. Materials used in this section shall be listed in the latest editions of the following:
 - 1. Factory Mutual System Approval Guide - equipment, materials, services for conservation of property.
 - 2. Underwriters Laboratories, Inc. - building materials directory.
 - 3. NRCA Roofing and Waterproofing Manual, fifth edition - National Roofing Contractors Association.
- B. Roof insulation must meet the requirements of FM 4450 or UL 1256.
- C. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2013.

1.03 DESCRIPTION

- A. Furnish and install a weather and watertight asphalt built-up roof complete, in place, as shown on the drawings and specified herein, for a complete and proper installation including, but not necessarily limited to:
 - 1. Contractor shall take all necessary precautions to protect Owner's property from damage caused by weather conditions, excessive loading of the existing structural system or careless workmanship.
 - 2. Metal cap flashings, counterflashings, and miscellaneous sheet metal work incorporated into the work shall be installed and made watertight as a part of the work of this section.
 - 3. Installation of wood nailers, wood edge strips and plywood backers in accordance with manufacturer's specifications and/or as shown on drawings. Contractor shall coordinate the installation of all carpentry work required for the membrane system herein specified.
- B. Work included:
 - 1. Provide and install all roof and deck insulation and insulation fasteners as shown on the roof plan and detail drawings.

1.04 SUBMITTALS

- A. Product Data: Within ten (10) calendar days after award of contract, submit:
 - 1. Complete material list of all items proposed to be furnished and installed under this section.
 - 2. Manufacturer's specifications and other data required to demonstrate compliance with specified requirements.
 - 3. Manufacturer's recommended methods of installation.
 - 4. When approved by the Architect/Engineer, the manufacturer's recommended methods of installation (unless superseded by the specifications) will become the basis for accepting or rejecting the installation.

- B. Certification from the manufacturer that roofing Contractor is currently approved for installation of the specified roofing system.
- C. Samples and test results for materials when requested by the Architect/Engineer.
- D. Roof system details at roof edges, drains, scuppers, penetrations, terminations, curbs and flashings.
- E. Manufacturer Certificates:
 - 1. Performance Requirement Certificate: Signed by roof membrane manufacturer, certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
 - a. Submit evidence of compliance with performance requirements.
- F. Product Test Reports: For roof insulation, tests performed by a qualified testing agency, indicating compliance with specified requirements.
- G. Evaluation Reports: For components of roofing system, from ICC-ES.

1.05 QUALITY ASSURANCE

- A. Standards: Comply with the standards specified in this section and as listed in the general requirements.
- B. Qualifications of manufacturer: Products used in the work included in this section shall be produced by manufacturers regularly engaged in the manufacture of similar items and with a history of successful production acceptable to the Architect/Engineer.
- C. Qualifications of Contractor: The Contractor and contract personnel shall be currently approved by the manufacturer of the approved products as qualified to install the materials of this section.
- D. Qualifications of installers: Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper work in this section.
- E. Roofing Inspections: Make all required notifications and secure all required inspections by the manufacturer of the approved materials to facilitate issuance of the specified roof warranty.
- F. Provide and install roofing system in accordance with the manufacturer's current recommendations, as required by the referenced standards, meeting Factory Mutual Class I roof system with FM 1-60 wind uplift rating and meeting the requirements of the Contract Documents.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Storage:
 - 1. Deliver all packaged materials to the job site in their original, unopened containers with all labels intact and legible, no sooner than five (5) calendar days prior to start of job.
 - 2. Store all materials in an approved manner, up off of the roof deck or ground on wooden pallets, and protected from exposure to the elements on all sides with tarps extending to the ground. Manufacturers' wraps or covers are not acceptable protection. Note: All insulation materials, felts, and other "waterproof" materials shall be protected as described above.
 - a. Contractor is responsible for all materials delivered to job site until completion of project.
 - b. When storing materials on the roof, do not over-stress deck.
- B. Store all rolls of felt, cartons and drums of asphalt roof cement, primer, and coating on end.
- C. Protection:
 - 1. Use all necessary means to protect the materials in this section before, during and after installation, and to protect the work and materials of all other trades.
- D. Replacements:
 - 1. In the even of damage, immediately make all repairs and replacements necessary to the approval of the Architect/Engineer, at no additional cost to the owner.

- E. Work is to be performed on a daily basis, with each section completed before progressing to the next days work.
- F. Completion of work shall be defined as the installation of all specified substrate preparation, vapor retarder (if required), insulation and membrane completely sealed at perimeters, curbs and penetrations.

1.07 "R" VALUES

- A. Isocyanurate insulation thermal values shall be determined in accordance with ASTM: C 1303.
- B. The project shall have a minimum R-value of 30.

1.08

- A. Work is to be performed on a daily basis, with each section completed before progressing to the next day's work.
- B. Completion of work shall be defined as the installation of all specified roof preparation, insulation roof membrane, and flashings to ensure a waterproof system.
- C. Contractor shall complete roofing work on a daily basis unless specifically directed otherwise by the Architect/Engineer.

1.09 FIELD CONDITIONS

- A. Do not apply roofing membrane during unsuitable weather.
- B. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.
- C. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.
- D. Schedule applications so that no partially completed sections of roof are left exposed at end of workday.

1.10 WARRANTY

- A. As part of the work of this section, apply all required fees, secure all required inspections, and complete all items necessary to secure and deliver to the Owner a Contractor's two (2) year labor and material warranty and manufacturer's thirty (30) year labor and material (NDL) No Dollar Limit Warranty.
 - 1. Before final payment by Owner, Contractor shall submit system manufacturer's warranties and contractor's warranty directly to Owner.
- B. There will be no penal sum per square of roofing.
- C. Repairs shall be made promptly.
- D. If any moisture infiltration is experienced through the system, the manufacturer is to cover the cost of any repairs to the roof leaks and effected underlying insulation that was part of this project.
- E. The manufacturers are to include any repair of any blister formations within the membrane assembly.
- F. The manufacturers are to include the repair of any delaminated base flashings.
- G. The manufacturers are to include any repair to any damage caused by winds up to 72 miles per hour.

PART 2 PRODUCTS

2.01 GENERAL

- A. Minimum product requirements have been listed. All of these components must be used and bid.

2.02 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed roofing system and flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roof system and flashings shall remain watertight.
 - 1. Accelerated Weathering: Roof membrane shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
 - 2. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D 3746/C 3746M, ASTM D 4272/D 4272M, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.
- B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roof membrane manufacturer based on testing and field experience.
- C. Wind Uplift Resistance: Design roofing system to resist the following wind-uplift pressures when tested according to FM Approvals 4474, UL 580, or UL 1897.
 - 1. As required by the Minnesota State Building Code for the Wind Design Criteria for this building.
- D. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, Class B; for application and roof slopes indicated; testing by a qualified testing agency.
 - 1. Identify products with appropriate markings of applicable testing agency.

2.03 FINISHING FELTS

- A. Fiberglass roofing felts shall meet or exceed ASTM: D2178, Type VI and supplied by:
 - 1. Firestone Building Products: www.firestonebpco.com.
 - 2. Johns Manville: www.jm.com.
 - 3. GAF Materials Corp: www.gaf.com.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Organic felt, meeting the Requirements for ASTM: D226 Type I, shall be used exclusively for nightly tie-offs.

2.04 BASE FLASHINGS

- A. Granular-surfaced modified bitumen product combining a glass fiber mat, glass fiber web and/or polyester core as manufactured by an approved manufacturer.

2.05 ROOF BITUMENS

- A. Type III (steep) roofing asphalt : conform to ASTM; D312 and have a softening point of 185 degrees F minimum, to 205 degrees F maximum; flash point of 500 degrees F minimum.

2.06 GRAVEL, COATINGS AND CEMENTS

- A. Natural gravel shall be commercial grade, washed, 1/2 inch to number 4 sieve, or 3/8 inch to 3/4 inch depending on application, and shall comply with ASTM: C 1863. No more than 10 percent of any lot shall be outside these requirements. Gravel shall be dry and free of dust, soil and foreign matter.
- B. Asphalt roof cement for vertical surfaces shall be an asbestos-free trowel grade, asphalt-based and conform to ASTM: D 4568 Type I, Class I.
- C. Asphaltic primer shall be suitable for use with asphalt for application to concrete and masonry surfaces and conform to ASTM: D41.

2.07 VAPOR BARRIER

- A. Mopped two ply vapor barrier (VPR RET-5).

2.08 INSULATION MATERIALS

- A. Insulation to be of the type and minimum thickness as listed here or as shown on the detail drawings.
- B. Insulation System Identification:
 - 1. (INSUL-50): Constant thickness polyisocyanurate insulation; minimum two staggered layers of equal thickness; provide tapered polyisocyanurate insulation as needed.
 - 2. (INSUL-51): Tapered polyisocyanurate insulation over constant thickness polyisocyanurate insulation; minimum two staggered layers of equal thickness; provide tapered insulation over entire roof as indicated in the drawings.
- C. Rigid Cover Board (Top Layer or tapered Built-Up Roof System) (RF BRD-3):
 - 1. Perlite roof insulation is to conform to ASTM: C 728. Insulation is to be supplied in 2 foot x 4 foot boards.
 - 2. Thickness to be as shown on detail drawings.
 - 3. Approved Products:
 - a. Fesco Board by Johns Manville: www.jm.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.

2.09 RELATED MATERIALS

- A. Means of Attachment:
 - 1. Screw-and-Plate:
 - a. Corrosion-resistant, self-tapping, self-drilling, self-drilling screw with low profile head. Fasteners to be carbon steel with corrosion resistant coating. Fastener shall show no more than 10 percent red rust corrosion after 30 cycles or Kesternich testing.
 - b. Corrosion-resistant, factory-made plate.
 - c. Screw-and-plate type fastener to be Factory Mutual approved.
 - d. Approved Products:
 - 1) UltraFast by Johns Manville: www.jm.com.
 - 2) Roof Grip by ITW Buildex: www.buildex.com
 - 3) Insulation Fastener by OMG Roofing Products: www.omgroofing.com.
 - 4) Dekfast by SFS Intec: sfsintecusa.com.
 - e. Fasteners to be of sufficient length to penetrate top flange of deck by 3/4 inch.
 - 2. Roofing Bitumens:
 - a. Type III (steep) roofing asphalt shall conform to ASTM D 312 and have a softening point of 185 degrees F minimum, to 205 degrees F maximum flash point of 500 degrees F minimum.

2.10 DECK BOARD

- A. Cover Boards (RF BRD-1): Glass-mat faced gypsum panels complying with ASTM C1177/C1177M.
 - 1. Thickness: 5/8 inch (15.9 mm), Type X, fire-resistant.
 - 2. Manufacturers:
 - a. USG Corporation; Securock Ultralight Glass-Mat Roof Board: www.usg.com.
 - b. DensDeck Prime by Georgia-Pacific.
 - c. Substitutions: See Section 01 6000 - Product Requirements.

2.11 ACCESSORIES

- A. Lead flashing for roof drains.

1. Material shall weigh 4 lbs. per square foot.
 2. Material shall be approximately 1/16 inch in thickness.
 3. Material shall meet the requirements of ASTM: B749-97, "Standard Specification for Lead and Lead Alloy Strip, Sheet, and Plate Products."
 4. Material shall be provided in continuous sheets sized to extend 12inch beyond the drain body.
- B. Pipe or vent jackets shall be a frost-proof type with a lead cap and fabricated of galvanized iron, and designed for use on flat roof construction. Verify at work site for quantity and size.
1. Approved Products:
 - a. No. 1-F flat plumbing vent flange by F.J. Moore Manufacturing Company:
www.fjmooremfg.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- C. Fasteners shall be of adequate design to achieve substantial and positive anchorage.
1. Nails for flashings and roofing felts shall be stainless steel or zinc-coated type with one inch caps.
- D. Two-part pourable sealer for pitch pans shall be supplied by the system manufacturer.

PART 3 EXECUTION

3.01 GENERAL

- A. The latest manufacturer specifications and installation techniques are to be followed.

3.02 INSPECTION

- A. Examine the areas and conditions under which work in this section will be installed. Correct conditions detrimental to the proper and timely completion of the work. Do not proceed until such conditions have been corrected.

3.03 SURFACE CONDITIONS

- A. Surfaces scheduled to receive roofing and insulation are to be free of any standing water, dew, loose debris, dust and dirt.
- B. Substrate is to be smooth, free of sharp projections, and free of obvious depressions.
- C. All metal fittings specified or shown on drawings are to be in place before roofing.
- D. All nailers shall be securely installed prior to insulation and roofing.

3.04 JOB CONDITIONS

- A. Protection:
1. Existing work shall be properly protected from damage or soiling during the process of removal of existing roofing and installation of new roofing material. Exercise special care at openings through roof and at roof edges. Spill no roofing materials on building surfaces. Any finished work damaged in the execution of work of this section, including lawns/shrubbery, shall be replaced or restored to the original condition by this Contractor.
 2. Contractor shall protect existing roofing that is not scheduled to be removed with minimum 3/4 inch thick plywood protection board. Any damage to existing roof shall be repaired by Contractor.
- B. Workmanship:
1. Roofing work shall be accomplished to fulfill requirements of the drawings and specifications. Any specific directions furnished by the manufacturer regarding the application of their materials shall be strictly followed.
 2. After starting work, Contractor is responsible for complete moisture integrity of the roofing and flashing membrane. Therefore, this Contractor shall:

- a. Not apply insulation or membrane under any conditions not suitable.
- b. Exercise care to ensure adequate quantities of materials are used.
- c. Maintain competent supervisor at the work site, with authority to discard unsuitable materials or remove unsatisfactory workers.
- d. Observe all precautions involving the storage and handling of roofing materials.

3.05 HANDLING, HEATING AND APPLICATION TEMPERATURE OF ASPHALT

- A. If pumper kettles only are used on the project, then the asphalt shall be delivered to the job site in cartons and/or cans.
- B. If tankers are used, the asphalt in the tanker shall not be heated to above 475 degrees F.
- C. The heating of asphalt should conform to the equiviscous temperature range concept (EVT).
- D. Never heat the asphalt to or above the actual Cleveland Open Cup (COC) flash point, (FPT).
- E. The asphalt manufacturer must label each carton of asphalt with the EVT and FPT temperatures.
- F. All asphalt delivered to the site shall meet ASTM D312 requirements according to testing conducted by an independent testing laboratory. This is the responsibility of the Contractor and costs of such tests are to be included in bid price.
- G. The application or embedment temperatures of asphalt shall be within 25 degrees F. of the equiviscous temperature (EVT) for optimum application.

3.06 INSULATION BOARD ATTACHMENT

- A. Rigid insulation to be loosely laid with all joints staggered and tightly butted. Insulation board to be cut to fit tightly around projections.
- B. Fasten insulation board with screw-and-plate type fasteners, minimum spacing to be one fastener every two square feet. If manufacturer's fastening requirements exceed those of this section, then manufacturer's recommendations are to be followed.
- C. Ensure the fasteners do not penetrate conduit or miscellaneous piping located at bottom of the decking.
- D. Insulation board attachment shall meet Factory Mutual research wind storm resistance classification 1-60.

3.07 INSULATION INSTALLATION - CONVENTIONAL APPLICATION

- A. Ensure vapor retarder is clean and dry, continuous, and ready for application of roofing system.
 - 1. Embed each layer of insulation into flood coat mopping of hot bitumen in accordance with roofing and insulation manufacturers' instructions.
- B. Lay subsequent layers of insulation with joints staggered minimum 6 inch 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. Do not apply more insulation than can be covered with membrane in same day.

3.08 VAPOR BARRIER INSTALLATION - CONVENTIONAL APPLICATION

- A. Mopped Two-ply Vapor Barrier applied over deck sheathing over metal and concrete decks:
 - 1. Apply primer at a rate of 1 gal/square and allow to dry.
 - 2. Mop surface with hot bitumen and embed two plies of vapor retarder felt; lap plies 19 inches, full mop each ply.
 - 3. Apply bitumen at 20 lb/square.
 - 4. Glaze top surface of the vapor retarder with bitumen if insulation is not placed immediately.

- B. Extend vapor barrier under cant strips and blocking.
- C. Install flexible flashing from vapor retarder to air seal material of wall construction, lap and seal to provide continuity of the air barrier plane.

3.09 MEMBRANE INSTALLATION

- A. Over insulation, apply five plies of roofing felt set in hot (at EVT) asphalt as specified to yield a 7.4 inch exposure using one meter wide felt and 6.8 inches using 36 inches wide felts.
- B. Install each felt so that it shall be firmly and uniformly set, without voids, into the hot (within 25 degrees F of EVT). Type II (flat) asphalt applied just before the felt at a nominal uniform rate of 25 lbs/100 sq ft +/- 25 percent.
- C. Felts are to be broomed into the hot asphalt with a soft bristle push-broom.
- D. Do not walk directly on felts for a minimum of 20 minutes to allow for proper adhesion of the felts.
Note: No phased construction is to be allowed. The roof section is to be completed with a full five-ply application at the end of each working day. If it should become necessary to employ a phased application due to a sudden rainstorm, the temporarily installed felts will be removed prior to a full five-ply application. Note: All felts shall be installed so that the head laps will be with the flow of water.
- E. Install five plies of fiberglass finishing felts extending to the top of the cant and trimmed level.

3.10 BASE FLASHINGS

- A. Install two plies of fiberglass backer felt in solid moppings of Type III (steep) asphalt, extending four and six inches onto the field of the membrane construction and extending up the vertical surface a minimum of eight inches.
- B. Apply granular-surfaced modified bitumen base flashings, extending eight inches onto the field of the membrane construction, and extending up the vertical section a minimum of eight inches. All base flashings shall be installed by heat-fusing or solid asphalt (Type III) mopping the material to the substrate and, while pliable, rubbing it in so as to achieve intimate contact. The horizontal seam of the completed base flashing shall then be mechanically fastened using simplex-type nails with one-inch disc heads eight inches on center.
- C. Apply a solid troweling of asphalt roof cement to the exposed heads of the mechanical fasteners and along the horizontal edge and, while pliable, embed a four-inch width of fiberglass reinforcing fabric.
- D. Install self-adhering membrane or 45 mil EPDM to cover the base flashings, as shown in the detail drawings. Secure with simplex-type nails with 1 inch disc heads.

3.11 FLOOD AND GRAVEL APPLICATION

- A. Embed not less than 400 lbs/100 sq ft of clean, river washed aggregate conforming to ASTM D 1863 requirements into Type II asphalt, using not less than 60 lbs/100 sq ft of roof area. Note: Wet or dirty aggregate is not to be used and should be discarded.
- B. Care should be taken to ensure that the aggregate is embedded within five to seven seconds of the application of the asphalt flood coat.
- C. Surfaces scheduled to receive roofing gravel are to be free of standing water, dew, or loose debris.

3.12 PITCH PANS

- A. Install pitch pans with the flanges embedded in asphalt roof cement.
- B. Prime top of metal flanges, then install three stripping plies of fiberglass felts, in hot asphalt.
- C. Fill the inside of pitch pan with cut-to-fit, rigid fiberboard insulation, and the top two inches with two-part pourable sealer.

3.13 ASPHALT ATTACHMENT

- A. Insulation is to be installed in a solid mopping of hot Type III (steep) asphalt within 25 degrees of manufacturer's recommended EVT, staggered 50 percent from proceeding layer and applied at a rate of 25 lbs/100 sq ft minimum.
- B. Insulation boards are to be "stepped in" continuously to ensure 100 percent adhesion.
- C. Insulation is to be installed with all joints staggered and tightly butted. Insulation is to fit tightly around projections.
- D. Any gaps larger than 1/4 inch are to be filled with similar material.

3.14 VERIFICATION

- A. Upon completion of the installation in each area, visually inspect and verify that all components are complete and properly installed. Verify that fasteners are properly located and securely anchored.

3.15 CLEAN UP

- A. The Contractor shall clear the construction areas and shall provide for the removal from the building site of all his construction debris.
- B. All debris shall be removed from the premises promptly and the construction area left clean daily. Keep all drains clear of debris and in proper order at the end of each working day.
- C. At the completion of the contract, the Contractor is to remove all excess materials and equipment related to his contract.

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, downspouts, and exterior penetrations.
- B. Sealants for joints within sheet metal fabrications.
- C. Precast concrete splash pads.

1.02 REFERENCE STANDARDS

- A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.
- B. ASTM A755/A755M - Standard Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products; 2018 (Reapproved 2024).
- C. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
- D. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- E. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007 (Reapproved 2024).
- F. CDA A4050 - Copper in Architecture - Handbook; Current Edition.
- G. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.
- H. ANSI/SPRI/FM 4435/ES-1 - Wind Resistance Resting for Roof Edge Systems

1.03 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.
- C. Provide testing in compliance with ES-1.

1.04 QUALITY ASSURANCE

- A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.

1.05 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. 316 Stainless Steel (SMF-3): ASTM A666, soft temper, 28 gauge, (0.0156 inch) (0.40 mm) thick, smooth No. 4 - Brushed.

2.02 PREFINISHED ALUMINUM SHEETS

- A. Description (SMF-2): Factory-applied topcoat systems applied to aluminum flat sheet substrates prior to fabrication by coil coating; topcoat systems consist of primers and organic topcoats on exposed side and backing coats on unexposed side.

- B. Aluminum Sheet Substrates: ASTM B209/B209M, alloy and temper as recommended by manufacturer for application.
- C. Superior Performance Organic Coating System: Comply with AAMA 2605 for aluminum preparation, pretreatment, primer and finish coat system; provide thermally cured 70-percent PVDF fluoropolymer systems; tested for weathering for 10 years with 5 delta units color change maximum.
- D. Drawing Detail: As indicated on drawings.
- E. Base Metal Thickness: 0.032 inch (0.81 mm), minimum.
- F. Color: As selected by Architect from manufacturer's standard colors.

2.03 PREPAINTED, METALLIC-COATED STEEL SHEETS

- A. Description (SMF-1): Factory-applied coatings applied to metallic-coated steel sheet substrates prior to fabrication by coil coating; topcoat systems consist of primers and organic topcoats on exposed, top side of sheet; washcoats on bottom, unexposed sheet side.
- B. Comply with ASTM A755/A755M.
- C. Metallic-Coated Steel Sheet Substrates:
- D. Substrate Preparation for Prefinishing: Clean and prepare substrate surfaces in accordance with coating manufacturer's recommendations for substrate type and application.
- E. Washcoats or Backercoats: Provide washcoats or backercoats in accordance with organic coating manufacturer's recommendations.
- F. Primer Coats: Provide basecoat primers in accordance with coating manufacturer's recommendations for substrate type, topcoat, and application.
- G. Superior Performance Organic Coating System: Provide thermally cured 70-percent PVDF or FEVE fluoropolymer systems in accordance with AAMA 2605, tested for weathering for 10 years with 5 delta units maximum of color change.
- H. Drawing Detail: As indicated on drawings.
- I. Base Metal Thickness: 24 gauge, 0.024 inch (0.61 mm), minimum.
- J. Color: As selected by Architect from manufacturer's standard colors.

2.04 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.

2.05 GUTTERS AND DOWNSPOUTS

- A. Downspouts (DOWNSPOUT-1): Rectangular profile, open face.
- B. Accessories: Profiled to suit gutters and downspouts.
 - 1. Anchorage Devices: In accordance with SMACNA (ASMM) requirements.
- C. Splash Pads (SPLASH-1): Precast concrete type, of size and profiles indicated; minimum 3000 psi (21 MPa) at 28 days, with minimum 5 percent air entrainment.

1. Basis of Design: Amcon Splash Blocks: www.tccmaterials.com.
- D. Seal metal joints.

2.06 ACCESSORIES

- A. Fasteners: Galvanized steel, with soft neoprene washers.
- B. Primer Type: Zinc chromate.
- C. Concealed Sealants: Non-curing butyl sealant.
- D. Exposed Sealants: ASTM C920; elastomeric sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; color to match adjacent material.
- E. Asphalt Roof Cement: ASTM D4586/D4586M, Type I, asbestos-free.

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, and 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, 0.015 inch (0.38 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, and 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.

END OF SECTION

SECTION 07 7200 - ROOF ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Roof hatches.

1.02 REFERENCE STANDARDS

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2017.
- D. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2025.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used.
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
 - 4. Maintenance requirements.
- C. Shop Drawings: Submit detailed layout developed for this project and provide dimensioned location and number for each type of roof accessory.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store products under cover and elevated above grade.

PART 2 PRODUCTS

2.01 ROOF HATCHES AND VENTS

- A. Roof Hatch Manufacturers:
 - 1. Activar Construction Products Group, Inc. - JL Industries: www.activarcpg.com.
 - 2. Acudor Products Inc: www.acudor.com.
 - 3. Babcock-Davis: www.babcockdavis.com.
 - 4. BILCO Company: www.bilco.com.
 - 5. Nystrom, Inc: www.nystrom.com.
 - 6. Substitutions: See Section 01 6000 - Product Requirements.
- B. Roof Hatches and Smoke Vents: Factory-assembled aluminum frame and cover, complete with operating and release hardware.
 - 1. Type:
 - a. (RF HATCH-1): Regular Roof Hatch.
 - b. (RF HATCH-2): Impact Resistant; to meet ICC-500 impact rating.
 - 1) Basis of Design: Cyclone Roof Hatch by RPH Products: www.rphproducts.com.

2. Style: Provide flat metal covers unless otherwise indicated.
 3. Mounting Substrate: Provide frames and curbs suitable for mounting on metal deck and concrete.
 4. Size: As indicated on drawings; single-leaf style unless otherwise indicated.
 5. For Ships Ladder Access: Single leaf; 30 by 54 inches (762 by 1372 mm).
 6. Capable of supporting 40 psf (1.92 kPa) live load.
 7. Insulation: Manufacturer's standard 3 inch (76 mm) rigid glass fiber.
 8. Gasket: Neoprene, continuous around cover perimeter.
- C. Safety Railing System: Roof hatch safety rail system mounted directly to curb without penetration of roofing system.

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.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using methods recommended by manufacturer for achieving acceptable results for applicable substrate under project conditions.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions, in manner that maintains roofing system weather-tight integrity.

3.04 CLEANING

- A. Clean installed work to like-new condition.

3.05 PROTECTION

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

SECTION 07 8123 - INTUMESCENT FIRE PROTECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

1.02 RELATED REQUIREMENTS

- A. Section 05 1200 - Structural Steel Framing.

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 E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2024.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittals procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Performance characteristics and test results.
 - 2. Preparation instructions and recommendations.
 - 3. Storage and handling requirements and recommendations.
 - 4. Installation methods.
- C. Verification Samples: For each thickness, color, sheen, and finish required, submit samples not less than 4 inches (102 mm) square on designated substrate illustrating finished appearance.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. See Section 01 7419 - Construction Waste Management and Disposal for packaging waste requirements.
- B. Deliver materials in manufacturer's original, unopened containers with identification labels and testing agency markings intact and legible.
- C. Store products in manufacturer's unopened packaging until ready for installation.
 - 1. Store at temperatures not less than 50 degrees F (10 degrees C) in dry, protected area.
 - 2. Protect from freezing, and do not store in direct sunlight.
 - 3. Dispose of any materials that have come into contact with contaminants of any kind prior to application.
- D. 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. Protect areas of application from windblown dust and rain.
- B. Maintain ambient field conditions, such as temperature, humidity, and ventilation, within limits recommended by manufacturer for optimum results. Do not install products under ambient conditions outside manufacturer's absolute limits.
 - 1. Provide temporary enclosures as required to control ambient conditions.
 - 2. Do not apply intumescent fireproofing when ambient temperatures are below 50 degrees F (10 degrees C) without specific approval from manufacturer.
 - 3. Ensure that relative humidity is between 40 and 60 percent in areas of application.
 - 4. Provide ventilation in enclosed spaces during application and for not less than 72 hours afterward.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Intumescent Thin-Film Fire Protection for Metal:
 - 1. Albi Manufacturing Division of StanChem Inc: www.albi.com.
 - 2. Contego International, Inc: www.contegointernational.com.
 - 3. Basis of Design: Hilti, Inc: www.us.hilti.com.
 - 4. Isolatek International Corp: www.isolatek.com.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 MATERIALS

- A. Fire Resistive Coating System (FR PRF-20): Thin-film intumescent fire protection system for structural steel, gypsum board, wood, oriented strand board (OSB), concrete, and concrete masonry units (CMU).
 - 1. Surface Burning Characteristics: Class A, flame spread/smoke developed index of 25/450, maximum, when tested in accordance with ASTM E84.
 - 2. For Interior Use:
 - a. Use only water-based products.
 - b. Use only products without fiber content.
 - c. VOC Content: Less than 100 g per L when tested in accordance with 40 CFR 59, Subpart D (EPA Method 24).
 - 3. For Exterior Use:
 - a. Use only water-based products.
 - b. Use only products without fiber content.
- B. Sealers and Primer: As required by tested and listed assemblies, and recommended by fireproofing manufacturer to suit specific substrate conditions.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates to determine if they are in satisfactory condition to receive intumescent fire protection; verify that substrates are clean and free of oil, grease, incompatible primers, or other foreign substances capable of impairing bond to fireproofing system.
- B. Do not begin installation until substrates have been properly prepared.
- C. If substrate preparation is responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- A. Thoroughly clean surfaces to receive fireproofing.
- B. Repair substrates to remove surface imperfections that could effect uniformity of texture and thickness of fireproofing system, and remove minor projections and fill voids that could telegraph through finished work.
- C. Cover or otherwise protect other work that might be damaged by fallout or overspray of fireproofing system, and provide temporary enclosures as necessary to confine operations and maintain required ambient field conditions.

3.03 APPLICATION

- A. Comply with manufacturer's instructions for each particular intumescent fire protection system installation application as indicated.

- B. Apply manufacturer's recommended primer to required coating thickness.
- C. Apply fireproofing to full thickness over entire area of each substrate to be protected.
- D. Apply coats at manufacturer's recommended rate to achieve dry film thickness (DFT) as required for fire resistance ratings designated for each condition.
- E. Apply intumescent fire protection by spraying to maximum extent possible, and as necessary complete coverage by roller application or other method acceptable to manufacturer.
- F. Achieve uniform finished appearance complying with approved samples.

3.04 CLEANING

- A. See Section 01 7000 - Execution and Closeout Requirements for additional requirements.
- B. Immediately after installation of fireproofing in each area, remove overspray and fallout from other surfaces and clean soiled areas.

3.05 PROTECTION

- A. Protect installed intumescent fire protection from damage due to subsequent construction activities, so fireproofing is without damage or deterioration before Date of Substantial Completion.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 07 8400 - FIRESTOPPING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Firestopping systems.
- B. Firestopping of joints and penetrations in fire-resistance-rated and smoke-resistant assemblies, whether indicated on drawings or not, and other openings indicated.

1.02 REFERENCE STANDARDS

- A. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2024.
- B. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2024.
- C. ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems; 2024.
- D. ASTM E2307 - Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-Story Test Apparatus; 2025b.
- E. ASTM E2837 - Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed between Rated Wall Assemblies and Nonrated Horizontal Assemblies; 2023a, with Editorial Revision (2024).
- F. ITS (DIR) - Directory of Listed Products; current edition.
- G. FM (AG) - FM Approval Guide; Current Edition.
- H. UL 1479 - Standard for Fire Tests of Penetration Firestops; Current Edition, Including All Revisions.
- I. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems; Current Edition, Including All Revisions.
- J. UL (DIR) - Online Certifications Directory; Current Edition.
- K. UL (FRD) - Fire Resistance Directory; Current Edition.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance ratings, and limitations.
- C. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Certificate from authority having jurisdiction indicating approval of materials used.
- F. Manufacturer's qualification statement.
- G. Installer's qualification statement.

1.04 QUALITY ASSURANCE

- A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.
 - 1. Listing in UL (FRD), FM (AG), or ITS (DIR) will be considered as constituting an acceptable test report.
 - 2. Valid evaluation report published by ICC Evaluation Service, Inc. (ICC-ES) at www.icc-es.org will be considered as constituting an acceptable test report.
 - 3. Submission of actual test reports is required for assemblies for which none of the above substantiation exists.

- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section and:
 - 1. Verification of minimum three years documented experience installing work of this type.
- D. Firestop sealants upon curing, shall not re-emulsify, dissolve, leach, breakdown or otherwise be damaged over time from exposure to atmospheric moisture, sweating pipes, ponding water or other forms of moisture characteristic in a building's normal operating life.
- E. Firestop sealants selected shall be sufficiently flexible to accommodate motion such as pipe vibration, water-hammer, thermal expansion, and other normal building movement, without damage to the seal.
- F. One manufacturer shall supply all firestopping material to the extent possible.
- G. All firestop materials shall be installed prior to expiration of shelf life.

1.05 COORDINATION

- A. Schedule firestopping after installation of penetrants, but prior to concealing the openings.
- B. Firestopping shall precede gypsum board finishing.

1.06 FIELD CONDITIONS

- A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation; maintain minimum temperature before, during, and for three days after installation of materials.
- B. Provide ventilation in areas where solvent-cured materials are being installed.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Firestopping Manufacturers:
 - 1. 3M Fire Protection Products: www.3m.com/firestop.
 - 2. A/D Fire Protection Systems Inc: www.adfire.com.
 - 3. Hilti, Inc: www.us.hilti.com.
 - 4. Nelson FireStop Products: www.nelsonfirestop.com.
 - 5. Specified Technologies Inc: www.stifirestop.com.
 - 6. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com.
 - 7. Substitutions: See Section 01 6000 - Product Requirements.

2.02 MATERIALS

- A. Firestopping Materials: Any materials meeting requirements.
- B. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Provide type of materials as required for tested firestopping assembly.
- C. Fire Ratings: Refer to drawings for required systems and ratings.

2.03 FIRESTOPPING ASSEMBLY REQUIREMENTS

- A. Perimeter Fire Containment Firestopping: Use system that has been tested according to ASTM E2307 to have fire resistance F Rating equal to required fire rating of floor assembly.
 - 1. Movement: Provide systems that have been tested to show movement capability as indicated.
 - 2. Temperature Rise: Provide systems that have been tested to show T Rating as indicated.
 - 3. Air Leakage: Provide systems that have been tested to show L Rating as indicated.
 - 4. Where floor assembly is not required to have a fire rating, provide systems that have been tested to show L Rating as indicated.

- B. Head-of-Wall (HW) Joint System Firestopping at Joints Between Fire-Rated Wall Assemblies and Non-Rated Horizontal Assemblies: Use system that has been tested according to ASTM E2837 to have fire resistance F Rating equal to required fire rating of wall assembly.
 - 1. Movement: Provide systems that have been tested to show movement capability as indicated.
- C. Floor-to-Floor (FF), Floor-to-Wall (FW), Head-of-Wall (HW), and Wall-to-Wall (WW) Joints, Except Perimeter, Where Both Are Fire-Rated: Use system that has been tested according to ASTM E1966 or UL 2079 to have fire resistance F Rating equal to required fire rating of the assembly in which the joint occurs.
 - 1. Movement: Provide systems that have been tested to show movement capability as indicated.
 - 2. Air Leakage: Provide systems that have been tested to show L Rating as indicated.
 - 3. Watertightness: Provide systems that have been tested to show W Rating as indicated.
 - 4. Listing by FM (AG), ITS (DIR), UL (DIR), or UL (FRD) in their certification directories will be considered evidence of successful testing.
- D. Through Penetration Firestopping: Use system that has been tested according to ASTM E814 to have fire resistance F Rating equal to required fire rating of penetrated assembly.
 - 1. Temperature Rise: Provide systems that have been tested to show T Rating as indicated.
 - 2. Air Leakage: Provide systems that have been tested to show L Rating as indicated.
 - 3. Watertightness: Provide systems that have been tested to show W Rating as indicated.
 - 4. Listing by FM (AG), ITS (DIR), UL (DIR), or UL (FRD) in their certification directories will be considered evidence of successful testing.

2.04 FIRESTOPPING SYSTEMS

- A. Firestopping (FR STOP): Any material meeting requirements.
 - 1. Fire Ratings: Use system that is listed by FM (AG), ITS (DIR), or UL (FRD) and tested in accordance with ASTM E814, ASTM E119, or UL 1479 with F Rating equal to fire rating of penetrated assembly and minimum T Rating Equal to F Rating and in compliance with other specified requirements.

PART 3 EXECUTION

3.01 CONDITIONS REQUIRING FIRESTOPPING

- A. General: Provide firestopping for conditions specified whether or not firestopping is indicated, and if indicated, whether such materials designated as insulation, safing, or otherwise.
- B. Through-Penetration: Firestopping shall be installed in all open penetrations and in the annular space in all penetrations in any bearing or non-bearing fire-rated barrier.
- C. Membrane-Penetration: Where required by code, all membrane-penetrations in rated walls shall be protected with firestopping products that meet the requirements of third party time/temperature testing.
- D. Construction Joints/Gaps: Firestopping shall be provided at all fire rated walls as indicated on project drawings.
 - 1. Between the tops of walls and the underside of floors.
 - 2. In expansion joints at fire rated walls.
 - 3. In any penetration through fire rated wall, fill gaps and spaces with fire stopping material sufficient to maintain intended wall rating.
 - 4. Smoke-Stopping: As required by the other sections, smoke-stops shall be provided for through-penetrations, membrane-penetrations, and construction gaps with a material approved and tested for such application.

3.02 EXAMINATION

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

3.03 PREPARATION

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other materials that could adversely affect bond of firestopping material.
- B. Remove incompatible materials that could adversely affect bond.
- C. Install backing materials to prevent liquid material from leakage.

3.04 INSTALLATION

- A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.
- B. Do not cover installed firestopping until inspected by authorities having jurisdiction.
- C. Install labeling required by code.

3.05 MARKING AND IDENTIFICATION

- A. Fire walls, fire barriers, fire partitions, smoke barriers and smoke partitions or any other wall required to have protected openings or penetrations shall be effectively and permanently identified with signs or stenciling. Such identification shall:
 - 1. Be located in accessible concealed floor, floor-ceiling or attic spaces;
 - 2. Be located within 15 feet (4572 mm) of the end of each wall and at intervals not exceeding 30 feet (9144 mm) measured horizontally along the wall or partition; and
 - 3. Include lettering not less than 3 inches (76 mm) in height with a minimum 3/8 inch (9.5 mm) stroke in a contrasting color incorporating the suggested wording. "FIRE AND/OR SMOKE BARRIER-PROTECT ALL OPENINGS" or other wording.

3.06 CLEANING

- A. Clean adjacent surfaces of firestopping materials.

3.07 PROTECTION

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

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 09 2116 - Gypsum Board Assemblies: Sealing acoustical and sound-rated walls and ceilings.

1.03 REFERENCE STANDARDS

- A. ASTM C794 - Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants; 2018 (Reapproved 2022).
- B. ASTM C834 - Standard Specification for Latex Sealants; 2017 (Reapproved 2023).
- C. ASTM C1087 - Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems; 2023.
- D. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2025.
- E. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants; 2002 (Reapproved 2013).
- F. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2015e1.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Submit manufacturer's technical datasheets for each product to be used; include 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 sufficient samples to manufacturer for testing.
5. Report manufacturer's recommended corrective measures, if any, including primers or techniques not indicated in product data submittals.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Nonsag Sealants:
 1. Bostik Inc: www.bostik-us.com.
 2. Dow Chemical Company: consumer.dow.com/en-us/industry/ind-building-construction.html.
 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. Sherwin-Williams Company: www.sherwin-williams.com.
 7. Sika Corporation: www.usa-sika.com.
 8. Specified Technologies Inc: www.stifirestop.com.
 9. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com.
 10. W.R. Meadows, Inc: www.wrmeadows.com.
 11. Substitutions: See Section 01 6000 - Product Requirements.
- B. Self-Leveling Sealants:
 1. Bostik Inc: www.bostik-us.com.
 2. Dow Chemical Company: consumer.dow.com/en-us/industry/ind-building-construction.html.
 3. Pecora Corporation: www.pecora.com.
 4. Sherwin-Williams Company: www.sherwin-williams.com.
 5. Sika Corporation: www.usa-sika.com.
 6. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.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:
 - a. Do not seal exterior joints unless indicated on drawings as sealed.
 - b. Seal open joints except open joints indicated on drawings as not sealed.
 2. Interior Joints:
 - a. Do not seal interior joints indicated on drawings as not sealed.
 - b. Do not seal gaps and openings in gypsum board and suspended ceilings
 - c. Do not seal through-penetrations in sound-rated assemblies that are also fire-rated assemblies.
 - d. Seal open joints except specific open joints indicated on drawings as not sealed.
 3. Do Not Seal:
 - a. Intentional weep holes in masonry.
 - b. Joints indicated to be covered with expansion joint cover assemblies.
 - c. Joints where sealant is specified to be furnished and installed by manufacturer of product to be sealed.
 - d. Joints where sealant installation is specified in other sections.
 - e. Joints between suspended ceilings 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 Wet Areas: Non-sag polyurethane sealant for continuous liquid immersion.
 - 2. Floor Joints in Wet Areas: Non-sag polyurethane "non-traffic-grade" sealant suitable for continuous liquid immersion.
 - 3. Joints between Fixtures in Wet Areas and Floors, Walls, and Ceilings: Mildew-resistant silicone sealant; white.
 - 4. In Sound-Rated Assemblies: Acrylic emulsion latex sealant.
 - 5. Narrow Control Joints in Interior Concrete Slabs: Self-leveling epoxy sealant.
 - 6. Other Floor Joints: Self-leveling polyurethane "traffic-grade" sealant.
- D. 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): Joint sealant or caulking with or without backer rod. 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. Color: To be selected by Architect from manufacturer's standard range.
 - 2. Cure Type: Multi-component, neutral curing.
 - 3. Service Temperature Range: Minus 20 to 180 degrees F (Minus 29 to 82 degrees C).
- B. Acrylic Emulsion Latex: Water-based; ASTM C834, single component, nonstaining, nonbleeding, non-sagging; not intended for exterior use.
 - 1. Color: To be selected by Architect from manufacturer's standard range.
 - 2. Grade: ASTM C834; Grade 0 Degrees F (Minus 18 Degrees C).

2.05 SELF-LEVELING JOINT 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: Multicomponent, 100 percent solids by weight.
 - 2. Durometer Hardness: Minimum of 85 for Type A or 35 for Type D, after seven days when tested in accordance with ASTM D2240.
 - 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.
- B. Semi-Rigid Self-Leveling Polyurea Joint Filler: Two-component, 100 percent solids; intended for filling cracks and control joints not subject to significant movement; rigid enough to support concrete edges under traffic.
 - 1. Durometer Hardness, Type A: 80, minimum, after seven days when tested in accordance with ASTM D2240.

2. Color: Warmstone.
3. Basis of Design: Metzger/McGuire; Edge-Pro 80 Semi-Rigid Polyurea Joint Filler:
www.metzgermcguire.com.

2.06 ACCESSORIES

- A. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.
- B. Masking Tape: Self-adhesive, nonabsorbent, nonstaining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.
- C. Joint Cleaner: Noncorrosive and nonstaining type, type recommended by sealant manufacturer; compatible with joint forming materials.
- D. Primers: Type recommended by sealant manufacturer to suit application; nonstaining.

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 an inconspicuous area to verify that it does not stain or discolor slab.

3.03 INSTALLATION

- A. Install this work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Provide joint sealant installations complying 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 07 9513 - EXPANSION JOINT COVER ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Expansion joint cover assemblies for floor, wall, ceiling, and soffit surfaces.

1.02 RELATED REQUIREMENTS

- A. Section 09 2116 - Gypsum Board Assemblies: Gypsum board control joint trim.

1.03 REFERENCE STANDARDS

- A. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
- B. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.
- C. ASTM B308/B308M - Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles; 2020.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate joint and splice locations, miters, layout of the work, affected adjacent construction and anchorage locations.
- C. Manufacturer's Installation Instructions: Indicate rough-in sizes and required tolerances for item placement.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Expansion Joint Cover Assemblies:
 - 1. Construction Specialties, Inc: www.c-sgroup.com.
 - 2. Inpro: www.inprocorp.com.
 - 3. MM Systems Corp: www.mmsystemscorp.com.
 - 4. Nystrom, Inc: www.nystrom.com.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 EXPANSION JOINT COVER ASSEMBLIES

- A. Expansion Joint Cover Assemblies - General: Factory-fabricated and assembled; designed to completely fill joint openings, sealed to prevent passage of air, dust, water, smoke; suitable for traffic expected.
 - 1. Basis of Design: Construction Specialties, Inc.
 - a. (EXP JT-1): VF Series (Exterior Joints Compressible Foam).
 - b. (EXP JT-2): AFW Series (Interior, Flush Mount, Fire Rated).
 - c. (EXP JT-3): FWF Series (Interior Joints 1-2 inches).
 - d. (EXP JT-4): ASM Series (Interior, Surface Mount).
 - 2. Joint Dimensions and Configurations: As indicated on drawings.
 - 3. Joint Cover Sizes: Selected to suit joint width and configuration, based on manufacturer's published recommendations and limitations.
 - 4. Lengths: Provide covers in full lengths required; avoid splicing wherever possible.
 - 5. Anchors, Fasteners, and Fittings: Provided by cover manufacturer.

2.03 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper; or ASTM B308/B308M, 6061 alloy, T6 temper.
- B. Threaded Fasteners: Aluminum.
- C. Backing Paint for Aluminum Components in Contact with Cementitious Materials: Asphaltic type.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that joint preparation and dimensions are acceptable and in accordance with manufacturer's requirements.

3.02 INSTALLATION

- A. Install components and accessories in accordance with manufacturer's instructions.
- B. Align work plumb and level, flush with adjacent surfaces.
- C. Rigidly anchor to substrate to prevent misalignment.

3.03 PROTECTION

- A. Do not permit traffic over unprotected floor joint surfaces.

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. Tornado-resistant hollow metal doors and frames.
- F. 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 - 2010 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; 2024.
- C. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2023.
- D. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2025.
- E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2017.
- 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; 2016.
- 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; 2023.
- H. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2020.
- I. ASTM C476 - Standard Specification for Grout for Masonry; 2018.
- 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 (Reapproved 2021).
- K. BHMA A156.115 - Hardware Preparation in Steel Doors and Frames; 2016.
- L. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- M. ITS (DIR) - Directory of Listed Products; current edition.
- N. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.
- O. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2024.
- P. NAAMM HMMA 840 - Guide Specifications for Receipt, Storage and Installation of Hollow Metal Doors and Frames; 2024.

- Q. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames; 2014.
- R. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2025.
- S. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2022.
- T. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames; 2023.
- U. UL (DIR) - Online Certifications Directory; Current Edition.
- V. 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 products specified in this section, with not less than three years documented experience.
- B. Maintain at project site copies of reference standards relating to installation of products specified.

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. Basis of Design: Steelcraft, an Allegion brand: www.steelcraft.com.
 - 2. Other Acceptable Manufactures provided they meet or exceed the Basis of Design performance requirements:
 - a. Ceco Door or Curries, an Assa Abloy Group company: www.cecodoor.com.
 - b. Republic Doors, an Allegion brand: www.republicdoor.com.
 - c. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS

- A. Requirements for Hollow Metal Doors and Frames:
 - 1. Steel Sheet: Comply with one or more of the following requirements; galvanized steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with 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: Manufacturer's 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.
 9. Zinc Coating for Typical Interior and/or Exterior Locations: Provide metal components zinc-coated (galvanized) and/or zinc-iron alloy-coated (galvannealed) by the hot-dip process in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness, unless noted otherwise for specific hollow metal doors and frames.
 - a. Based on SDI Standards: Provide at least A40/ZF120 (galvannealed) when necessary, coating not required for typical interior door applications, and at least A60/ZF180 (galvannealed) for corrosive locations.
- 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. Basis of Design: Steelcraft Series L18.
 2. 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: 14 gauge, 0.067 inch (1.7 mm), minimum.
 - e. Zinc Coating: A60/ZF180 galvannealed coating; ASTM A653/A653M.
 3. Door Thickness: 1-3/4 inches (44.5 mm), nominal.
 4. Door Finish: Factory primed and field finished.
 5. Maximum U-Factor: 0.370.
- 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 gauge, 0.053 inch (1.3 mm), minimum.

2. Door Core Material: Manufacturers standard core material/construction and in compliance with requirements.
 3. Door Thickness: 1-3/4 inches (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 gauge, 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. Door Core Material: Manufacturers standard core material/construction in compliance with requirements.
 4. Door Thickness: 1-3/4 inches (44.5 mm), nominal.
- D. Tornado-Resistant Doors (Impact Protected):
1. Design and size door and frame components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M.
 - a. Design Wind Loads: Comply with requirements of authorities having jurisdiction.
 - b. Wind-Borne Debris Resistance: Door and frame components shall have UL (DIR) approval for Large and Small Missile impact and pressure cycling at design wind loads.
 2. Tornado Shelter Application: Comply with ICC 500 standard.
 3. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 4 - Maximum-duty.
 - b. Physical Performance Level A, 1,000,000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Model 1 - Full Flush.
 - d. Door Face Metal Thickness: 14 gauge, 0.067 inch (1.7 mm), minimum.
 4. Door Core Material: Manufacturers standard core material/construction and in compliance with requirements.
 5. Door Finish: Factory primed and field finished.

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: Thermally insulated. Full profile/continuously welded type.
 - 1.
 2. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A60/ZF180 coating.
 3. Frame Metal Thickness: 14 gauge, 0.067 inch (1.7 mm), minimum.
 4. Weatherstripping: Separate, see Section 08 7100.
 5. U-Factor: 0.370 maximum.
- D. Interior Door Frames, Non-Fire Rated: Face welded type.

1. Frame Metal Thickness: 16 gauge, 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 gauge, 0.053 inch (1.3 mm), minimum; except 14 gage, 0.067 inch (1.7 mm) for masonry applications.
- F. Tornado-Resistant Door Frames: With same tornado resistance as door; face welded or full profile/continuously welded construction, ground smooth, fully prepared and reinforced for hardware installation.
 1. Frame Metal Thickness: 14 gauge, 0.067 inch (1.7 mm), minimum.
- G. Frames for Wood Doors: Comply with frame requirements in accordance with corresponding door.
- H. Borrowed Lites Glazing Frames: Construction and face dimensions to match door frames, and as indicated on drawings.
- I. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.
- J. Frames Wider than 48 inches (1219 mm): Reinforce with steel channel fitted tightly into frame head, flush with top.

2.05 FINISHES

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

2.06 ACCESSORIES

- A. Glazing: As specified in Section 08 8000.
- B. Grout for Frames: Mortar grout complying with ASTM C476 with maximum slump of 4 inches (102 mm) as measured in accordance with ASTM C143/C143M for hand troweling in place; plaster grout and thinner pumpable grout are prohibited.
- C. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.
- D. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

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. Install door hardware as specified in Section 08 7100.
- F. Comply with glazing installation requirements of Section 08 8000.
- 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 frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.
- B. Maximum Diagonal Distortion: 1/16 inch (1.6 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; fire-rated and 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. 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: 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. Samples: Submit two samples of door veneer, 6 x 6 inch (152 x 152 mm) in size illustrating wood grain, stain color, and sheen.
- E. Manufacturer's Installation Instructions: Indicate special installation instructions.
- F. Warranty, executed in St. Cloud School District 742's name.

1.05 QUALITY ASSURANCE

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

1.06 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, and inspect for damage.
- C. Protect doors with resilient packaging sealed with heat shrunk plastic; do not store in damp or wet areas or areas where sunlight might bleach veneer; seal top and bottom edges with tinted sealer if stored more than one week, and break seal on site to permit ventilation.

1.07 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Manufacturer Warranty: Provide manufacturer's warranty on interior doors for the life of the installation. Complete forms in St. Cloud School District 742's name and register with manufacturer.
 - 1. 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. Basis of Design: VT Industries, Inc: www.vtindustries.com.
2. Other Acceptable Manufactures provided they meet or exceed the Basis of Design performance requirements:
 - a. Oregon Door; Architectural Series: www.oregondoor.com.
 - b. Forte Opening Solutions; Aspiro Select Wood Veneer Doors: www.forteopenings.com.
 - c. Substitutions: See Section 01 6000 - Product Requirements.

2.02 DOORS

- A. Doors: See drawings for locations and additional requirements.
 1. Quality Standard: Custom Grade, Heavy Duty performance, in accordance with AWI/AWMAC/WI (AWS), 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. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with UL 10C - Positive Pressure; Underwriters Laboratories Inc (UL) or Intertek/Warnock Hersey (WHI) labeled without any visible seals when door is open.
 3. Wood veneer facing with factory transparent finish.

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: White 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. Provide sustainably harvested wood, sourced or labeled as specified in Section 01 6000.
- C. Provide composite wood containing no added formaldehyde. See Section 01 6116.
- D. 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.
- E. Where supplementary protective edge trim is required, install trim after veneer facing has been applied full-width.
- F. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
- G. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
- H. Provide edge clearances in accordance with the quality standard specified.

2.06 FINISHES - WOOD VENEER DOORS

- A. Finish work in accordance with AWI/AWMAC/WI (AWS), Section 5 - Finishing for grade specified and as follows:
 - 1. Transparent:
 - a. System - 9 UV Curable Acrylated Epoxy Polyester or Urethane.
 - b. Stain: Wheat by VT Industries.
 - c. Sheen: Satin.
- B. Seal door top edge with color sealer to match door facing.

2.07 ACCESSORIES

- A. Glazing: See Section 08 8000.
- B. Glazing Stops: Wood, of same species as door facing, mitered corners; prepared for countersink style tamper proof screws.
- C. Door Hardware: See Section 08 7100.

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.
- E. Coordinate installation of glazing.

3.03 TOLERANCES

- A. Comply with specified quality standard for fit and clearance tolerances.
- B. Comply with 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 1613 - FIBERGLASS DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fiberglass doors.
- B. Fiberglass door frames.

1.02 RELATED REQUIREMENTS

- A. Section 08 7100 - Door Hardware.

1.03 REFERENCE STANDARDS

- A. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2024.
- B. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position; 2022.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Obtain hardware templates from hardware manufacturer prior to starting fabrication.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide manufacturer's standard details, installation instructions, hardware and anchor recommendations.
- C. Shop Drawings: Indicate layout and profiles; include assembly methods.
 - 1. Indicate product components, including hardware reinforcement locations and preparations, accessories, finish colors, patterns, and textures.
 - 2. Indicate wall conditions, door and frame elevations, sections, materials, gauges, finishes, location of door hardware by dimension, and details of openings; use same reference numbers indicated on drawings to identify details and openings.
- D. Selection Samples: Submit two complete sets of color chips, illustrating manufacturer's available finishes, colors, and textures.
- E. Maintenance Data: Include instructions for repair of minor scratches and damage.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with minimum 5 years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified, with minimum 5 years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- B. Store materials in original packaging, under cover, protected from exposure to harmful weather conditions and from direct contact with water.
 - 1. Store at temperature and humidity conditions recommended by manufacturer.

2. Do not use non-vented plastic or canvas shelters.
 3. Immediately remove wet wrappers.
- C. Store in position recommended by manufacturer, elevated minimum 4 inches (100 mm) above grade, with minimum 1/4 inch (6 mm) space between doors.

1.08 FIELD CONDITIONS

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

1.09 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Manufacturer Warranty: Provide 5-year manufacturer warranty covering materials and workmanship, including degradation or failure due to chemical contact. Complete forms in St. Cloud School District 742's name and register with manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Laminated Fiberglass Doors:
 1. Special-Lite, Inc; AF-100 Smooth Pultruded Fiberglass Door with AF-150 Fiberglass Frame System: www.special-lite.com.
 2. Corrim Company: www.corrim.com.
 3. Substitutions: See Section 01 6000 - Product Requirements.

2.02 DOOR AND FRAME ASSEMBLIES

- A. Door and Frame Assemblies: Factory-fabricated, prepared and machined for hardware.
 1. Physical Endurance: Swinging door cycle test to ANSI/SDI A250.4, Level A (1,000,000 cycles) minimum; tested with hardware and fasteners intended for use on project.
 2. Screw-Holding Capacity: Tested to 890 pounds (404 kg), minimum.
 3. Surface Burning Characteristics: Flame spread index (FSI) of 0 to 25, Class A, and smoke developed index (SDI) of 450 or less, when tested in accordance with ASTM E84.
 4. Flammability: Self-extinguishing when tested in accordance with ASTM D635.
 5. Chemical Resistance: Resist degradation due to exposure to tap water and distilled water.
 - a. Chlorine-treated moisture in air.
 6. Clearance Between Door and Frame: 1/8 inch (3 mm), maximum.
 7. Clearance Between Bottom of Door and Finished Floor: 3/4 inch (19 mm), maximum; not less than 1/4 inch (6 mm) clearance to threshold.
 8. Provide frame anchors that allow for variation in rough opening size; allow doors and frames to be field cut up to 2 inch (50 mm) maximum to adjust for field conditions.

2.03 COMPONENTS

- A. Doors: Fiberglass construction with reinforced core.
 1. Type: As indicated on drawings.
 2. Thickness: 1-3/4 inch (44 mm), nominal.
 3. Core Material: Manufacturer's standard core material for application indicated.
 4. Construction:
 - a. Pultruded as single monolithic fiberglass reinforced plastic (FRP) panel.

5. Face Sheet Texture: Smooth.
6. Door Panel Configuration: As indicated on drawings.
7. Subframe and Reinforcements: Manufacturer's standard materials.
8. Waterproof Integrity: Provide factory fabricated edges, cut-outs, and hardware preparations of fiberglass reinforced plastic (FRP); provide cut-outs with joints sealed independently of glazing, louver inserts, or trim.
9. Hardware Preparations: Factory reinforce, machine, and prepare for door hardware including field installed items; provide solid blocking for each item; field cutting, drilling or tapping is not permitted; obtain manufacturer's hardware templates for preparation as necessary.

2.04 PERFORMANCE REQUIREMENTS

- A. Provide door assemblies that have been designed and fabricated in compliance with specified performance requirements.

2.05 FINISHES

- A. Painted: Two-part aliphatic polyurethane, low VOC industrial coating.
 1. Thickness: Minimum 5 mils, 0.005 inch (0.127 mm) wet thickness.
 2. Color: As indicated on drawings.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify actual dimensions of openings by field measurements before door fabrication; show recorded measurements on shop drawings.
- B. Do not begin installation until substrates have been properly prepared.

3.02 PREPARATION

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

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions; do not penetrate frames with anchors.
- B. Set units plumb, level, and true-to-line, without warping or racking doors, and with specified clearances; anchor in place.
- C. In masonry walls, install frames prior to laying masonry; anchor frames into masonry mortar joints; fill jambs with grout as walls are laid up.
- D. In stud walls, install frames prior to building walls; anchor frames to studs using concealed anchors.
- E. Separate aluminum and other metal surfaces from sources of corrosion of electrolytic action at points of contact with other materials.
- F. Repair or replace damaged installed products.

3.04 ADJUSTING

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

3.05 CLEANING

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

3.06 PROTECTION

- A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION

SECTION 08 1700 - INTEGRATED DOOR OPENING ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Factory-assembled and factory-finished hollow metal doors and frames, including hardware for door opening assemblies.

1.02 RELATED REQUIREMENTS

- A. Section 08 7100 - Door Hardware: Door hardware submittal requirements.
- B. Section 08 7100 - Door Hardware: Additional hardware to be installed on these doors.

1.03 REFERENCE STANDARDS

- A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2023.
- C. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2025.
- D. BHMA A156.32 - American National Standard for Integrated Swinging Door Opening Assemblies; 2023.
- E. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

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: Indicate details of each opening showing elevations, glazing, frame profiles, hardware, and different finish locations, if any.
- D. Door Hardware Schedule: Provided at end of section and containing detailed list of each hardware item to be provided on each integrated door opening; coordinate hardware furnished by others.
 - 1. See Section 08 7100 for additional submittal requirements.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver units preassembled and prefinished, with door hardware mounted and functioning, and packaged to protect contents from damage.
- B. Store in a clean, dry, and ventilated space having controlled temperature and relative humidity between 30 and 60 percent and in accordance with manufacturer's written instructions.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Integrated Door Opening Assemblies Manufacturers:
 - 1. Basis of Design: Sytegra, XT Series: www.syntegrausa.com.
 - 2. Adams Rite - The Rite Door, an Assa Abloy Group company: www.ritedoor.com
 - 3. Total Door Systems: www.totaldoor.com.
- B. Substitutions: See Section 01 6000 - Product Requirements.

2.02 ASSEMBLIES

- A. Door, Frame, and Hardware Assemblies: Provide fully functional, factory-assembled and factory-finished door opening units, complete with door, frame, and hardware; complying with BHMA A156.32 and specified requirements.
 - 1. Accessibility: Comply with ICC A117.1 and ADA Standards.
 - 2. Provide additional hardware; see Section 08 7100.
- B. Applications:
 - 1. Door opening assemblies include cross corridor as indicated on drawings.

2.03 PERFORMANCE REQUIREMENTS

- A. Comply with requirements of local building code and authorities having jurisdiction, and the following:
 - 1. Force to Open Interior Swinging Egress Doors, Non-Fire Doors: Not more than 5 lb (22.2 N).
 - 2. Force to Release Latch for Other Swinging Doors: Not more than 15 lb (67 N) to release latch, not more than 30 lb (133 N) to set door in motion, and not more than 15 lb (66.6 N) to swing door to full open position.

2.04 COMPONENTS

- A. Hollow Metal Doors: Doors complying with ANSI/SDI A250.8 construction requirements exceeding Level 3 and Physical Performance Level A, Model 1 - Full Flush; electrogalvanized prior to finishing; manufacturer's standard core and reinforcements.
 - 1. Door Thickness: 1-3/4 inches (44 mm).
 - 2. Level 3 Fire-Rated Doors: 16-gauge, 0.053-inch (1.3 mm) thick faces and edges.
- B. Hollow Metal Door Frames: Formed steel cased opening complying with ANSI/SDI A250.8 construction requirements exceeding Level 3 and Physical Performance Level A; electrogalvanized prior to finishing.
 - 1. Type: Full profile welded, 16 gauge, 0.053 inch (1.3 mm), primed for field finishing.
 - 2. Provide frame anchors for secure installation and to comply with opening performance requirements.

2.05 DOOR HARDWARE

- A. See Section 08 7100 for door hardware requirements.

2.06 FINISHES

- A. Doors and Frames:
 - 1. Primed Frames: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.
 - 2. Primed Doors: Where indicated on the door schedule as painted, rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.
 - 3. Doors: Where indicated on the door schedule as prefinished, provide Surfacequest Architectural Fusions to match WDP-#. Pushbar to match door finish. www.surfacequest.com.

2.07 ACCESSORIES

- A. Frame Spreader Bar: Provide for preassembled welded frames, unless otherwise indicated.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 INSTALLATION

- A. Install doors in accordance with manufacturer's requirements and the specified performance requirements.
- B. Coordinate frame anchor placement with wall construction.

3.03 TOLERANCES

- A. Clearances Between Door and Frame: As specified in ANSI/SDI A250.8.
- B. Maximum Diagonal Distortion: 1/16 in (1.5 mm) measured with straight edge, corner to corner.

3.04 ADJUSTING

- A. Adjust for smooth and balanced door movement.

END OF SECTION

SECTION 08 3100 - ACCESS DOORS AND PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Wall- and ceiling-mounted access 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 DOORS AND PANELS ASSEMBLIES

- A. Wall and Ceiling Mounted Units:
 - 1. Panel Material: Steel.
 - 2. Size: 24 inch by 24 inch (609 mm by 609 mm).
 - 3. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.
 - 4. Gypsum Board Mounting Criteria: Provide drywall bead frame with door surface flush with wall surface.
 - a. Basis of Design: DW-5040 Acudor Flush Drywall Access Door.
 - 5. Masonry Mounting Criteria: Provide surface-mounted frame with door surface flush with frame surface.
 - a. Basis of Design: BP-2002 Acudor Universal Flush Access Door with Hidden Flange.
- B. Wall-Mounted Units in Wet Areas:
 - 1. Panel Material: Steel, hot-dipped zinc, or zinc-aluminum-alloy coated.
 - 2. Size: 24 inch by 24 inch (609 mm by 609 mm).
 - 3. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.
 - 4. Gypsum Board Mounting Criteria: Provide drywall bead frame with door surface flush with wall surface.
 - a. Basis of Design: DW-5040 Acudor Flush Drywall Access Door.
 - 5. Masonry Mounting Criteria: Provide surface-mounted frame with door surface flush with frame surface.
 - a. Basis of Design: BP-2002 Acudor Universal Flush Access Door with Hidden Flange.
- C. Fire-Rated Wall-Mounted Units:
 - 1. Wall Fire-Rating: As indicated on drawings.
 - 2. Panel Material: Steel.
 - 3. Size: 24 inch by 24 inch (609 mm by 609 mm).
 - 4. Gypsum Board Mounting Criteria: Provide drywall bead frame with door surface flush with wall surface.

- a. Basis of Design: FB-5060 DW Acudor Fire-Rated Access Door.
- 5. Masonry Mounting Criteria: Provide surface-mounted frame with door surface flush with frame surface.
 - a. Basis of Design: FB-5060 Acudor Fire-Rated Uninsulated Access Door.

2.02 WALL- AND CEILING-MOUNTED ACCESS UNITS

- A. Manufacturers:
 - 1. ACUDOR Products Inc: www.acudor.com.
 - 2. Babcock-Davis: www.babcockdavis.com.
 - 3. Cendrex, Inc: www.cendrex.com.
 - 4. Karp Associates, Inc: www.karpinc.com.
 - 5. Nystrom, Inc; HVAC - Access Doors: www.nystrom.com/#sle.
 - 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.
 - 2. Frames: 16-gauge, 0.0598-inch (1.52 mm) minimum thickness.
 - 3. Single Steel Sheet Door Panels: 16-gauge, 0,0625-inch (1.6 mm) minimum thickness.
 - 4. Units in Fire-Rated Assemblies: Fire rating as required by applicable code for fire-rated assembly that access doors are being installed.
 - 5. Steel Finish: Primed.
 - 6. Size: As scheduled above unless otherwise indicated in the drawings.
 - 7. 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, and secure units rigidly in place.
- C. Position units to provide convenient access to concealed equipment when necessary.

END OF SECTION

SECTION 08 3313 - COILING COUNTER DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Non-fire-rated coiling counter doors and operating hardware.
- B. Electric motor operation; wiring from electric circuit disconnect to operator to control station.

1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Rough openings.

1.03 REFERENCE STANDARDS

- A. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.
- B. ITS (DIR) - Directory of Listed Products; current edition.
- C. NEMA MG 00001 - Motors and Generators; 2024.
- D. UL (DIR) - Online Certifications Directory; Current Edition.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Submit manufacturer's standard literature showing materials and details of construction and finish.
- C. Shop Drawings: Indicate rough and actual opening dimensions, anchorage methods, hardware locations, and installation details.
- D. Operation and Maintenance Data: Indicate modes of operation, lubrication requirements and frequency, and periodic adjustments required.
- E. Project Record Documents: Include as-built electrical diagrams for electrical operation and connection to fire alarm system.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Coiling Counter Doors:
 - 1. Overhead Door Corp: www.overheaddoor.com.
 - 2. The Cookson Company: www.cooksondoor.com.
 - 3. Cornell Iron Works, Inc: www.cornelliron.com.
 - 4. Alpine Overhead Doors, Inc.: www.alpinedoors.com.
 - 5. Raynor Garage Doors: www.raynor.com.
 - 6. Substitutions: See Section 01 6000 - Product Requirements.

2.02 COILING COUNTER DOORS

- A. Coiling Counter Doors, Non-Fire-Rated: Stainless steel slat curtain.
 - 1. Nominal Slat Size: 1-1/4 inches (32 mm) wide.
 - 2. Finish, Stainless Steel: No. 4 - Brushed.
 - 3. Hood Enclosure: Manufacturer's standard; primed steel.
 - 4. Electric operation.
 - 5. Coiling Door Type 4 - Basis of Design: 651 Series by Overhead Door Corp.

2.03 COMPONENTS

- A. Metal Curtain Construction: Interlocking, single-thickness slats.
 - 1. Slat Ends: Alternate slats fitted with end locks to act as wearing surface in guides and to prevent lateral movement.
 - 2. Curtain Bottom: Fitted with angles to provide reinforcement and positive contact in closed position.
 - 3. Stainless Steel Slats: ASTM A666/A666M, Type 304; minimum thickness 20 gauge, 0.04 inch (0.95 mm).
- B. Guide Construction: Continuous, of profile to retain door in place, with mounting brackets of same metal.
- C. Hood Enclosure: Internally reinforced to maintain rigidity and shape.
- D. Lock Hardware:
 - 1. For motor operated units, additional lock or latching mechanisms are not required.
- E. Roller Shaft Counterbalance: Steel pipe and torsion steel spring system, capable of producing torque sufficient to ensure smooth operation of curtain from any position and capable of holding position at mid-travel; with adjustable spring tension; requiring 25 lb (10 kg) nominal force to operate.

2.04 ELECTRIC OPERATION

- A. Operator, Controls, Actuators, and Safeties: Listed and classified by ITS (DIR), UL (DIR), or testing agency acceptable to authorities having jurisdiction (AHJ) as suitable for purpose specified and indicated.
 - 1. Provide interlock switches on motor operated units.
- B. Electric Operators:
 - 1. Basis of Design: RMX by Overhead Door Corp.
 - 2. Mounting: Above shaft mounting.
 - 3. Motor Enclosure: NEMA MG 00001.
 - 4. Motor Rating: As recommended by manufacturer; continuous duty.
 - 5. Motor Voltage: 110-120 VAC, single phase, 60 Hz.
 - 6. Opening Speed: 6 inches per second (150 mm/sec).
 - 7. Manual override in case of power failure.
- C. Control Station: Standard three button (OPEN-STOP-CLOSE) momentary control for each electrical operator.
 - 1. Controls: 24 VAC circuit.
 - 2. Surface mounted; Location: as indicated on drawings.
- D. Safety Edge: Located at bottom of curtain, full width, electro-mechanical sensitized type, wired to stop operator upon striking object, hollow neoprene covered.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that adjacent construction is suitable for door installation.
- B. Verify that door opening is plumb, header is level, and dimensions are correct.
- C. Notify Architect of any unacceptable conditions or varying dimensions.
- D. Commencement of installation indicates acceptance of substrate and door opening conditions.

3.02 INSTALLATION

- A. Install units in accordance with manufacturer's instructions.
- B. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.
- C. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.
- D. Fit and align assembly including hardware; level and plumb, to provide smooth operation.
- E. Coordinate installation of electrical service with Division 26.
- F. Complete wiring from disconnect to unit components.

3.03 TOLERANCES

- A. Maintain dimensional tolerances and alignment with adjacent work.
- B. Maximum Variation From Plumb: 1/16 inch (1.5 mm).
- C. Maximum Variation From Level: 1/16 inch (1.5 mm).
- D. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch per 10 ft (3 mm per 3 m) straight edge.

3.04 ADJUSTING

- A. Adjust operating assemblies for smooth and noiseless operation.

3.05 CLEANING

- A. Clean installed components.
- B. Remove labels and visible markings.

END OF SECTION

SECTION 08 3323 - OVERHEAD COILING DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Electric operators and control stations.
- B. Wiring from electric circuit disconnect to operators and control stations.

1.02 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- B. ITS (DIR) - Directory of Listed Products; current edition.
- C. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.
- D. NEMA ICS 2 - Industrial Control and Systems Controllers, Contactors and Overload Relays Rated 600 Volts; 2008 (Reaffirmed 2020).
- E. NEMA MG 00001 - Motors and Generators; 2024.
- F. UL (DIR) - Online Certifications Directory; Current Edition.
- G. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems; Current Edition, Including All Revisions.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide general construction, electrical equipment, and component connections and details.
- C. Shop Drawings: Indicate pertinent dimensioning, anchorage methods, hardware locations, and installation details.
- D. Manufacturer's Installation Instructions: Indicate installation sequence and procedures, adjustment and alignment procedures.
- E. Maintenance Data: Indicate lubrication requirements and frequency and periodic adjustments required.

1.04 QUALITY ASSURANCE

- A. Products Requiring Electrical Connection: Listed and classified by ITS (DIR), UL (DIR), or testing firm acceptable to authorities having jurisdiction as suitable for purpose specified and indicated.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Overhead Coiling Metal Doors:
 - 1. Alpine Overhead Doors, Inc.: www.alpinedoors.com.
 - 2. Clopay Building Products: www.clopaydoor.com.
 - 3. Cornell Iron Works, Inc.: www.cornelliron.com.
 - 4. McKeon Door Co: www.mcckeondoors.com.
 - 5. Overhead Door Corporation: www.overheaddoor.com.
 - 6. Raynor Garage Doors: www.raynor.com.
 - 7. Wayne-Dalton, a Division of Overhead Door Corporation: www.wayne-dalton.com.
 - 8. Substitutions: See Section 01 6000 - Product Requirements.

2.02 COILING DOORS

- A. Overhead Coiling Door Type 1:
 - 1. Basis of Design: Allura Shutter 653 by Overhead Door Company.
 - 2. Finish: Prefinished Powder Coat, Silver to match clear anodized aluminum.
 - 3. Slats: Perforated.
 - 4. Electrically operated.
 - 5. Face of wall mounting.
- B. Overhead Coiling Door Type 2:
 - 1. Basis of Design: Safespace S500F by McKeon Door Co.
 - 2. Finish: Prefinished Powder Coat, Sterling Gray.
 - 3. Impact and fire rated.
 - 4. Electrically operated.
 - 5. Face of wall mounting.
- C. Overhead Coiling Door Type 3:
 - 1. Basis of Design: Cornell Rolling Fire Door Model ERD10.
 - 2. Finish: Prefinished powder coat; Standard White.
 - 3. Fire rated.
 - 4. Electrically operated. Key switch to integrate into building access control system.
 - 5. Mounting: Jamb mounting.

2.03 MATERIALS

- A. Metal Curtain Construction: Interlocking slats.
 - 1. Curtain Bottom for Slat Curtains: Fitted with angles to provide reinforcement and positive contact in closed position.
- B. Guide Construction: Continuous, of profile to retain door in place with snap-on trim, mounting brackets of same metal.
- C. Guides - Angle: ASTM A36/A36M metal angles, size as indicated.
- D. Hood Enclosure and Trim: Internally reinforced to maintain rigidity and shape.
 - 1. Minimum thickness; 24 gauge, 24 inch (0.61 mm).
 - 2. Prime painted.

2.04 ELECTRIC OPERATION

- A. Operator, Controls, Actuators, and Safeties: Comply with UL 325; provide products listed by ITS (DIR), UL (DIR), or testing agency acceptable to authorities having jurisdiction.
 - 1. Provide interlock switches on motor operated units.
- B. Electric Operators:
 - 1. Mounting: Side mounted.
 - 2. Motor Enclosure:
 - a. Interior Coiling Doors: NEMA MG 00001, Type 1; open drip proof.
 - 3. Motor Rating: 1/2 HP (375 W); continuous duty.
 - 4. Motor Voltage: 120 volts, single phase, 60 Hz.
 - 5. Motor Controller: NEMA ICS 2, full voltage, reversing magnetic motor starter.
 - 6. Controller Enclosure: NEMA EN 10250, Type 4.
 - 7. Opening Speed: 12 inches per second (300 mm/sec).
 - 8. Brake: Manufacturer's standard type, activated by motor controller.

9. Manual override in case of power failure.
 10. See Section 26 0583 for electrical connections.
- C. Control Station: Provide standard three button, 'Open-Close-Stop' momentary-contact control device for each operator complying with UL 325.
1. 24 volt circuit.
 2. Surface mounted. See plan for locations and quantity required per door.
 3. Entrapment Protection Devices: Provide sensing devices and safety mechanisms complying with UL 325.
 - a. Primary Device: Provide wireless sensing as required with momentary-contact control device.
- D. Safety Edge: Located at bottom of coiling door, full width, electro-mechanical sensitized type, wired to stop and reverse door direction upon striking object, hollow neoprene covered.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that adjacent construction is suitable for door installation.
- B. Verify that electrical services have been installed and are accessible.
- C. Verify that door opening is plumb, header is level, and dimensions are correct.
- D. Notify Architect of any unacceptable conditions or varying dimensions.
- E. Commencement of installation indicates acceptance of substrate and door opening conditions.

3.02 INSTALLATION

- A. Install units in accordance with manufacturer's instructions.
- B. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.
- C. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.
- D. Fit and align assembly including hardware; level and plumb, to provide smooth operation.
- E. Complete wiring from disconnect to unit components.
- F. Install enclosure and perimeter trim.

3.03 TOLERANCES

- A. Maintain dimensional tolerances and alignment with adjacent work.
- B. Maximum Variation From Plumb: 1/16 inch (1.6 mm).
- C. Maximum Variation From Level: 1/16 inch (1.6 mm).
- D. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch per 10 feet (3.2 mm per 3 m) straight edge.

3.04 ADJUSTING

- A. Adjust operating assemblies for smooth and noiseless operation.

3.05 CLEANING

- A. Clean installed components.
- B. Remove labels and visible markings.

END OF SECTION

SECTION 08 3513.23 - ACCORDION FOLDING FIRE DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Horizontal sliding, accordion folding fire rated doors.
- B. Associated construction assembly.

1.02 RELATED REQUIREMENTS

- A. Section 09 2116 - Gypsum Board Assemblies: Fire-rated gypsum board.
- B. Section 09 9123 - Interior Painting: Finish painting.
- C. Section 28 4600 - Fire Detection and Alarm: Connections for activating automatic closing operation.

1.03 REFERENCE STANDARDS

- A. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2016a.
- B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- C. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2025.
- D. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2022.
- E. UL (DIR) - Online Certifications Directory; Current Edition.
- F. UL 10B - Standard for 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: Provide manufacturer's technical literature; include UL listing data.
- C. Shop Drawings: Indicate construction and installation details and dimensions, including layout, electrical requirements, required stacking depth, height of header above finished floor; and requirements for anchorage and support of each door.
- D. Operation and Maintenance Data: Operating procedures, troubleshooting and repair methods, wiring diagrams, parts lists, and identification of authorized maintenance firms located in vicinity of project.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to project site in manufacturer's original, unopened packaging, labeled to show name, brand, and type.
- B. Store products in a protected dry location, in manufacturer's original packaging, in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Accordion Folding Fire Doors:
 - 1. Won-Door Corporation; Fire Guard: www.wondoor.com.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 SYSTEM DESCRIPTION

- A. Provide motor operated accordion folding fire doors with configurations as indicated on drawings.
- B. Fire Door Fire-Rating: 90 minutes.

- C. Provide products listed and labeled by UL (DIR) as horizontal sliding accordion folding fire doors at corridor walls or smoke barrier wall locations and other fire partitions with fire-rating indicated, and in compliance with ASTM E119, NFPA 252 or UL 10B fire tests and requirements of authorities having jurisdiction (AHJ).
- D. Closing Operation: Automatic motor-operated closing upon activation by low battery charge and fire alarm system. See Division 28.
 - 1. Obstruction Detection: Contact with an obstruction causes door to stop and pause before attempting to re-close.
 - 2. Allow manual closing of door at any time.
 - 3. Interconnect door operation with the access control system for "lock down" operation.
- E. Opening Operation: Provide exit hardware on both sides of door.
 - 1. When door has been closed manually, operation of exit hardware to allow door to open 32 inches (0.81 m), minimum.
 - 2. When door has been closed automatically, operation of exit hardware to allow door to open at least 32 inches (813 mm), width of opening programmable up to full opening, pause for three seconds and then automatically close.
 - 3. Access Control: Provide interlocking exit hardware with activation system so that door may not be opened if alarm condition persists; provide key switch to deactivate.
- F. Configuration: Bi-parting; straight; recessed in pocket.
 - 1. Striker Mounting: Recessed.

2.03 COMPONENTS

- A. Door Construction: Two parallel, accordion-type walls of independently suspended panels, 6 to 8 inches (152 to 203 mm) apart, without pantographs or interconnections except at lead post.
 - 1. Panels: V-grooved steel, 24 gauge, 0.0239 inch (0.61 mm); connected by full height steel hinges, 24 gauge, 0.0239 inch (0.61 mm) thick.
 - 2. Insulation: Manufacturer's standard.
 - 3. Lead Posts: Cold rolled steel, 24 gauge, 0.0239 inch (0.61 mm); internally mounted stabilizer bar; spring-loaded cap with PVC seals at top and bottom to fit into striker wall cavity; positive latching at striker wall.
 - 4. Smoke and Draft Seals: Continuous PVC sweeps attached at top and bottom.
 - 5. Hanging Weight: 6.5 pounds per sq ft (32 kg per sq m), maximum.
 - 6. Finish: Steel parts, factory-applied enamel.
 - 7. Color: As selected by Architect, field painted as specified in Section 09 9123.
- B. Suspension System: Two tracks, on 8 inch (203 mm) centers, attached to overhead structural support.
 - 1. Tracks: 14 gauge, 0.0747 inch (1.90 mm) cold rolled steel.
 - 2. Panel Hangers: Each panel individually suspended from steel hanger pin and 1/4 inch (6 mm) diameter ball bearing roller.
 - 3. Lead Post Hangers: Eight wheel ball bearing trolley.
- C. Motor Operator Assembly: Chain drive attached to stabilizer bar trolley with DC gear-motor, drive sprocket and clutch.
- D. Power Supply: 12-volt maintenance-free DC battery, automatically maintained at capacity by continuous charger, 120 VAC.

- E. Controls: Microprocessor logic board, interconnect board, motor control relays, and limit switches; provide loud audible signal if sensors indicate high or low voltage, AC or DC; drive train, limit switch, or key switch malfunction; or ROM or RAM check-sum error.
- F. Key Switches: Recessed wall-mounted within line-of-sight of door.

2.04 ASSEMBLY

- A. Track Support Construction: Provide supports attached to structural system and mounting surface for tracks; comply with accordion door manufacturer's installation instructions and recommendations. Refer to Section 05 1200.
- B. Pocket Construction: As indicated on drawings; use Type X gypsum wallboard, unless noted otherwise. See Section 09 2116.
- C. Striker Recess: Mount striker in wall recess deep enough to prevent striker from protruding beyond face of wall; construct recess to maintain fire rating of wall.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that adjacent construction is suitable for installation of door.
- B. Verify that electrical utilities have been installed and are accessible.
- C. Verify access to, and proper clearance for, motor operators in wall cavity.
- D. Verify that door opening is plumb and header is level and of correct dimensions.
- E. Notify Architect of any unacceptable conditions or varying dimensions.
- F. Commencement of work indicates acceptance of substrate and opening.

3.02 INSTALLATION

- A. Install accordion folding fire doors in accordance with manufacturer's written instructions, approved shop drawings, and NFPA 80 standards.
- B. Install accordion folding fire doors plumb and level.
- C. Install wiring in accordance with applicable codes and NFPA 70.

3.03 ADJUSTING

- A. Adjust accordion folding fire door installation to provide uniform clearances and smooth, quiet, non-binding operation.
- B. Test accordion folding fire doors closing functions under anticipated conditions.
- C. Verify that operations are functional and meet requirements of authorities having jurisdiction.

3.04 CLEANING

- A. Clean surfaces using manufacturer's recommended means and methods.

3.05 PROTECTION

- A. Protect installed work from damage.
- B. Repair or replace defective work prior to Date of Substantial Completion.

END OF SECTION

SECTION 08 3613 - SECTIONAL DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Overhead sectional doors, electrically operated.
- B. Operating hardware and supports.
- C. Electrical controls.

1.02 RELATED REQUIREMENTS

- A. Section 05 5000 - Metal Fabrications: Steel channel opening frame.
- B. Section 07 9200 - Joint Sealants: Sealing joints between frames and adjacent construction.

1.03 REFERENCE STANDARDS

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2017.
- B. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
- C. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2025.
- D. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.
- E. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014 (Reapproved 2021).
- F. DASMA 102 - American National Standard Specifications for Sectional Doors; 2018.
- G. ITS (DIR) - Directory of Listed Products; current edition.
- H. NEMA ICS 2 - Industrial Control and Systems Controllers, Contactors and Overload Relays Rated 600 Volts; 2008 (Reaffirmed 2020).
- I. NEMA MG 00001 - Motors and Generators; 2024.
- J. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.
- K. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- L. UL (DIR) - Online Certifications Directory; Current Edition.
- M. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems; Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate opening dimensions and required tolerances, connection details, anchorage spacing, hardware locations, and installation details.
- C. Product Data: Show component construction, anchorage method, and hardware.
- D. Samples: Submit two panel finish samples, 6 x 6 inch (152 x 152 mm) in size, illustrating color and finish.
- E. Manufacturer's Installation Instructions: Include any special procedures required by project conditions.
- F. Operation Data: Include normal operation, troubleshooting, and adjusting.

- G. Maintenance Data: Include data for motor and transmission, shaft and gearing, lubrication frequency, spare part sources.

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 work of type specified and with at least three years documented experience.
- C. Comply with applicable code for motor and motor control requirements.
- D. Products Requiring Electrical Connection: Listed and classified by ITS (DIR), UL (DIR), or testing firm acceptable to authorities having jurisdiction, as suitable for purpose specified.

1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for warranty requirements.
- B. Extended Correction Period: Correct defective work within a 2-year period commencing on Date of Substantial Completion.
- C. Manufacturer Warranty: Provide 5-year manufacturer warranty for electric operating equipment. Complete forms in Owners name and register with manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Sectional Doors:
 - 1. Clopay Building Products: www.clopaydoor.com.
 - 2. Midland Garage Door: www.midlandgaragedoor.com.
 - 3. Overhead Door Corporation: www.overheaddoor.com/#sle.
 - 4. Raynor Garage Doors: www.raynor.com.
 - 5. Wayne-Dalton, a Division of Overhead Door Corporation: www.wayne-dalton.com.
 - 6. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS

- A. Performance: Withstand positive and negative wind loads equal to 1.5 times design wind loads specified by local code without damage or permanent set, when tested in accordance with ASTM E330/E330M, using 10 second duration of maximum load.
- B. Air Leakage Rate: Less than 0.40 cfm/sq ft (2 L/sec/sq m) when tested in accordance with ASTM E283/E283M at test pressure difference of 1.57 psf (75 Pa).
- C. Thermal Transmittance: U-factor (Usi-factor) of 0.31 Btu/hr sq ft degrees F (1.76 W/sq m K), maximum, in accordance with DASMA 102.

2.03 ALUMINUM DOORS

- A. Doors: Stile and rail aluminum with glazed panels; low headroom operating style with track and hardware; complying with DASMA 102, Commercial application.
 - 1. Basis of Design: Model 521 by Overhead Door Corp.
 - 2. Door Nominal Thickness: 2 inches (50 mm) thick.
 - 3. Finish: Factory anodized; dark bronze.
 - 4. Insulated Panels: 3/8 inch EPS solid panels.
 - 5. Glazed Lites: As indicated on drawings.
 - a. Glazing: 1/2 inch insulated glass; SolarBan 70xl; Argon filled.

2.04 COMPONENTS

- A. Track: Rolled galvanized steel, 0.090 inch (2.3 mm) minimum thickness; 3 inch (75 mm) wide, continuous one piece per side; galvanized steel mounting brackets 1/4 inch (6 mm) thick.
- B. Lift Mechanism: Torsion spring on cross head shaft, with braided galvanized steel lifting cables. Provide high cycle springs; minimum 50,000 cycles.
- C. Sill Weatherstripping: Resilient hollow rubber strip, one piece; fitted to bottom of door panel, full length contact.
- D. Jamb Weatherstripping: Roll formed steel section full height of jamb, fitted with resilient weatherstripping, placed in moderate contact with door panels.
- E. Head Weatherstripping: EPDM rubber seal, one piece full length.
- F. Panel Joint Weatherstripping: Neoprene foam seal, one piece full length.
- G. Lock: Inside center mounted, adjustable keeper, spring activated latch bar with feature to retain in locked or retracted position; interior and exterior handle.

2.05 MATERIALS

- A. Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G60/Z180 coating, plain surface.
- B. Aluminum Sheet: ASTM B209/B209M, 5005 alloy, H14 temper, plain surface.
- C. Aluminum Extrusions: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.
- D. Float Glass: Provide float glass glazing, unless noted otherwise.
 - 1. Heat-Strengthened and Fully Tempered Types: ASTM C1048.

2.06 ELECTRIC OPERATION

- A. Operator, Controls, Actuators, and Safeties: Comply with UL 325; provide products listed by ITS (DIR), UL (DIR), or testing agency acceptable to authorities having jurisdiction.
 - 1. Provide interlock switches on motor operated units.
- B. Electric Operators:
 - 1. Mounting: Side mounted on cross head shaft.
 - 2. Motor Enclosure:
 - a. Exterior Doors: NEMA MG 00001, Type 4; open drip proof.
 - 3. Motor Rating: 1/2 hp (375 W); continuous duty.
 - 4. Motor Voltage: 208 volts, single phase, 60 Hz.
 - 5. Motor Controller: NEMA ICS 2, full voltage, reversing magnetic motor starter.
 - 6. Controller Enclosure: NEMA EN 10250, Type 1.
 - 7. Opening Speed: 12 inches per second (300 mm/s).
 - 8. Brake: Adjustable friction clutch type, activated by motor controller.
 - 9. Manual override in case of power failure.
- C. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated; enclose terminal lugs in terminal box sized to comply with NFPA 70.
- D. Control Station: Provide standard three button (Open-Close-Stop) momentary-contact control device for each operator complying with UL 325.
 - 1. 24 volt circuit.
 - 2. Surface mounted, at interior door jamb.
 - 3. Entrapment Protection Devices: Provide sensing devices and safety mechanisms complying with UL 325.

- a. Primary Device: Provide NEMA 1 photo eye sensors as required with momentary-contact control device.
- E. Safety Edge: Located at bottom of sectional door panel, full width; electro-mechanical sensitized type, wired to stop and reverse door direction upon striking object; hollow neoprene covered to provide weatherstrip seal.
- F. Hand Held Transmitter: Digital control, and resettable.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that wall openings are ready to receive work and opening dimensions and tolerances are within specified limits.
- B. Verify that electric power is available and of the correct characteristics.

3.02 PREPARATION

- A. Prepare opening to permit correct installation of door unit to perimeter air and vapor barrier seal.
- B. Apply primer to wood frame.

3.03 INSTALLATION

- A. Install door unit assembly in accordance with manufacturer's instructions.
- B. Anchor assembly to wall construction and building framing without distortion or stress.
- C. Securely brace door tracks suspended from structure. Secure tracks to structural members only.
- D. Fit and align door assembly including hardware.
- E. Coordinate installation of electrical service. Complete power and control wiring from disconnect to unit components.
- F. Install perimeter trim and closures.

3.04 TOLERANCES

- A. Maximum Variation from Plumb: 1/16 inch (1.5 mm).
- B. Maximum Variation from Level: 1/16 inch (1.5 mm).
- C. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch (3 mm) from 10 ft (3 m) straight edge.
- D. Maintain dimensional tolerances and alignment with adjacent work.

3.05 ADJUSTING

- A. Adjust door assembly for smooth operation and full contact with weatherstripping.
- B. Have manufacturer's field representative present to confirm proper operation and identify adjustments to door assembly for specified operation.

3.06 CLEANING

- A. Clean doors and frames and glazing.
- B. Remove temporary labels and visible markings.

3.07 PROTECTION

- A. Protect installed products from damage until Date of Substantial Completion.
- B. Do not permit construction traffic through overhead door openings after adjustment and cleaning.

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.

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 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document); 2015.
- C. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).
- D. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.
- E. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- F. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- G. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
- H. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.
- I. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.
- 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 (Reapproved 2021).
- 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 2016).
- L. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes; 2017.
- M. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.

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, door hardware, and 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.

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 documented experience.
- C. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented 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. 2 inch by 4-1/2 inch, nominal frame profile.
 - a. Basis of Design: Kawneer Company, Inc; Trifab VersaGlaze 451T; www.kawneer.com.
 - b. Other Acceptable Manufactures provided they meet or exceed the Basis of Design performance, including sustainability requirements:
 - 1) EFCO Corporation; Series 403 Storefront Framing; www.apogeeearchmetals.com.
 - 2) Oldcastle Building Envelope; Series 3000 Thermal MultiPlane; obe.com.
 - 3) Tubelite Inc; T14000 Series; www.apogeeearchmetals.com.
 - 4) YKK AP America Inc; YES 45 TU; www.ykkap.com.
 - c. Finish:
 - 1) (ALSTOR-1A): Dark bronze anodized.
 - 2) (ALSTOR-1B): Clear anodized.

2.02 BASIS OF DESIGN -- FRAMING FOR MONOLITHIC GLAZING (ALSTOR-2)

- A. Center-Set Style, Not Thermally-Broken:

1. 2 inch by 4-1/2 inch, nominal frame profile.
 - a. Basis of Design: Kawneer Company, Inc; Trifab VersaGlaze 451; www.kawneer.com.
 - b. Other Acceptable Manufactures provided they meet or exceed the Basis of Design performance requirements:
 - 1) EFCO Corporation; Series 402 Storefront Framing; www.apogearchmetals.com.
 - 2) Oldcastle Building Envelope; FG-3000; obe.com.
 - 3) Tubelite Inc; E14000 Series; www.apogearch.com.
 - 4) YKK AP America Inc; YES 45 FI; www.ykkap.com.
 - c. Finish:
 - 1) (ALSTOR-2A): Dark bronze anodized.
 - 2) (ALSTOR-2B): Clear anodized.

2.03 BASIS OF DESIGN -- SWINGING DOORS

- A. Wide Stile, Not Thermally-Broken:
 1. Basis of Design: Kawneer Company, Inc; 500 Heavy Wall Entrances; www.kawneer.com.
 2. Other Acceptable Manufactures provided they meet or exceed the Basis of Design performance requirements:
 - a. EFCO Corporation; Series D518 DuraStile; www.apogearchmetals.com.
 - b. Oldcastle Building Envelope; Rugged Entrance Wide Stile Door and Frame; obe.com.
 - c. Tubelite Inc; Monumental Doors; www.apogearchmetals.com.
 - d. YKK AP America Inc; 50M Monumental Commercial Entrances; www.ykkap.com.
- B. Wide Stile, Insulating Glazing, Thermally-Broken:
 1. Basis of Design: Kawneer Company, Inc; 560 Insulclad Thermal Entrances; www.kawneer.com.
 2. Other Acceptable Manufactures provided they meet or exceed the Basis of Design performance requirements:
 - a. EFCO Corporation; Series D502 ThermaStile; www.apogearchmetals.com.
 - b. Oldcastle Building Envelope; WS-500TC Thermal Composite Door & Frame Entrances; obe.com.
 - c. Tubelite Inc; Therml=Block Entrances; www.apogearchmetals.com.
 - d. YKK AP America Inc; MegaTherm 50T Thermally Broken Entrance Systems; www.ykkap.com.

2.04 ALUMINUM-FRAMED 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. Glazing Rabbet: For 1/4 inch (6 mm) monolithic glazing.
 3. Glazing Position: Centered (front to back).
 4. 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.
 5. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
 6. 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.

7. 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.
 8. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
 9. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
 10. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with inside pane of glazing and heel bead of glazing compound.
- 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. Design Wind Loads: Comply with requirements of applicable code.
 - b. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
 2. Wind-Borne-Debris Resistance (ALSTOR-3): Identical full-size glazed assembly without auxiliary protection, tested by independent agency in accordance with ASTM E1996 for Wind Zone ____ - Enhanced Protection for Large and Small Missile impact and pressure cycling at design wind pressure.
 3. Water Penetration Resistance: No uncontrolled water on interior face, when tested in accordance with ASTM E331 at pressure differential of 10 psf (480 Pa).
 4. Air Leakage: 0.06 cfm/sq ft (0.3 L/sec sq m) maximum leakage of storefront wall area when tested in accordance with ASTM E283/E283M at 1.57 psf (75 Pa) pressure difference.
 5. Condensation Resistance Factor of Framing: 60, minimum, measured in accordance with AAMA 1503.
 6. Overall U-value Including Glazing: 0.34 Btu/(hr sq ft deg F), maximum.

2.05 COMPONENTS

- A. Aluminum Framing Members: Tubular aluminum sections, drainage holes and internal weep drainage system.
1. Framing members for interior applications need not be thermally broken.
 2. Glazing Stops: Flush.
 3. Cross-Section: As indicated on drawings.
 4. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel member.
- B. Glazing: See Section 08 8000.
- C. Swing Doors: Glazed aluminum.
1. Top Rail: 5 inches (127 mm) wide, nominal.
 2. Vertical Stiles: 5 inches (127 mm) wide, nominal.
 3. Bottom Rail: 10 inches (254 mm) wide.
 4. Glazing Stops: Square.
 5. Finish: Same as storefront.

2.06 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 gauge, 0.032 inch (0.81 mm) minimum thickness; finish to match framing members.
- E. Concealed Flashings: Stainless steel, 26 gauge, 0.0187 inch (0.48 mm) minimum thickness.
- F. Sill Flashing Sealant: Elastomeric, silicone or polyurethane, compatible with flashing material.
- G. Sealant for Setting Thresholds: Non-curing butyl type.
- H. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
- I. Touch-Up Primer for Galvanized Steel Surfaces: SSPC-Paint 20, zinc rich.

2.07 FINISHES

- A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils (0.018 mm) thick.
- B. Class I Color Anodized Finish: AAMA 611 AA-M12C22A42 Integrally colored anodic coating not less than 0.7 mils (0.018 mm) thick.

2.08 HARDWARE

- A. For each door, include weatherstripping.
- B. Other Door Hardware: See Section 08 7100.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify dimensions, tolerances, and method of attachment with other work.
- B. Verify that storefront wall openings and adjoining water-resistive and/or air barrier 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. Install glass and infill panels using glazing method required to achieve performance criteria; see Section 08 8000.
- H. 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 inch per 3 feet (1.5 mm per m) non-cumulative or 0.06 inch per 10 feet (1.5 mm per 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 general testing and inspection requirements.
- B. Water-Spray Test: Provide water spray quality test of installed storefront components in accordance with AAMA 502 during construction process and before installation of interior finishes.
 - 1. Perform a minimum of two tests in each designated area as indicated on drawings.
 - 2. Conduct tests in each area prior to 10 percent and 50 percent completion of this work.
- C. Repair or replace storefront components that have failed designated field testing, and retest to verify performance complies with specified requirements.

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, and take care to remove dirt from corners and to 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 4413 - GLAZED ALUMINUM CURTAIN WALLS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Aluminum-framed curtain wall, with vision glazing and glass infill panels.

1.02 RELATED REQUIREMENTS

- A. Section 07 2500 - Weather Barriers: Sealing framing to water-resistive barrier installed on adjacent construction.
- B. Section 08 8000 - Glazing.

1.03 REFERENCE STANDARDS

- A. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site; 2015.
- B. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems; 2025.
- C. AAMA 501.4 - Recommended Static Test Method for Evaluating Window Wall, Curtain Wall and Storefront Systems Subjected to Seismic and Wind-Induced Inter-Story Drift; 2018.
- D. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document); 2015.
- E. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).
- F. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.
- G. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- H. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- I. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- J. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
- K. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
- L. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.
- M. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.
- N. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2023).
- O. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.

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, internal drainage details, glazing, and infill.
- 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. Samples: Submit two samples 2 x 4 inches (51 x 102 mm) in size illustrating finished aluminum surface, glazing, infill panels, and glazing materials.
- E. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.
- F. Design Data: Provide framing member structural and physical characteristics and engineering calculations, and identify dimensional limitations; include load calculations at points of attachment to building structure.
- G. Energy Performance Certification: For each glazed aluminum curtain wall system and glazing combination provide NFRC CMAST Bid Report. Coordinate with Section 08 8000.
- H. Test Reports: Submit results of full-size mock-up testing. Reports of tests previously performed on the same design are acceptable.
- I. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.
- J. Warranty: Submit manufacturer warranty and ensure forms have been completed in St. Cloud School District 742's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

- A. Designer Qualifications: Design curtain wall and its structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed at the State in which the Project is located.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with not less than 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. Manufacturer Warranty: Provide 5-year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units. Complete forms in St. Cloud School District 742's name and register with installer.

- C. Finish Warranty: Provide 5-year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking. Complete forms in St. Cloud School District 742's name and register with warrantor.

PART 2 PRODUCTS

2.01 BASIS OF DESIGN - CURTAIN WALL SYSTEMS

- A. Pressure Cap Four Sides; Not Unitized, Field Assembled, 2-1/2 inch (65 mm) wide face plate:
 - 1. Basis of Design: Kawneer Company, Inc; 1600UT Series Wall System 1.
 - 2. Other Acceptable Manufactures provided they meet or exceed the Basis of Design performance requirements:
 - a. EFCO Corporation; XTherm 8250 Unitized Curtain Wall: www.apogeeearchmetals.com.
 - b. Oldcastle Building Envelope: Reliance TC Type II: www.obe.com.
 - c. Tubelite, Inc; 400TU High Performance Thermal Curtainwall: www.apogeeearchmetals.com.
 - d. YKK AP America, Inc: YCW 750 XT: www.ykkap.com.
 - 3. Mullions:
 - a. (ALCRTN-1): Clear anodized, 8 inches deep with Kawneer mullion extensions.
 - b. (ALCRTN-2): Clear anodized, 8 inches deep with standard mullions.
 - c. (ALCRTN-3): Clear anodized, 8 inches deep standard mullions, interior.

2.02 CURTAIN WALL

- A. Aluminum-Framed Curtain Wall: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
 - 1. Outside glazed, with pressure plate and mullion cover.
 - 2. Finish: Class I natural anodized.
 - a. Factory finish surfaces that will be exposed in completed assemblies.
 - b. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
 - 3. Provide flush joints and corners, weathersealed, accurately fitted and secured; prepared to receive anchors; 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. Maintain continuous air barrier and/or vapor retarder seal throughout assembly, primarily in line with inside pane of glazing and inner sheet of infill panel and heel bead of glazing compound.
 - 7. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
- B. Structural Performance Requirements: Design and size components to withstand the following load requirements without damage or permanent set.
 - 1. Design Wind Loads: Comply with the requirements of ASCE 7
 - a. Member Deflection: For spans less than 13 feet 6 inches (4115 mm), limit member deflection to flexure limit of glass in any direction, and maximum of 1/175 of span or 3/4 inch (19 mm), whichever is less and with full recovery of glazing materials.

- b. Member Deflection: For spans over 13 feet 6 inches (4115 mm) and less than 40 feet (12.2 m), limit member deflection to flexure limit of glass in any direction, and maximum of 1/240 of span plus 1/4 inch (1/240 of span plus 6.4 mm), with full recovery of glazing materials.
- 2. Interstory Differential Lateral Movement: Meeting pass/fail criteria of AAMA 501.4 for Use Group I, Standard Occupancy, when tested at design displacement of 0.010 times greater adjacent story height, maximum, and 1.5 times design displacement, through three complete cycles.
- 3. Movement: Accommodate the following movement without damage to components or deterioration of seals:
 - a. Expansion and contraction caused by 180 degrees F (82 degrees C) surface temperature.
 - b. Expansion and contraction caused by cycling temperature range of 170 degrees F (77 degrees C) over a 12 hour period.
 - c. Movement of curtain wall relative to perimeter framing.
 - d. Deflection of structural support framing, under permanent and dynamic loads.
- C. Water Penetration Resistance on Manufactured Assembly: No uncontrolled water on indoor face when tested as follows:
 - 1. Test Pressure Differential: 10 psf (480 Pa).
 - 2. Test Method: ASTM E331.
- D. Air Leakage: 0.06 cfm/sq ft (0.3 L/sec sq m) maximum leakage of wall area when tested in accordance with ASTM E283/E283M at 6.24 psf (300 Pa) pressure difference across assembly.
- E. Thermal Performance Requirements:
 - 1. Condensation Resistance Factor of Framing: 50, minimum, measured in accordance with AAMA 1503.
 - 2. Overall U-value Including Glazing: 0.34 Btu/(hr sq ft deg F), maximum.

2.03 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.
 - 2. Cross-Section: As indicated on drawings.
 - 3. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel member.
- B. Glazing: See Section 08 8000.
- C. Infill Panels (CRTN CLPNL-1): Insulated, aluminum sheet face and back, with edges formed to fit glazing channel and sealed, with insulated backpan.
 - 1. Basis of Design: Americlad Curtainwall Interior Closure Panel.
- D. Sill Plate: Provide a subsill plate with integral front lip. Match finish of curtain wall system.

2.04 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).
- B. Sheet Aluminum: ASTM B209/B209M.
- C. Structural Steel Sections: ASTM A36/A36M; galvanized in accordance with requirements of ASTM A123/A123M.
- D. Fasteners: Stainless steel; type as required or recommended by curtain wall manufacturer.
- E. Exposed Flashings: Aluminum sheet, 20-gauge, 0.032-inch (0.81 mm) minimum thickness; finish to match framing members.
- F. Concealed Flashings: Sheet aluminum, 26-gauge, 0.017-inch (0.43 mm) minimum thickness.

- G. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
- H. Glazing Accessories: See Section 08 8000.
- I. Touch-Up Primer for Galvanized Steel Surfaces: SSPC-Paint 20, zinc rich.

2.05 FINISHES

- A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils (0.018 mm) thick.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify dimensions, tolerances, and method of attachment with other related work.
- B. Verify that curtain wall openings and adjoining water-resistive and air barrier seal materials are ready to receive work of this section.
- C. Verify that anchorage devices have been properly installed and located.

3.02 INSTALLATION

- A. Install curtain 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. Pressure Plate Framing: Install glazing and infill panels using exterior dry glazing method; see Section 08 8000.
- H. 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 inch per 3 feet (1.5 mm/m) noncumulative or 0.5 inches per 100 feet (12 mm/30 m), whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch (0.8 mm).
- C. Sealant Space Between Curtain Wall Mullions and Adjacent Construction: Maximum of 3/4 inch (19 mm) and minimum of 1/4 inch (6 mm).

3.04 FIELD QUALITY CONTROL

- A. Provide services of curtain wall manufacturer's field representative to observe for proper installation of system and submit report.
- B. See Section 01 4000 - Quality Requirements for general testing and inspection requirements.
- C. Water-Spray Test: Provide water spray quality test of installed curtain wall components in accordance with AAMA 502 during construction process and before installation of interior finishes.
 - 1. Perform a minimum of two tests in each designated area as indicated on drawings.
 - 2. Conduct tests in each area prior to 10 percent and 50 percent completion of this work.
- D. Window Testing:

1. The newly installed (x) shall be field tested by AAMA accredited independent laboratory, in accordance with **AAMA 503**, "Voluntary Specification for Field Testing of Newly Installed Storefronts, Curtain Walls and Sloped Glazing Systems." The area(s) to be tested is (are) as required.
 2. Air Leakage resistant tests shall be conducted at a uniform static test pressure of 6.24 psf. The maximum allowable rate of leakage shall not exceed 0.06 cfm/ft²
 3. Water Penetration test shall be conducted at a static test pressure of 12 psf for curtainwall windows.
 4. For each test that fails:
 - a. Identify reason for the failure.
 - b. Repair failure and retest the installation unit until it is completely free of defects.
 - c. The Architect/Testing Agent will select two additional windows to be tested. All unsuccessful tests, both original and retest as well as additional windows to be tested due to an unsuccessful test will be paid by the Contractor by deduct change order.
 5. The window installer is required to carry an allowance to cover attending the testing and for corrective measure is required.
 6. Attendance at the window testing is required for the installing Contractor and General Contractor or Construction Manager.
 7. Testing Schedule: As required.
- E. Repair or replace curtain wall components that have failed designated field testing, and retest to verify performance complies with specified requirements.

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, and wipe surfaces clean.
- C. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.

END OF SECTION

SECTION 08 4435 - PROTECTIVE FRAMED GLAZING ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Exterior protective framed glazing assembly.
- B. Interior protective framed glazing assembly.

1.02 RELATED REQUIREMENTS

- A. Section 07 2500 - Weather Barriers: Sealing framing to water-resistive barrier installed on adjacent construction.
- B. Section 07 8400 - Firestopping: Firestop at exterior wall assembly junction with structure.
- C. Section 07 9200 - Joint Sealants: Sealing joints between frames and adjacent construction.

1.03 REFERENCE STANDARDS

- A. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site; 2015.
- B. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).
- C. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- D. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.
- E. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2016a.
- F. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.
- G. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2024.
- H. ITS (DIR) - Directory of Listed Products; current edition.
- I. UL (DIR) - Online Certifications Directory; Current Edition.
- J. UL 263 - Standard for Fire Tests of Building Construction and Materials; Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide evidence of compliance with fire performance criteria and manufacturer's published product data on framing components, glazing, anchorage and fasteners, and doors, if any.
- 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. Samples: Submit samples as follows illustrating each exposed metal finish of interior and exterior project-specific applications.
- E. Test Reports: Submit results of full-size mock-up testing for criteria other than fire performance. Reports of tests previously performed on the same design are acceptable.
- F. Warranty Documentation: Submit manufacturer warranty and ensure forms have been completed in St. Cloud School District 742's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with at least ten years documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Handle products of this section in accordance with AAMA CW-10.
- B. Protect finished surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to substrate when exposed to sunlight or weather.

1.07 FIELD CONDITIONS

- A. Do not install sealants when ambient temperature is less than 40 degrees F (5 degrees C), and maintain above this minimum temperature during and for 48 hours after installation.

1.08 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 EXTERIOR PROTECTIVE FRAMED GLAZING ASSEMBLIES

- A. Single Story Walls (FR STOR-2) with (FR GL-10)
 - 1. SAFTIFIRST, a division of O'Keeffe's Inc; GPX Architectural Series with fire resistive walls/windows: www.safti.com/#sle.
- B. Provide factory fabricated, factory finished framing members with glazing and related flashings, anchorage and attachment devices.
 - 1. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" within internal spaces.
 - 2. 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.
- C. Fire Performance: Provide hourly fire-resistance-rating as indicated; tested as an assembly including glazing in compliance with ASTM E119 or UL 263 and requirements of local authorities having jurisdiction.
 - 1. Acceptable evidence of compliance includes listing by UL (DIR), ITS (DIR), or testing agency acceptable to authorities having jurisdiction.
- D. Structural Performance: Design and size components to withstand the following loading without damage or permanent set.
 - 1. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
 - 2. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths or 3/4 inch (19 mm), whichever is less, under specified design load.
 - 3. Movement: Accommodate the following movement without damage to components or deterioration of seals:
 - a. Expansion and contraction caused by 180 degrees F (82 degrees C) surface temperature.

- b. Expansion and contraction caused by cycling temperature range of 170 degrees F (95 degrees C) over a 12 hour period.
 - c. Movement of wall relative to perimeter framing.
 - d. Deflection of structural support framing, under permanent and dynamic loads.
- E. Water Penetration: No uncontrolled water on indoor face when tested as follows:
- 1. Test Pressure Differential: 10 pound-force per square foot (480 Pa).
- F. Air Leakage: 0.06 cfm/sq ft (0.3 L/sec sq m) maximum leakage of wall area when tested at 1.57 psf (75 Pa) pressure difference in accordance with ASTM E283/E283M.

2.02 INTERIOR PROTECTIVE FRAMED GLAZING ASSEMBLIES

- A. Basis of Design (FR STOR-1) with (FR GL-1):
- 1. SAFTI FIRST, a division of O'Keeffe's Inc; GPX Architectural Series: www.safti.com.
 - 2. Technical Glass Products; Fireframes Designer Series: www.fireglass.com.
 - 3. Substitutions: See Section 01 6000 - Product Requirements.
- B. Provide factory fabricated, factory finished framing members with glazing and related flashings, anchorage and attachment devices.
- C. Fire Performance: Provide hourly fire-resistance-rating as indicated; tested as an assembly including glazing in compliance with ASTM E119 or UL 263 and requirements of local authorities having jurisdiction.
- 1. Acceptable evidence of compliance includes listing by UL (DIR), ITS (DIR), or testing agency acceptable to authorities having jurisdiction.

2.03 COMPONENTS

- A. Framing Members: Formed steel structural members with aluminum cladding and non-combustible thermally-resistive material as required for fire rating.
- 1. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors; fasteners and attachments concealed from view; reinforced as required for imposed loads.
 - 2. Cross-Section: As indicated on drawings.
 - 3. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.

2.04 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).
- B. Fasteners: Stainless steel.
- 1. Arrange fasteners and attachments to conceal from view.
- C. Exposed Flashings: 20 gauge, 0.032 inch (0.81 mm) thick aluminum sheet; finish to match framing members.
- D. Concealed Flashings: 26-gauge, 0.018 inch (0.45 mm) thick galvanized steel.
- E. Firestopping: See Section 07 8400.
- F. Sealants Within Fire-Rated Assembly: As required by fire-rating and manufacturer's assembly.
- G. Sealants: See Section 07 9200 for additional information.
- H. Glazing Gaskets: Type to suit application to achieve fire-rating, weather, moisture, and air infiltration requirements.

2.05 FINISHES

- A. Finishing: Apply factory finish to surfaces that will be exposed in completed assemblies.
 - 1. Touch-up surfaces cut during fabrication so that no natural metal surfaces are visible in completed assemblies, including joint edges.
- B. Aluminum Finish: Class I natural anodized.
 - 1. Apply factory finish to surfaces that will be exposed in completed assemblies.
 - 2. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
- C. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils (0.018 mm) thick.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify dimensions, tolerances, and method of attachment with other work.
- B. Verify that wall openings and adjoining water-resistive barrier materials are ready to receive work of this section; see Section 07 2500 for additional information.
- C. Verify that anchorage devices have been properly installed and located.

3.02 INSTALLATION

- A. Install wall system in accordance with limitations of fire rating and 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. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.03 TOLERANCES

- A. Maximum Variation from Plumb: 1/16 inch every 3 feet (1.6 mm every 0.914 m) non-cumulative or 1/2 inch per 100 ft (12.7 mm per 30.5 m), whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch (0.8 mm).
- C. Sealant Space Between Mullions and Adjacent Construction: Maximum of 3/4 inch (19 mm) and minimum of 1/4 inch (6.4 mm).

3.04 ADJUSTING

- A. Adjust doors for smooth operation.

3.05 CLEANING

- A. Remove protective material from pre-finished 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.

3.06 PROTECTION

- A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION

SECTION 08 8000 - GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Insulating glass units.
- B. Glazing units.
- C. Plastic films.
- D. Glazing compounds.

1.02 RELATED REQUIREMENTS

- A. Section 08 4435 - Protective Framed Glazing Assemblies: Glazing fire-tested as part of wall assembly.

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; 2015 (Reaffirmed 2020).
- C. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2019).
- D. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2012.
- E. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2025.
- F. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass; 2021a.
- G. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2023.
- H. ASTM E413 - Classification for Rating Sound Insulation; 2022.
- I. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2019.
- J. BS EN 14179-1 - Glass in Building - Heat Soaked Thermally Toughened Soda Lime Silicate Safety Glass - Part 1: Definition and Description; 2016.
- K. GANA (GM) - GANA Glazing Manual; 2022.
- L. GANA (SM) - GANA Sealant Manual; 2008.
- M. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- N. IGMA TM-3000 - North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use; 1990 (2016).
- O. ITS (DIR) - Directory of Listed Products; current edition.
- P. UL (DIR) - Online Certifications Directory; Current Edition.
- Q. UL 972 - Standard for Burglary Resisting Glazing Material; Current Edition, Including All Revisions.

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, and identify available colors.

- D. Test results from heat soaking.
- E. 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 providing products to replace failed units.
- C. Heat Soaked Tempered Glass: Provide a five (5) year manufacturer warranty to include coverage for spontaneous breakage of fully tempered glass caused by nickel sulfide (NiS) inclusions.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Float Glass Manufacturers:
 - 1. Cardinal Glass Industries: www.cardinalcorp.com.
 - 2. Guardian Glass, LLC: www.guardianglass.com.
 - 3. Oldcastle Building Envelope: obe.com.
 - 4. Vitro Architectural Glass (formerly PPG Glass): www.vitroglazings.com.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 GLASS MATERIALS

- A. Float Glass: Provide float glass based glazing unless otherwise indicated. All glazing shall be tempered as required by codes, and as required to meet thermal stress and wind loads.
 - 1. Kind HS - Heat-Strengthened Type: Complies with ASTM C1048.
 - 2. Kind FT - Fully Tempered Type: Complies with ASTM C1048.
 - 3. Fully Tempered Safety Glass: Complies with ANSI Z97.1 or 16 CFR 1201 criteria for safety glazing used in hazardous locations.
 - 4. Heat-Soak Testing (HST): Provide HST of fully tempered glass used on all applications of project, to reduce risks of spontaneous breakage due to nickel sulfide (NiS) induced fractures in accordance with BS EN 14179-1.

2.03 INSULATING GLASS UNITS

- A. Manufacturers:
 - 1. Cardinal Glass Industries: www.cardinalcorp.com.
 - 2. Guardian Glass, LLC: www.guardianglass.com.
 - 3. Oldcastle Building Envelope: obe.com.
 - 4. Pilkington North America Inc: www.pilkington.com.

5. Viracon: www.viracon.com.
 6. Vitro Architectural Glass (formerly PPG Glass): www.vitroglazings.com.
 7. Substitutions: See 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. Warm-Edge Spacers: Flexible silicone with polyisobutylene (PIB) primary seal.
 - a. Spacer Width: As required for specified insulating glass unit.
 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: Fully tempered 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) Guardian Industries: SunGuard SNX 62/27.
 - (b) Vitro Architectural Glass: Solarban 70.
 - (c) Viracon: VNE1-63.
 4. Inboard Lite: Fully tempered 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: 0.24, maximum.
 7. Visible Light Transmittance (VLT): 62 percent, minimum.
 8. Solar Heat Gain Coefficient (SHGC): 0.26, maximum.
 9. Visible Light Reflectance, Outside: 11 percent, minimum.
 10. Visible Light Reflectance, Inside: 12 percent, minimum.
 11. Glazing Method: Dry glazing method, gasket glazing.

2.04 GLAZING UNITS

- A. Monolithic Safety Glazing: Non-fire-rated.
1. Applications: Interior glazing, unless otherwise indicated.
 - 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.
 2. Glass Type: Fully tempered float glass.
 3. Tint: Clear.

4. Glass Type: Fully tempered safety glass as specified.
 - a. Thickness:
 - 1) (GL-1): 1/4 inch (6.4 mm), nominal.
5. Tint: Clear.
- B. Security Glazing (SEC GL-1): Laminated glass, 2-Ply.
 1. Applications: Locations as indicated on drawings.
 2. Tint: Clear.
 3. Thickness: 1/2 inch (12.7 mm).
 4. Outer Lite: Tempered glass.
 5. Interlayer: Polyvinyl butyral (PVB), thickness as required to meet performance criteria.
 6. Inside Lite: Tempered glass.
 7. Performance Criteria:
 - a. Burglary Resistance: Pass UL 972 tests in compliance with level of burglary and forced-entry resistance indicated; Multiple Impact.
 8. Glazing Method: As required to meet performance criteria.
- C. (ACST GL-1) Sound Control Glazing: Laminated double insulating glass.
 1. Applications: Locations as indicated on drawings.
 2. Tint: Clear.
 3. Sound Transmission Class (STC) Rating: Provide at least STC 46 rating, conforming to ASTM E90 and ASTM E413.
 4. Overall Thickness: As required to meet STC rating as indicated.
 5. Laminated Double Insulating Glass:
 - a. Outer Layer: Tempered glass.
 - 1) Thickness: 3/8 inch (9.6 mm).
 - b. Air Space: 1 inch (25 mm), filled with air.
 - c. Inner Layer, Outboard Side: Annealed glass.
 - 1) Thickness: 1/4 inch (6.4 mm).
 - d. Interlayer: Polyvinyl butyral (PVB), 0.060 inches thick.
 - e. Inner Layer, Inboard Side: Tempered glass.
 - 1) Thickness: 1/4 inch (6.4 mm).
 6. Glazing Method: As required to meet STC rating as indicated.

2.05 PLASTIC FILMS

- A. Decorative Plastic Film (FILM-1): Polyester type.
 1. Basis of Design: See drawings for product information.
 2. Application: Locations as indicated on drawings.

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. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com/#sle.
 6. Substitutions: See Section 01 6000 - Product Requirements.

2.07 ACCESSORIES

- A. Setting Blocks: Silicone, 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) by width of glazing rabbet space minus 1/16 inch (1.5 mm) by 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 by one half the height of the glazing stop by 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, and paint.

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 08 71 00
DOOR HARDWARE**

PART 1 - GENERAL

1.1 CONDITIONS

- A. Conditions of the contract (General and Supplementary Conditions) and Division 01 - General Requirements, govern the work of this section.
- B. This section includes all material and related service necessary to furnish all finish hardware indicated on the drawings or specified herein.
- C. Furnish UL listed hardware for all labeled and 20 min. openings in conformance with the requirements for the class of opening scheduled. Underwriters' requirements shall have precedence over specification where conflicts exist.
- D. All work shall be in accordance with all applicable state and local building codes. Code requirements shall have precedence over this specification where conflicts exist.

1.2 WORK INCLUDED

- A. This section includes the following:
 - 1. Furnish door hardware specified herein, listed in the hardware schedule, and/or required by the drawings.
 - 2. Cylinders for Aluminum Doors
 - 3. Thresholds and Weather-stripping (Aluminum frame seals to be provided by aluminum door supplier)
 - 4. Electro-Mechanical Devices
- B. Where items of hardware are not definitely or correctly specified and are required for the intended service, such omission, error or other discrepancy should be directed to the Architect prior to the bid date for clarification by addendum. Otherwise furnish such items in the type and quantity established by this specification for the appropriate service intended.

1.3 RELATED WORK IN OTHER SECTIONS

- A. This section includes coordination with related work in the following sections:
 - 1. Division 06 Section "Finish Carpentry".
 - 2. Division 08 Section "Hollow Metal Doors and Frames".
 - 3. Division 08 Section "Wood Doors"
 - 4. Division 08 Section "Storm Doors"
 - 5. Division 08 Section "Aluminum Entrances and Storefronts"
 - 6. Division 26 Section "Electrical"
 - 7. Division 28 Section "Electronic Safety and Security".

1.4 REFERENCES

- A. Publications of agencies and organizations listed below form a part of this specification section to the extent referenced.
 - 1. DHI - Recommended Locations for Builders' Hardware.
 - 2. NFPA 80 - Standards for Fire Doors and Windows.
 - 3. NFPA 101 - Code for Safety to Life from Fire in Buildings and Structures.
 - 4. UL - Building Material Directory.
 - 5. DHI - Door and Hardware Institute
 - 6. WHI - Warnock Hersey
 - 7. BHMA - Builders Hardware Manufacturers Association
 - 8. ANSI - American National Standards Institute
 - 9. ANSI ICC500 2020 - Standard for the Design and Construction of Storm Shelters
 - 10. IBC - International Building Code (as adopted and amended by local building code)

1.5 SUBMITTALS

- A. Within ten days after award of contract, submit detailed hardware schedule in quantities as required by Division 01 - General Requirements.
- B. 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.
- C. 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).
- D. The schedule will be prepared under the direct supervision of a certified Architectural Hardware Consultant (AHC), or certified Door Hardware Consultant (DHC) employed by the hardware distributor. The hardware schedule shall be signed and embossed or stamped with the DHI certification seal of the supervising AHC or DHC. The supervising AHC or DHC shall attend any meetings related to the project when requested by the architect.
- E. Check the specified hardware for suitability and adaptability to the details and surrounding conditions.
- F. 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.
- G. Provide documentation for all hardware to be furnished on labeled fire doors indicating compliance with positive pressure fire testing UL 10C.
- H. Furnish manufacturers' catalog data for each item of hardware in quantities as required by Division 01 - General Requirements.
- I. 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.
- J. Furnish with first submittal, a list of required lead times for all hardware items.
- K. After final approved schedule is returned, transmit corrected copies for distribution and field use in quantities as required by Division 01 - General Requirements.
- L. Furnish approved hardware schedules, template lists, and pertinent templates as requested by related trades.
- M. 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.
- N. After receipt of approved hardware schedule, Hardware supplier shall initiate a meeting including the owner's representative to determine keying requirements. Upon completion of 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 Requirements. Wiring diagrams shall be included in final submittals transmitted for distribution of field use.

1.6 QUALITY ASSURANCE

- A. Manufacturers and model numbers listed are to establish a standard of function and quality. Similar items by approved manufacturers that are equal in design, function, and quality may be considered for prior approval of the architect, provided the required data and physical samples are submitted for approval as set forth in Division 01 - General Requirements.
- B. Where indicated in this specification, products shall be independently certified by ANSI for compliance with relevant ANSI/BHMA standards A156.1 - A156.36 – Standards for Hardware and Specialties. All products shall meet or exceed certification requirements for the respective grade indicated within this specification. Supplier shall provide evidence of certification when requested by the architect.
- C. Obtain each type of hardware (hinges, latch & locksets, exit devices, closers, etc.) from a single manufacturer, although several may be indicated as offering products complying with requirements.
- D. Electrical drawings and electrical specifications are based on the specific electrified hardware components specified in hardware sets. When electronic hardware components other than those indicated in hardware sets are provided, the supplier shall be responsible for all costs incurred by the design team and their consultants to review and revise electrical drawings and electrical specifications. Supplier shall also be responsible for any additional costs associated with required changes in related equipment, materials, installation, or final hook up to ensure the system will operate and function as indicated in the construction documents, including hardware set operational / functional descriptions.
- E. All hardware items shall be manufactured no earlier than 6 months prior to delivery to site.
- F. Installation of hardware shall be installed or directly supervised and inspected by a skilled installer certified by the manufacturer of locksets, door closers, and exit devices used on the project, or with not less than 3 years' experience in successful completion of projects similar in size and scope.
- G. Provide hardware for all labeled fire doors, which complies with positive pressure fire testing UL 10C.
- H. Comply with all applicable provisions of the standards referenced within section 1.4 of this specification.
- I. Hardware supplier shall participate when requested to meet with the contractor and or architect to inspect any claim for incorrect or non-functioning materials; following such inspection, the hardware supplier shall provide a written statement documenting the cause and proposed remedy for any unresolved items.

1.7 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. 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 receiving material at the job site.
- D. Coordinate with related trades under the direction of the contractor for delivery of hardware items necessary for factory installation.

1.8 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), Manufacturer's representatives for above hardware items, and any other affected subcontractors or suppliers.
- C. All attendees shall be prepared to distribute installation manuals, hardware schedules, templates, and physical hardware samples.

1.9 WARRANTY

- A. All hardware items shall be warranted against defects in material and workmanship as set forth in Division 01 - General Requirements.
- B. Repair, replace, or otherwise correct deficient materials and workmanship without additional cost to owner.

PART 2 - PRODUCTS

2.1 FASTENERS

- A. All exposed fasteners shall be Phillips head or as otherwise specified and shall match the finish of adjacent hardware. All fasteners exposed to the weather shall be non-ferrous or stainless steel. Furnish correct fasteners to accommodate surrounding conditions.
- B. Coordinate required reinforcements for doors and frames. Seek architect approval prior to furnishing through-bolts. Furnish through-bolts as required for materials not readily reinforced.

2.2 BUTT HINGES

- A. Acceptable manufacturers and respective catalog numbers:

	<u>Ives</u>	<u>Stanley</u>	<u>Hager</u>	<u>McKinney</u>
1. Standard Weight, Plain Bearing	5PB1	F179	****	T2714
2. Standard Weight, Ball Bearing	5BB1	BB179	BB1279	TB2714
3. Standard Weight, Ball Bearing, Non-Ferrous	5BB1	FBB191	BB1191	TB2314
4. Heavy Weight, Ball Bearing	5BB1HW	FBB168	BB1168	T4B3786
5. Heavy Weight, Ball Bearing, Non-Ferrous	5BB1HW	FBB199	BB1199	T4B3386

- B. Hinges shall be independently certified by ANSI for compliance with ANSI A156.1 (2006). Hinges shall meet or exceed the following ANSI grade requirements as indicated below:
 - 1. Standard Weight, Plain Bearing Hinges: Grade 3
 - 2. Standard Weight, 2 Ball Bearing Hinges: Grade 2
 - 3. Heavy Weight, 4 Ball Bearing Hinges: Grade 1
- C. Unless otherwise specified, furnish the following hinge quantities for each door leaf.
 - 1. 3 hinges for doors up to 90 inches.
 - 2. 1 additional hinge for every 30 inches on doors over 90 inches.
 - 3. 4 hinges for Dutch door applications.
- D. 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.
- E. Unless otherwise specified, furnish hinge weight and type as follows:
 - 1. Standard-weight plain-bearing hinges or ball-bearing hinges for interior openings up to 36 inches wide without a door closer.
 - 2. Standard weight ball bearing hinges for interior openings 36 to 40 inches wide without a door closer and for interior openings up to 40 inches wide with a door closer.

- 3. Heavyweight, ball bearing hinges for interior openings over 40 inches wide with a door closer and for all interior vestibule doors.
- 4. Heavyweight stainless steel ball bearing hinges for all exterior openings unless otherwise listed in groups.
- 5. Heavyweight 5" height ball bearing hinges for all doors that have an automatic operator.
- F. 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.
- G. 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
- H. Furnish hinges with width to accommodate trim and allow for 180-degree swing.
- I. Unless otherwise specified, furnish hinges with flat button tips with non-rising pins. Furnish non-removable pin (NRP) hinges at all reverse-handed doors that are furnished with lockable hardware.
- J. Unless otherwise specified, furnish all hinges to template standards.

2.3 CONTINUOUS GEARED HINGES

- A. Acceptable manufacturers and respective catalog numbers:

	<u>Ives</u>	<u>Hager</u>	<u>Pemko</u>	<u>Stanley</u>
1. Full Mortise	112HD	780-112HD	FMSLFHD	661HD
- B. Hinges shall be independently certified by ANSI for compliance with ANSI A156.26, Grade 1 (2012).
- C. Continuous hinges shall be geared type hinge providing full height door support up to 600 lbs.
- D. Hinge shall be non-handed with symmetrical template hole pattern and factory drilled.
- E. Hinge to be able to carry Warnock Hersey Int. or UL for fire rated doors and frames up to 90 minutes.
- F. Provide machine screws for doors which have been reinforced to accept machine screws.
- G. Note: Fire label for doors and frames should be placed on the header and top rail of fire rated doors and frames.

2.4 POWER TRANSFERS

- A. Acceptable manufacturers and respective catalog numbers:

	<u>Von Duprin</u>	<u>ASSA</u>
1. Concealed Ten Wire	EPT-10	CEPT-10
- B. Door cords shall be armored cable with screw on caps.
- C. Concealed power transfers shall be concealed in the door and frame when the door is closed.
- D. Concealed power transfers shall have a steel tube to protect wires from being cut.
- E. Concealed power transfers with spring tubes shall be rejected.
- F. Concealed power transfers shall be supplied with a mud box to house all terminations.

2.5 FLUSH BOLTS AND DUST PROOF STRIKES

- A. Acceptable manufacturers and respective catalog numbers:

	<u>Ives</u>	<u>Trimco</u>	<u>Hager</u>
1. Dust Proof Strike	DP2	3910	280X
2. Auto Flush Bolt (Metal Door)	FB31P	3810	292D

3. Auto Flush Bolt (Wood Door)	FB41P	3815L	291D
4. Constant Latching Bolt (Metal Door)	FB51P	3820	293D
5. Constant Latching Bolt (Wood Door)	FB61P	3825L	294D
6. Manual Flush Bolt	FB458	3915	282D

- B. Unless otherwise specified, provide 12" rods for manual flush bolts for door 7'6" or less, 24" top rods for doors over 7'6" to 8'6".
- C. Unless otherwise specified, provide doors over 8'6" with automatic top bolts.
- D. Provide automatic flush bolts where required to maintain fire door listing and or egress requirements on pairs of doors.
- E. All flush-bolt applications shall be UL listed to be installed with top flush-bolt only. Provide auxiliary fire bolt as required for fire rated openings where less bottom bolt has been specified.
- F. Provide all bottom flush bolts with non-locking dust proof strikes.

2.6 EXIT DEVICES

- A. Acceptable manufacturers and respective catalog numbers:

	<u>Von Duprin</u>	<u>No Substitution</u>
1. Wide Stile, Push Pad	99 Series	
2. Wide Stile, Electric Latch Retraction	QEL 99 Series	
3. Lever Trim	996 Series	
4. Pull Trim	990 Series	

- A. Exit devices shall be independently certified by ANSI for compliance with ANSI A156.3, Grade 1 (2008).
- 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. On full glass doors there shall be no exposed fasteners on the back of the mechanism visible through the glass.
- F. All exit devices shall be provided with flush end caps to reduce potential damage from impact.
- G. All exit devices shall be provided with dead-locking latch bolts to ensure security.
- H. 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.
- I. 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.
- J. Coordinate with related trades to ensure adequate clearance and reinforcement is provided in doors and frames. Provide through bolts as required.
- K. Refer to hardware groups for exit device applications utilizing the option of: "less bottom rod and floor strike" (LBR)

- L. All exit devices shall be provided with trim designs to match other lever and pull designs used on the 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 Von Duprin #154 or equivalent mullion stabilizers at all doors with removable mullions.
- P. Provide reinforced crossbars for all traditional style exit devices applied to doors over 36" wide.

2.7 EXIT DEVICES (ICC-500)

- A. Acceptable manufacturers and respective catalog numbers:

	<u>Von Duprin</u>	<u>No Substitution</u>
1. Wide Stile, Push Pad	WS-T-99 Series	
2. Lever Trim	996 Series	
3. Pull Trim	990 Series	
- B. Exit devices shall be independently certified by ANSI for compliance with ANSI A156.3-2008, Grade 1.
- C. Exit devices shall be FEMA 361 and ICC500 certified.
- D. Exit device shall be tested and approved for compliance and compatibility with manufacturer's tested assembly.
- E. Obtain windstorm exit devices from a single manufacturer, although several may be indicated as offering products complying with requirements.
- F. All exit devices shall be equipped with a sound-dampening feature to reduce push pad return noise.
- G. All exit devices shall be provided with flush end caps to reduce potential damage from impact.
- H. All exit devices shall be provided with dead-locking latch bolts to ensure security.
- I. 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.
- J. Coordinate with related trades to ensure adequate clearance and reinforcement is provided in doors and frames.
- K. All exit devices shall be provided with optional trim designs to match other lever and pull designs used on the project.

2.8 LOCKS AND LATCHES

- A. Acceptable manufacturers and respective catalog numbers:

	<u>Schlage</u>	<u>No Substitution</u>
1. Grade 1 Mortise	L Series 03A	
2. Grade 1 Cylindrical	ND Series TLR	
- B. Bored locks shall be independently certified by ANSI for compliance with ANSI A156.2 (2011).
- C. Mortise locks shall be independently certified by ANSI for compliance with ANSI A156.13 (2012).
- D. Provide full escutcheon at mortise locks with indicators.
- E. Unless otherwise specified, all locks and latches have:
 - 1. 2-3/4" Backset
 - 2. 1/2" minimum throw latchbolt
 - 3. 1" throw deadbolt
 - 4. ANSI A115.2 strikes

- F. Provide guarded latch bolts for all locksets and latch bolts with throw to maintain fire rating of both single and paired door assemblies.
- G. Provide strike with lip length adequate to clear surrounding trim.
- H. Provide wrought boxes for strikes at inactive doors, wood frames, and metal frames without integral mortar covers.
- I. Provide temperature control modules for electrified locks to limit transfer of heat to door lever.

2.9 PULLS, PUSH BARS, PUSH/PULL PLATES

A. Acceptable manufacturers and respective catalog numbers:

	<u>Ives</u>	<u>Burns</u>	<u>Hager</u>
1. Straight Pull (1" dia., 10" CTC)	8103-0	26C	4J
2. Straight Pull (3/4" dia., 8" CTC)	8102-8	25B	3G
3. Pull / Push-Bar (1" dia., 10" CTC Pull)	9103-0	422 x 26C	153
4. Push Plate (.050 6"X 16")	8200 6" X 16"	56	30S 6 x 16
5. Pull Plate (1" dia., 10" CTC - .050" X 4" X 16")	8303-0 4" X 16"	5426C	34J 4 x 16

- A. 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 on 4 sides and counter sunk.
- B. When mounting straight pull on a wide stile door will prevent access to key cylinder, mount pull offset from cylinder location to allow access to cylinder.
- 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.

2.10 COORDINATORS

A. Acceptable manufacturers and respective catalog numbers:

	<u>Ives</u>	<u>Trimco</u>	<u>Hager</u>
1. Bar Coordinator	COR x FL	3094	297D x 297F
2. Mounting Bracket	MB Series	3095/3096	297 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.

2.11 CLOSERS

A. Acceptable manufacturers and respective catalog numbers:

<u>LCN</u>	<u>No Substitution</u>
1. 4050A / 4050A EDA	

- B. Door closers shall be independently certified by ANSI for compliance with ANSI A156.4, Grade 1 (2013).
- C. Obtain door closers from a single manufacturer, although several may be indicated as offering products complying with requirements.
- D. Provide extra heavy-duty arm (EDA / HD) when closer is to be installed using parallel arm mounting.
- E. Hardware supplier shall coordinate with related trades to ensure aluminum frame profiles will accommodate specified door closers.
- F. Closers shall use aluminum cylinders.

- G. Closers for fire-rated doors shall be provided with temperature stabilizing fluid that complies with standards UL10C.
- H. Unless otherwise specified, all door closers shall have full covers and separate adjusting valves for sweeps, latch, and backcheck.
- I. Provide closers for all labeled doors. Provide closer series and type consistent with other closers for similar doors specified elsewhere on the project.
- J. Provide closers with adjustable spring power. Size closers to ensure 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.
- K. Install closers on the room side of corridor doors, stair side of stairways and interior side of exterior doors.
- L. Closers shall be furnished with all mounting brackets and cover plates as required by door and frame conditions and by adjacent hardware.
- M. 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.

2.12 LOW ENERGY ELECTRO-HYDRAULIC AUTOMATIC OPERATORS

- A. Acceptable manufacturers and respective catalog numbers:

	<u>LCN</u>	<u>No Substitution</u>
1. Electro-Hydraulic Operator	4640	
2. Wall-mount Actuator, 4-3/4" Square	8310-853	
3. Mullion-mount Actuator	8310-818	
4. Double Vestibule Actuator, 4-3/4" Square	8310-855	

- B. Low energy operators shall be independently certified by ANSI for compliance with ANSI A156.19 (2002).
- C. 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.
- D. 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.
- E. Full closing force shall be provided when the power or assist cycle ends.
- F. 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-volatile 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. Exterior actuator switches shall be weather resistant and mount on a single gang electrical box furnished by Division 26.
- G. 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.
- H. Power Operators shall be warranted by the manufacturer to be free from defects in material and workmanship for a period of two years.

2.13 PEDESTALS

- A. Acceptable manufacturers and respective catalog numbers:
- | | |
|-----------------------------|--------------------|
| | <u>PedestalPro</u> |
| 1. Steel Gooseneck Pedestal | 36-9C 36" BLK |
| 2. Housing | MC-CS-08-E BLK |
- B. Provide carbon steel pedestal with powder-coat finish.
- C. Provide all mounting bolts, plates, and fasteners as required for complete installation.
- D. Provide housings, hoods, and mounting boxes as required for all pedestal-mounted equipment.
- E. Provide pedestals at locations indicated on Drawings. Verify final pedestal locations with architect.
- F. Verify pedestal-mounted equipment mounting heights and locations comply with applicable codes prior to installation.

2.14 KICK PLATES AND MOP PLATES

- A. Furnish protective plates as specified in hardware groups.
- B. 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.
- C. Protective plates shall be 2" less door width, or 1" less door width at pairs. All protective plates shall be beveled on 4 sides and counter sunk.
- D. Protection plates over 16" shall not be provided for labeled doors unless specifically approved by door manufacturers listing. When protection plates over 16" are provided for labeled doors, the plate shall be labeled.
- 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 OVERHEAD STOPS

- A. Acceptable manufacturers and respective catalog numbers:
- | | | |
|----------------------|---------------|----------------|
| <u>Glynn-Johnson</u> | <u>Rixson</u> | <u>Sargent</u> |
|----------------------|---------------|----------------|

- | | | | |
|-------------------------------|--------------|----------|-----|
| 1. Heavy Duty Surface Mount | GJ900 Series | 9 Series | 590 |
| 2. Heavy Duty Concealed Mount | GJ100 Series | 1 Series | 690 |
- B. Unless otherwise specified, furnish GJ900 series overhead stop for hollow metal or 1-3/4" solid core doors equipped with regular arm surface type closers that swing more than 140 degrees before striking a wall, for hollow metal or 1-3/4" solid core doors that open against equipment, casework, sidelights, or other objects that would make wall bumpers inappropriate, and as specified in hardware groups.
 - C. Furnish sex bolt attachments for wood and mineral core doors unless doors are supplied with proper reinforcing blocks.
 - D. Provide special stop only ("SE" suffix) overhead stops when used in conjunction with electronic hold open closers.
 - E. Do not provide holder function for labeled doors.

2.16 WALL STOPS AND HOLDERS

- A. Acceptable manufacturers and respective catalog numbers:

	<u>Ives</u>	<u>Hager</u>	<u>Burns</u>
1. Wrought Convex Wall Stop	WS406CVX	232W	570
2. Wrought Concave Wall Stop	WS406CCV	236W	575
3. Automatic Wall Holder	WS40	326W	533
- B. Furnish a stop or holder for all doors.
- C. Provide concave style wall stop at all adjacent integral push button locks; provide convex style wall stop at all other locations.
- D. Where wall stops are not applicable, furnish overhead stops.
- E. Furnish floor stops only where specified in hardware sets.
- F. Do not provide holder function for labeled doors.

2.17 MAGNETIC HOLD OPENS

- A. Acceptable manufacturers and respective catalog numbers:

	<u>LCN</u>	<u>ABH</u>	<u>Edwards</u>
1. Wall Holder	SEM 7800	2000	1500
- B. Magnetic hold opens shall be independently certified by ANSI for compliance with ANSI A156.15, Grade 1 (2006).
- C. Magnetic holder housing and armature shall be constructed of die-cast zinc.
- D. Where wall conditions do not permit the armature to reach the magnet, provide extensions.
- E. Provide proper voltage and power consumption as required by Division 16.
- F. Coordinate electrical requirements and mounting locations with related trades.

2.18 WEATHERSTRIP, GASKETING

- A. Acceptable manufacturers and respective catalog numbers:

	<u>Zero</u>	<u>Pemko</u>	<u>NGP</u>	<u>Reese</u>
1. Weatherstrip	429	2891_PK	700NA	755
2. Adhesive Gasket	188	S88	5050	797
3. Mullion Seal/Silencer	8780	5110	5100N	628
4. Meeting Edge Seals	8193	18041	9605	959
5. Automatic Door Bottom	369	***	***	***
6. Sweep w/ drip	8198	345_N	C627	354
7. Drip Cap	142	346	16	R201

- B. Weatherstrip and gasketing shall be independently certified by ANSI for compliance with ANSI A156.22 (2005).
- C. Where specified in the hardware groups, furnish the above products unless otherwise detailed in groups.
- D. Provide weatherstripping all exterior doors and where specified in hardware sets.
- E. Provide intumescent and other required edge sealing systems as required by individual fire door listings to comply with positive pressure standards UL 10C.
- F. Provide Zero 188 smoke gaskets at all fire rated doors and smoke and draft control assemblies.
- G. 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.

2.19 THRESHOLDS

- A. Acceptable manufacturers and respective catalog numbers:

	<u>Zero</u>	<u>Pemko</u>	<u>NGP</u>	<u>Reese</u>
1. Saddle Threshold	8655	171	425	S205
2. Thermal Break Saddle Threshold	625	252X3_ FG	8425	S471
3. Half Saddle Threshold	1675	****	325	S245
4. Saddle Threshold (Interior)	63	151	411	S263

- A. Thresholds shall be independently certified by ANSI for compliance with ANSI A156.21 (2001).
- B. Hardware supplier shall verify finish floor conditions and provide proper threshold as required to provide a smooth transition between finished floor surfaces.
- C. Unless otherwise specified or detailed, provide threshold as follows:
 - 1. Provide Zero 8655 or similar saddle threshold for exterior openings with finished floor height transition of 1/4" or less.
 - 2. Provide Zero 1675 or similar half-saddle threshold for exterior openings with finished floor height transition of 1/4" to 1/2".
 - 3. Provide Zero 63 or similar low-rise saddle threshold for interior openings when specified with a door sweep or automatic door bottom.

2.20 POWER SUPPLIES

- A. Acceptable manufacturers and respective catalog numbers:

	<u>Von Duprin</u>
1. Power Supply	PS900 Series

- B. All power supplies shall have the following features:
 - 1. 12/24 VDC Output, field selectable.
 - 2. Class 2 Rated power limited output.
 - 3. Universal 120-240 VAC input.
 - 4. Low voltage DC regulated and filtered.
 - 5. Polarized connector for distribution boards.
 - 6. Fused primary input.
 - 7. AC input and DC output monitoring circuit w/LED indicators.
 - 8. Cover mounted AC Input indication.
 - 9. Tested and certified to meet UL294.
 - 10.NEMA 1 enclosure.
 - 11.Hinged cover w/lock down screws.
 - 12.High voltage protective cover.
- C. All power supplies shall incorporate fused distribution boards.
- D. All electro-mechanical systems requiring fail safe circuits shall be capable of interfacing with the fire alarm system to cut power to appropriate system components. Unless already provided in

another system component, all power supplies utilized in fail safe circuits shall include an integral relay which when connected to the N/C fire alarm contact will cut power to all openings connected to the individual power supply. Power supply, unless otherwise specified, will automatically reset itself when fire alarm relay returns to normal state following a fire alarm.

2.21 DOOR POSITION SWITCHES

A. Acceptable manufacturers and respective catalog numbers:

	<u>Schlage Electronics</u>	<u>GEI</u>	<u>Sargent</u>
1. Concealed	679 Series	1076W	3287

2.22 SLIDING DOOR HARDWARE

A. Acceptable Manufacturers and respective catalog numbers:

	<u>K.N. Crowder</u>
1. Pocket Door Kit	As specified

B. Provide complete hardware sets for each opening specified with sliding door hardware. Include track, ball-bearing hangers, door stops, fasteners, guides, and all hardware required for a complete installation.

C. Hardware supplier shall coordinate with related trades to ensure that wall pocket framing will accommodate specified hardware.

2.23 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:

<u>HARDWARE ITEM</u>	<u>BHMA FINISH</u>
1. Butt Hinges: Exterior	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	719 (Mill Aluminum)
14. Weather-strip, Sweeps Drip Caps	Aluminum Anodized
15. Magnetic Holders	689 (Powder Coat Aluminum)
16. Miscellaneous	626 (US26D - Satin Chromium)

2.24 KEYING

A. All cylinders and cores will be existing reused or new provided by Owner. Existing key system is Medeco utilizing large format interchangeable cores.

B. All locks under this section will be keyed by the Owner to an existing Master Key System.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to installation of hardware, installer shall examine door frame installation to ensure frames have been set square and plumb. Installer shall examine doors, door frames, and adjacent wall, floor, and ceiling for conditions, which would adversely affect proper operation and function of door assemblies. Do not proceed with hardware installation until such deficiencies have been corrected.

3.2 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. Provide blocking or reinforcement for all hardware mounted to drywall construction, including wall mounted door stops and holders.
- C. Shim doors as required to maintain proper operating clearance between door and frame.
- D. Install all hardware in accordance with the approved hardware schedule and manufacturer's instructions for installation and adjustment.
- E. Set units level, plumb and true to the line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- F. Drill and countersink units which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accord with industry standards.
- G. Drill appropriate size pilot holes for all hardware attached to wood doors and frames.
- H. 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.
- I. Use only fasteners supplied by or approved by the manufacturer for each respective item of hardware.
- 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 ensure exterior and fire rated doors will consistently close and latch doors under existing conditions. Adjust all other door closers to ensure opening force does not exceed 5 lbs.
- S. Adjust "sweep", "latch", & "back check" valves on all door closers to properly control door throughout 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 one complete set of installation and adjustment instructions, and tools as furnished with the hardware.

3.3 FIELD QUALITY CONTROL

- A. After installation has been completed, the hardware supplier for locksets, door closers, exit devices and overhead stops shall check the project and verify compliance with installation instructions, adjustment of all hardware items, and proper application according to the approved hardware schedule. Hardware supplier shall submit a list of all hardware that has not been installed correctly.
- B. After installation has been completed, the hardware supplier meet with the owner to explain the functions, uses, adjustment, and maintenance of each item of hardware. Hardware supplier shall provide the owner with a copy of all wiring diagrams. Wiring diagrams shall be opening-specific and include both a riser diagram and point to point diagram showing all wiring terminations.

3.4 ADJUSTMENT AND CLEANING

- A. At final completion, and when H.V.A.C. equipment is in operation, installer shall make final adjustments to and verify proper operation of all door closers and other items of hardware. Lubricate moving parts with type lubrication recommended by the manufacturer.
- B. All hardware shall be left clean and in good operation. Hardware found to be disfigured, defective, or inoperative shall be repaired or replaced.

3.5 HARDWARE SCHEDULE

- A. The following schedule of hardware groups is intended to describe opening function. The hardware supplier is cautioned to refer to the preamble of this specification for a complete description of all materials and services to be furnished under this section.

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HW SET: 01 - Not Used

HW SET: 02

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	KEYED PRIVACY LOCK	ND52 OS-OCC	SCH
1	EA	OH STOP	90S	GLY

FUNCTION: KEYED PRIVACY LOCK (OFFICE LOCK W/ RESTORING LATCH). OUTSIDE LEVER LOCKED/UNLOCKED BY OUTSIDE KEY. INSIDE BUTTON LOCKS OUTSIDE LEVER UNTIL UNLOCKED BY OUTSIDE KEY, TURNING INSIDE LEVER, OR CLOSING DOOR. INSIDE LEVER ALWAYS UNLOCKED. OUTSIDE INDICATOR DISPLAYS LOCKED/UNLOCKED STATUS.

HW SET: 03 - Not Used

HW SET: 04 - Not Used

HW SET: 05

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	PASSAGE SET	L9010	SCH
1	EA	OH STOP	90S	GLY

FUNCTION: (F01) PASSAGE LATCH. LATCH RETRACTED BY LEVER EITHER SIDE. BOTH LEVERS ALWAYS UNLOCKED.

HW SET: 06

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	PASSAGE SET	L9010	SCH
1	EA	SURFACE CLOSER	4050A / 4050A EDA	LCN
1	EA	KICK PLATE	8400 10"	IVE
1	EA	WALL STOP	WS406	IVE
1	EA	PERIMETER SEAL	188S	ZER

FUNCTION: (F01) PASSAGE LATCH. LATCH RETRACTED BY LEVER EITHER SIDE. BOTH LEVERS ALWAYS UNLOCKED.

HW SET: 06.1

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	PASSAGE SET	L9010	SCH
1	EA	OH STOP	90S	GLY
1	EA	SURFACE CLOSER	4050A / 4050A EDA	LCN
1	EA	KICK PLATE	8400 10"	IVE
1	EA	PERIMETER SEAL	188S	ZER

FUNCTION: (F01) PASSAGE LATCH. LATCH RETRACTED BY LEVER EITHER SIDE. BOTH LEVERS ALWAYS UNLOCKED.

HW SET: 07 - Not Used

HW SET: 08 - Not Used

HW SET: 09 - Not Used

HW SET: 10

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	OFFICE W/SIM RETRACT W/ OUTSIDE INDICATOR W/ INSIDE INDICATOR	L9056 OS-OCC IS-LOC XL13-439	SCH
1	EA	KEY CYLINDER CORE	AS REQUIRED	
1	EA	WALL STOP	WS406	IVE

FUNCTION: KEYED PRIVACY LOCK WITH INDICATOR. OUTSIDE LEVER LOCKED BY OUTSIDE KEY OR INSIDE TURN. OUTSIDE LEVER UNLOCKED BY INSIDE TURN, INSIDE LEVER, OUTSIDE KEY, OR CLOSING DOOR. INSIDE LEVER ALWAYS UNLOCKED. OUTSIDE INDICATOR DISPLAYS OCCUPIED/VACANT STATUS. INSIDE INDICATOR DISPLAYS LOCKED/UNLOCKED STATUS. KEY OVERRIDES THUMBTURN FOR EMERGENCY ACCESS.

HW SET: 11

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	OFFICE W/SIM RETRACT W/ OUTSIDE INDICATOR W/ INSIDE INDICATOR	L9056 OS-OCC IS-LOC XL13-439	SCH
1	EA	KEY CYLINDER CORE	AS REQUIRED	
1	EA	SURFACE CLOSER	4050A / 4050A EDA	LCN
1	EA	KICK PLATE	8400 10"	IVE
1	EA	WALL STOP	WS406	IVE

FUNCTION: KEYED PRIVACY LOCK WITH INDICATOR. OUTSIDE LEVER LOCKED BY OUTSIDE KEY OR INSIDE TURN. OUTSIDE LEVER UNLOCKED BY INSIDE TURN, INSIDE LEVER, OUTSIDE KEY, OR CLOSING DOOR. INSIDE LEVER ALWAYS UNLOCKED. OUTSIDE INDICATOR DISPLAYS OCCUPIED/VACANT STATUS. INSIDE INDICATOR DISPLAYS LOCKED/UNLOCKED STATUS. KEY OVERRIDES THUMBTURN FOR EMERGENCY ACCESS.

HW SET: 12

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	OFFICE W/SIM RETRACT W/ INSIDE INDICATOR	L9056 IS-LOC XL13-439	SCH
1	EA	KEY CYLINDER CORE	AS REQUIRED	
1	EA	WALL STOP	WS406	IVE

FUNCTION: KEYED PRIVACY LOCK WITH INDICATOR. OUTSIDE LEVER LOCKED BY OUTSIDE KEY OR INSIDE TURN. OUTSIDE LEVER UNLOCKED BY INSIDE TURN, INSIDE LEVER, OUTSIDE KEY, OR CLOSING DOOR. INSIDE LEVER ALWAYS UNLOCKED. INSIDE INDICATOR DISPLAYS LOCKED/UNLOCKED STATUS. KEY OVERRIDES THUMBTURN FOR EMERGENCY ACCESS.

HW SET: 13

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	OFFICE W/SIM RETRACT W/ INSIDE INDICATOR	L9056 IS-LOC XL13-439	SCH
1	EA	KEY CYLINDER CORE	AS REQUIRED	
1	EA	OH STOP	90S	GLY

FUNCTION: KEYED PRIVACY LOCK WITH INDICATOR. OUTSIDE LEVER LOCKED BY OUTSIDE KEY OR INSIDE TURN. OUTSIDE LEVER UNLOCKED BY INSIDE TURN, INSIDE LEVER, OUTSIDE KEY, OR CLOSING DOOR. INSIDE LEVER ALWAYS UNLOCKED. INSIDE INDICATOR DISPLAYS LOCKED/UNLOCKED STATUS. KEY OVERRIDES THUMBTURN FOR EMERGENCY ACCESS.

HW SET: 14 - Not Used**HW SET: 15 - Not Used****HW SET: 16 - Not Used****HW SET: 17**

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	DBL CYL STORE LOCK	L9066	SCH
2	EA	KEY CYLINDER CORE	AS REQUIRED	
1	EA	KICK PLATE	8400 10"	IVE
1	EA	WALL STOP	WS406	IVE

FUNCTION: (F14) STORE LOCK. LATCH RETRACTED BY LEVER FROM EITHER SIDE. BOTH LEVERS LOCKED OR UNLOCKED BY KEY FROM EITHER SIDE.

HW SET: 18 - Not Used**HW SET: 19**

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	CLASSROOM LOCK	L9070	SCH
1	EA	KEY CYLINDER CORE	AS REQUIRED	
1	EA	WALL STOP	WS406	IVE

FUNCTION: (F05) CLASSROOM LOCK. OUTSIDE LEVER LOCKED AND UNLOCKED BY OUTSIDE KEY. INSIDE LEVER ALWAYS UNLOCKED.

HW SET: 20

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	CLASSROOM LOCK	L9070	SCH
1	EA	KEY CYLINDER CORE	AS REQUIRED	
1	EA	OH STOP	90S	GLY

FUNCTION: (F05) CLASSROOM LOCK. OUTSIDE LEVER LOCKED AND UNLOCKED BY OUTSIDE KEY. INSIDE LEVER ALWAYS UNLOCKED.

HW SET: 20.1 - Not Used**HW SET: 21**

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	CLASSROOM LOCK	L9070	SCH
1	EA	KEY CYLINDER CORE	AS REQUIRED	
1	EA	WALL STOP	WS406	IVE
2	EA	PERIMETER SEAL	188S (1 EA AT STOP AND RABBET)	ZER
1	EA	DOOR BOTTOM	369	ZER
1	EA	THRESHOLD	63	ZER

FUNCTION: (F05) CLASSROOM LOCK. OUTSIDE LEVER LOCKED AND UNLOCKED BY OUTSIDE KEY. INSIDE LEVER ALWAYS UNLOCKED.

HW SET: 22

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGES AND SEALS	BY ACOUSTIC DOOR MFR	BYO
1	EA	CLASSROOM LOCK	L9070	SCH
1	EA	KEY CYLINDER CORE	AS REQUIRED	
1	EA	WALL STOP	WS406	IVE

FUNCTION: (F05) CLASSROOM LOCK. OUTSIDE LEVER LOCKED AND UNLOCKED BY OUTSIDE KEY. INSIDE LEVER ALWAYS UNLOCKED.
COORDINATE HARDWARE WITH ACOUSTIC DOOR SUPPLIER.

HW SET: 22.1

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGES AND SEALS	BY ACOUSTIC DOOR MFR	BYO
1	EA	CLASSROOM LOCK	L9070	SCH
1	EA	KEY CYLINDER CORE	AS REQUIRED	
1	EA	OH STOP	90S	GLY

FUNCTION: (F05) CLASSROOM LOCK. OUTSIDE LEVER LOCKED AND UNLOCKED BY OUTSIDE KEY. INSIDE LEVER ALWAYS UNLOCKED.
COORDINATE HARDWARE WITH ACOUSTIC DOOR SUPPLIER.

FOR DOORS WITH CAM-LIFT HINGES WITH LIFT 1/8"-1/2", USE ABH 9000 SERIES "CL" OVERHEAD STOP. DO NOT USE OVERHEAD STOP FOR DOORS WITH CAM-LIFT HINGES WITH LIFT OVER 1/2".

HW SET: 23

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	CLASSROOM LOCK	L9070	SCH
1	EA	KEY CYLINDER CORE	AS REQUIRED	
1	EA	SURFACE CLOSER	4050A / 4050A EDA	LCN
1	EA	KICK PLATE	8400 10"	IVE
1	EA	WALL STOP	WS406	IVE
1	EA	PERIMETER SEAL	188S (AT RATED DOORS)	ZER

FUNCTION: (F05) CLASSROOM LOCK. OUTSIDE LEVER LOCKED AND UNLOCKED BY OUTSIDE KEY. INSIDE LEVER ALWAYS UNLOCKED.

HW SET: 23.1 - Not Used

HW SET: 23.2

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED (STAINLESS STEEL)	IVE
1	EA	CLASSROOM LOCK	L9070	SCH
1	EA	KEY CYLINDER CORE	AS REQUIRED	
1	EA	SURFACE CLOSER	4050A SRI / 4050 EDA SRI	LCN
1	EA	WALL STOP	WS406	IVE
1	EA	PERIMETER SEAL	188S	ZER

FUNCTION: (F05) CLASSROOM LOCK. OUTSIDE LEVER LOCKED AND UNLOCKED BY OUTSIDE KEY. INSIDE LEVER ALWAYS UNLOCKED.

HW SET: 24 - Not Used

HW SET: 25

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	FLUSH BOLT	AUTOMATIC	IVE
1	EA	CLASSROOM LOCK	L9070	SCH
1	EA	KEY CYLINDER CORE	AS REQUIRED	
2	EA	WALL STOP	WS406	IVE

FUNCTION: (F05) CLASSROOM LOCK. OUTSIDE LEVER LOCKED AND UNLOCKED BY OUTSIDE KEY. INSIDE LEVER ALWAYS UNLOCKED.

HW SET: 25.1

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	FLUSH BOLT	AUTOMATIC	IVE
1	EA	CLASSROOM LOCK	L9070	SCH
1	EA	KEY CYLINDER CORE	AS REQUIRED	
2	EA	WALL STOP/HOLDER	WS40	IVE

FUNCTION: (F05) CLASSROOM LOCK. OUTSIDE LEVER LOCKED AND UNLOCKED BY OUTSIDE KEY. INSIDE LEVER ALWAYS UNLOCKED.

HW SET: 25.2

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED (STAINLESS STEEL)	IVE
1	EA	FLUSH BOLT	AUTOMATIC	IVE
1	EA	CLASSROOM LOCK	L9070	SCH
1	EA	KEY CYLINDER CORE	AS REQUIRED	
2	EA	WALL STOP	WS406	IVE

FUNCTION: (F05) CLASSROOM LOCK. OUTSIDE LEVER LOCKED AND UNLOCKED BY OUTSIDE KEY. INSIDE LEVER ALWAYS UNLOCKED.

HW SET: 26

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	FLUSH BOLT	AUTOMATIC	IVE
1	EA	CLASSROOM LOCK	L9070	SCH
1	EA	KEY CYLINDER CORE	AS REQUIRED	
2	EA	OH STOP	90S	GLY

FUNCTION: (F05) CLASSROOM LOCK. OUTSIDE LEVER LOCKED AND UNLOCKED BY OUTSIDE KEY. INSIDE LEVER ALWAYS UNLOCKED.

HW SET: 27

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	FLUSH BOLT	AUTOMATIC	IVE
1	EA	CLASSROOM LOCK	L9070	SCH
1	EA	KEY CYLINDER CORE	AS REQUIRED	
1	EA	COORDINATOR	COR X FL	IVE
2	EA	SURFACE CLOSER	4050A / 4050A EDA	LCN
2	EA	KICK PLATE	8400 10"	IVE
2	EA	FIRE/LIFE WALL MAG	SEM7800	LCN
1	EA	PERIMETER SEAL	188S	ZER
2	EA	MEETING STILE SEAL	8193 (1 EA LEAF)	ZER
1	EA	N/C FIRE ALARM RELAY	BY FIRE ALARM CONTRACTOR	B/O

FUNCTION: (F05) CLASSROOM LOCK. OUTSIDE LEVER LOCKED AND UNLOCKED BY OUTSIDE KEY. INSIDE LEVER ALWAYS UNLOCKED.
ELECTRONIC HOLDER TO RELEASE UPON ACTUATION OF FIRE ALARM SYSTEM.

HW SET: 28 - Not Used**HW SET: 29 - Not Used****HW SET: 30**

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	CLASSROOM SECURITY	L9071	SCH
1	EA	KEY CYLINDER CORE	AS REQUIRED	
1	EA	SURFACE CLOSER	4050A / 4050A EDA	LCN
1	EA	KICK PLATE	8400 10"	IVE
1	EA	WALL STOP	WS406	IVE
1	EA	PERIMETER SEAL	188S	ZER

FUNCTION: (F32) CLASSROOM SECURITY LOCK. OUTSIDE LEVER LOCKED AND UNLOCKED BY OUTSIDE OR INSIDE KEY. INSIDE LEVER ALWAYS UNLOCKED.

HW SET: 31

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	STOREROOM LOCK	L9080	SCH
1	EA	KEY CYLINDER CORE	AS REQUIRED	
1	EA	WALL STOP	WS406	IVE

FUNCTION: (F07) STOREROOM LOCK. FIXED OUTSIDE TRIM - OUTSIDE KEY RETRACTS LATCH. INSIDE LEVER ALWAYS UNLOCKED.

HW SET: 32

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	POWER TRANSFER	EPT10	VON
2	EA	FLUSH BOLT	AUTOMATIC	IVE
1	EA	DUST PROOF STRIKE	DP2	IVE
1	EA	STOREROOM LOCK	L9080 RX	SCH
1	EA	KEY CYLINDER CORE	AS REQUIRED	
1	EA	SURFACE CLOSER	4050A / 4050A EDA	LCN
2	EA	KICK PLATE	8400 10"	IVE
2	EA	WALL STOP	WS406	IVE
1	EA	RAIN DRIP	142	ZER
1	SET	GASKETING	429	ZER
			(MOUNT PRIOR TO CLOSER)	
1	EA	ASTRAGAL SEAL	488S	ZER
1	EA	WELDED OVERLAPPING ASTRAGAL	BY DOOR SUPPLIER	B/O
2	EA	DOOR SWEEP	8198	ZER
1	EA	THRESHOLD	8655	ZER
2	EA	DOOR POSITION SWITCH	679	SCE

FUNCTION: (F07) STOREROOM LOCK. FIXED OUTSIDE TRIM - OUTSIDE KEY RETRACTS LATCH. INSIDE LEVER ALWAYS UNLOCKED.

HW SET: 32.1

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	FLUSH BOLT	AUTOMATIC	IVE
1	EA	STOREROOM LOCK	L9080	SCH
1	EA	KEY CYLINDER CORE	AS REQUIRED	
1	EA	OH STOP	90S	GLY
2	EA	SURFACE CLOSER	4050A / 4050A EDA	LCN
2	EA	KICK PLATE	8400 10"	IVE
1	EA	WALL STOP	WS406	IVE
1	EA	GASKETING	188S	ZER
2	EA	MEETING STILE SEAL	8193 (1 EA LEAF)	ZER

FUNCTION: (F07) STOREROOM LOCK. FIXED OUTSIDE TRIM - OUTSIDE KEY RETRACTS LATCH. INSIDE LEVER ALWAYS UNLOCKED.

HW SET: 33

QTY		DESCRIPTION	CATALOG NUMBER	MFR
3	EA	HINGE	AS REQUIRED	IVE
1	EA	STOREROOM W/DEADBOLT W/ OUTSIDE INDICATOR	L9480 OS-OCC	SCH
1	EA	KEY CYLINDER CORE	AS REQUIRED	
1	EA	SURFACE CLOSER	4050A / 4050A EDA	LCN
1	EA	KICK PLATE	8400 10"	IVE
1	EA	WALL STOP	WS406	IVE

FUNCTION: STOREROOM LOCK WITH DEADBOLT. FIXED OUTSIDE TRIM - OUTSIDE KEY RETRACTS LATCH. INSIDE LEVER ALWAYS UNLOCKED. DEADBOLT ACTUATED BY OUTSIDE KEY OR INSIDE TURN. INSIDE LEVER RETRACTS DEADBOLT. OUTSIDE INDICATOR DISPLAYS OCCUPIED/VACANT STATUS CORRESPONDING TO DEADBOLT POSITION.

HW SET: 34

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	EU ELR MORTISE LOCK	L9696EU	SCH
1	EA	KEY CYLINDER CORE	AS REQUIRED	
1	EA	OH STOP	100S	GLY
1	EA	SURFACE CLOSER	4050A / 4050A EDA	LCN
1	EA	ACTUATOR, HAND-WAVE	8310-810S	LCN
1	EA	CREDENTIAL READER	BY SECURITY SUPPLIER	B/O
1	EA	DOOR POSITION SWITCH	679	SCE
1	EA	POWER SUPPLY	PS902 900-2RS	VON
1	EA	WIRING DIAGRAMS	RISER AND POINT-TO-POINT	

FUNCTION: ELECTRIFIED STOREROOM LOCK WITH ELECTRONIC LATCH RETRACTION - FAIL SECURE.

LATCH RETRACTED BY KEY EITHER SIDE.

(CORRIDOR SIDE) LEVER ALWAYS FIXED/INOPERATIVE.

OUTSIDE ACTUATOR ENABLED/DISABLED BY ELECTRONIC ACCESS CONTROL SYSTEM.

LATCH ELECTRICALLY RETRACTED BY HAND-WAVE ACTUATOR FOR MOMENTARY ACCESS FROM CORRIDOR TO RECEPTION.

(RECEPTION SIDE) LEVER LOCKED/UNLOCKED BY ELECTRONIC ACCESS CONTROL SYSTEM. UPON LOSS OF POWER, LATCH EXTENDS AND BOTH LEVERS REMAIN LOCKED.

HW SET: 35

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	POWER TRANSFER	EPT10	VON
1	EA	EU STOREROOM LOCK	L9092EU RX	SCH
1	EA	KEY CYLINDER CORE	AS REQUIRED	
1	EA	SURFACE CLOSER	4050A / 4050A EDA	LCN
1	EA	KICK PLATE	8400 10"	IVE
1	EA	WALL STOP	WS406	IVE
1	EA	PERIMETER SEAL	188S (AT RATED DOORS)	ZER
1	EA	CREDENTIAL READER	BY SECURITY SUPPLIER	B/O
1	EA	DOOR POSITION SWITCH	679	SCE
1	EA	POWER SUPPLY	PS902 900-2RS	VON
1	EA	WIRING DIAGRAMS	RISER AND POINT-TO-POINT	

FUNCTION: ELECTRIFIED STOREROOM LOCK - FAIL SECURE. OUTSIDE KEY OR INSIDE LEVER RETRACTS LATCH. INSIDE LEVER ALWAYS UNLOCKED. OUTSIDE LEVER UNLOCKED BY ELECTRONIC ACCESS CONTROL SYSTEM. UPON LOSS OF POWER, OUTSIDE LEVER REMAINS LOCKED.

HW SET: 36 - Not Used**HW SET: 37**

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	POWER TRANSFER	EPT10	VON
1	EA	EU STOREROOM LOCK	L9092EU RX	SCH
1	EA	SURFACE CLOSER	4050A SCUSH	LCN
1	EA	RAIN DRIP	142	ZER
1	SET	GASKETING	429 (MOUNT PRIOR TO CLOSER)	ZER
1	EA	DOOR SWEEP	8198	ZER
1	EA	THRESHOLD	8655	ZER
1	EA	CREDENTIAL READER	BY SECURITY SUPPLIER	B/O
1	EA	DOOR POSITION SWITCH	679	SCE
1	EA	POWER SUPPLY	PS902 900-2RS	VON
1	EA	WIRING DIAGRAMS	RISER AND POINT-TO-POINT	

FUNCTION: ELECTRIFIED STOREROOM LOCK - FAIL SECURE. OUTSIDE KEY OR INSIDE LEVER RETRACTS LATCH. INSIDE LEVER ALWAYS UNLOCKED. OUTSIDE LEVER UNLOCKED BY ELECTRONIC ACCESS CONTROL SYSTEM. UPON LOSS OF POWER, OUTSIDE LEVER REMAINS LOCKED.

HW SET: 38

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	POWER TRANSFER	EPT10	VON
2	EA	FLUSH BOLT	AUTOMATIC	IVE
1	EA	DUST PROOF STRIKE	DP2	IVE
1	EA	EU STOREROOM LOCK	L9092EU RX	SCH
1	EA	OH STOP	90S	GLY
1	EA	SURFACE CLOSER	4050A SCUSH	LCN
2	EA	KICK PLATE	8400 10"	IVE
1	SET	GASKETING	429 (MOUNT PRIOR TO CLOSER)	ZER
1	EA	ASTRAGAL SEAL	488S	ZER
1	EA	WELDED OVERLAPPING ASTRAGAL	BY DOOR SUPPLIER	B/O
2	EA	DOOR SWEEP	8198	ZER
1	EA	THRESHOLD	8655	ZER
2	EA	DOOR POSITION SWITCH	679	SCE
1	EA	POWER SUPPLY	PS902 900-2RS	VON
1	EA	WIRING DIAGRAMS	RISER AND POINT-TO-POINT	

FUNCTION: ELECTRIFIED STOREROOM LOCK - FAIL SECURE. OUTSIDE KEY OR INSIDE LEVER RETRACTS LATCH. INSIDE LEVER ALWAYS UNLOCKED. OUTSIDE LEVER UNLOCKED BY ELECTRONIC ACCESS CONTROL SYSTEM. UPON LOSS OF POWER, OUTSIDE LEVER REMAINS LOCKED.

HW SET: 39

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	POWER TRANSFER	EPT10	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-99-DT	VON
1	EA	OH STOP	100S	GLY
1	EA	SURF. AUTO OPERATOR	4642	LCN
2	EA	ACTUATOR, WALL OR JAMB MOUNT	8310-853 OR 8310-818 AS REQD (VERIFY TYPE AND MOUNTING LOCATION)	LCN
1	EA	CREDENTIAL READER	BY SECURITY SUPPLIER	B/O
1	EA	DOOR POSITION SWITCH	679	SCE
1	EA	POWER SUPPLY	PS902 900-2RS	VON
1	EA	WIRING DIAGRAMS	RISER AND POINT-TO-POINT	

FUNCTION: DUMMY TRIM PANIC HARDWARE WITH ELECTRIC LATCH RETRACTION. FIXED OUTSIDE TRIM. INSIDE PUSH PAD RETRACTS LATCH FOR EGRESS. LATCH ELECTRICALLY RETRACTED BY ELECTRONIC ACCESS CONTROL SYSTEM FOR PUSH/PULL OPERATION. OUTSIDE ACTUATOR AUTOMATICALLY OPENS DOOR ONLY WHILE LATCH IS RETRACTED. INSIDE ACTUATOR RETRACTS LATCH AND AUTOMATICALLY OPENS DOOR AT ALL TIMES.

HW SET: 40

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	POWER TRANSFER	EPT10	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-99-DT	VON
1	EA	OH STOP	100S	GLY
1	EA	SURF. AUTO OPERATOR	4642	LCN
2	EA	ACTUATOR, WALL OR JAMB MOUNT	8310-853 OR 8310-818 AS REQD (VERIFY TYPE AND MOUNTING LOCATION)	LCN
1	EA	PEDESTAL	36-9C 36"	WIK
1	EA	RAIN DRIP	142	ZER
1	EA	WEATHERSTRIPPING	BY DOOR SUPPLIER	B/O
1	EA	DOOR SWEEP	8198	ZER
1	EA	THRESHOLD	8655	ZER
1	EA	CREDENTIAL READER	BY SECURITY SUPPLIER	B/O
1	EA	DOOR POSITION SWITCH	679	SCE
1	EA	POWER SUPPLY	PS902 900-2RS	VON
1	EA	WIRING DIAGRAMS	RISER AND POINT-TO-POINT	

FUNCTION: DUMMY TRIM PANIC HARDWARE WITH ELECTRIC LATCH RETRACTION. FIXED OUTSIDE TRIM. INSIDE PUSH PAD RETRACTS LATCH FOR EGRESS. LATCH ELECTRICALLY RETRACTED BY ELECTRONIC ACCESS CONTROL SYSTEM FOR PUSH/PULL OPERATION. OUTSIDE ACTUATOR AUTOMATICALLY OPENS DOOR ONLY WHILE LATCH IS RETRACTED. INSIDE ACTUATOR RETRACTS LATCH AND AUTOMATICALLY OPENS DOOR AT ALL TIMES.

HW SET: 40.1

QTY		DESCRIPTION	CATALOG NUMBER	MFR
1	EA	ELECTRIC HINGE	8-WIRE AS REQUIRED	IVE
1	EA	LATCH RETRACTION KIT	QELA CONVERSION KIT - MODULAR	VON
1	EA	RX SWITCH KIT	SWITCH KIT-RX	VON
1	EA	99 SERIES LD COVER PLATE	050589	VON
1	EA	SURF. AUTO OPERATOR	9542	LCN
2	EA	ACTUATOR, WALL OR JAMB MOUNT	8310-853 OR 8310-818 AS REQD (VERIFY TYPE AND MOUNTING LOCATION)	LCN
1	EA	PEDESTAL	36-9C 36"	WIK
1	EA	ACCESS CONTROL CONTACT	BY SECURITY SUPPLIER	
1	EA	DOOR POSITION SWITCH	679	SCE
1	EA	POWER SUPPLY	PS902 900-2RS	VON
1	EA	WIRING DIAGRAMS	RISER AND POINT-TO-POINT	

PROVIDE NEW ELECTRIC LATCH RETRACTION KIT, RX SWITCH, AND COVER PLATE FOR EXISTING PANIC HARDWARE.

LATCH RETRACTED BY ELECTRONIC ACCESS CONTROL SYSTEM FOR PUSH/PULL OPERATION. OUTSIDE ACTUATOR AUTOMATICALLY OPENS DOOR ONLY ELECTRIC STRIKE IS UNLOCKED. INSIDE ACTUATOR UNLOCKS ELECTRIC STRIKE AND AUTOMATICALLY OPENS DOOR AT ALL TIMES.

FIELD VERIFY NEW HARDWARE IS COMPATIBLE WITH EXISTING DOOR PRIOR TO ORDERING NEW HARDWARE.

HW SET: 40.2 - Not Used

HW SET: 41

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	POWER TRANSFER	EPT10	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-99-DT	VON
1	EA	OH STOP	100S	GLY
1	EA	SURFACE CLOSER	4050A / 4050A EDA	LCN
1	EA	ACCESS CONTROL CONTACT	BY SECURITY SUPPLIER	
1	EA	DOOR POSITION SWITCH	679	SCE
1	EA	KEY SWITCH	BY SECURITY SUPPLIER	
1	EA	POWER SUPPLY	PS902 900-2RS	VON
1	EA	WIRING DIAGRAMS	RISER AND POINT-TO-POINT	

FUNCTION: DUMMY TRIM PANIC HARDWARE WITH ELECTRIC LATCH RETRACTION. FIXED OUTSIDE TRIM. INSIDE PUSH PAD RETRACTS LATCH FOR EGRESS. LATCH ELECTRICALLY RETRACTED BY ELECTRONIC ACCESS CONTROL SYSTEM OR KEYSWITCH FOR PUSH/PULL OPERATION.

HW SET: 42

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	POWER TRANSFER	EPT10	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-99-DT	VON
1	EA	OH STOP	100S	GLY
1	EA	SURFACE CLOSER	4050A / 4050A EDA	LCN
1	EA	RAIN DRIP	142	ZER
1	EA	WEATHERSTRIPPING	BY DOOR SUPPLIER	B/O
1	EA	DOOR SWEEP	8198	ZER
1	EA	THRESHOLD	8655	ZER
1	EA	ACCESS CONTROL CONTACT	BY SECURITY SUPPLIER	
1	EA	DOOR POSITION SWITCH	679	SCE
1	EA	POWER SUPPLY	PS902 900-2RS	VON
1	EA	WIRING DIAGRAMS	RISER AND POINT-TO-POINT	

FUNCTION: DUMMY TRIM PANIC HARDWARE WITH ELECTRIC LATCH RETRACTION. FIXED OUTSIDE TRIM. INSIDE PUSH PAD RETRACTS LATCH FOR EGRESS. LATCH ELECTRICALLY RETRACTED BY ELECTRONIC ACCESS CONTROL SYSTEM FOR PUSH/PULL OPERATION.

HW SET: 42.1

QTY		DESCRIPTION	CATALOG NUMBER	MFR
1	EA	ELECTRIC HINGE	8-WIRE AS REQUIRED	IVE
1	EA	LATCH RETRACTION KIT	QELA CONVERSION KIT - MODULAR	VON
1	EA	RX SWITCH KIT	SWITCH KIT-RX	VON
1	EA	99 SERIES LD COVER PLATE	050589	VON
1	EA	ACCESS CONTROL CONTACT	BY SECURITY SUPPLIER	
1	EA	DOOR POSITION SWITCH	679	SCE
1	EA	POWER SUPPLY	PS902 900-2RS	VON
1	EA	WIRING DIAGRAMS	RISER AND POINT-TO-POINT	

PROVIDE NEW ELECTRIC LATCH RETRACTION KIT, RX SWITCH, AND COVER PLATE FOR EXISTING PANIC HARDWARE.

LATCH RETRACTED BY ELECTRONIC ACCESS CONTROL SYSTEM FOR PUSH/PULL OPERATION.

FIELD VERIFY NEW HARDWARE IS COMPATIBLE WITH EXISTING DOOR PRIOR TO ORDERING NEW HARDWARE.

HW SET: 42.2 - Not Used

HW SET: 43

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
2	EA	POWER TRANSFER	EPT10	VON
1	EA	REMOVABLE MULLION	KR4954 STAB	VON
2	EA	ELEC PANIC HARDWARE	RX-QEL-99-DT	VON
1	EA	CYLINDER HOUSING	AS REQUIRED	
1	EA	KEY CYLINDER CORE	AS REQUIRED	
2	EA	OH STOP	100S	GLY
2	EA	SURFACE CLOSER	4050A / 4050A EDA	LCN
1	EA	ACCESS CONTROL CONTACT	BY SECURITY SUPPLIER	
2	EA	DOOR POSITION SWITCH	679	SCE
1	EA	POWER SUPPLY	PS902 900-2RS	VON
1	EA	WIRING DIAGRAMS	RISER AND POINT-TO-POINT	

FUNCTION: DUMMY TRIM PANIC HARDWARE WITH ELECTRIC LATCH RETRACTION. FIXED OUTSIDE TRIM. INSIDE PUSH PAD RETRACTS LATCH FOR EGRESS. LATCH ELECTRICALLY RETRACTED BY ELECTRONIC ACCESS CONTROL SYSTEM FOR PUSH/PULL OPERATION.

HW SET: 44

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
2	EA	POWER TRANSFER	EPT10	VON
1	EA	REMOVABLE MULLION	KR4954 STAB	VON
2	EA	ELEC PANIC HARDWARE	RX-QEL-99-DT	VON
1	EA	CYLINDER HOUSING	AS REQUIRED	
1	EA	KEY CYLINDER CORE	AS REQUIRED	
2	EA	OH STOP	100S	GLY
2	EA	SURFACE CLOSER	4050A / 4050A EDA	LCN
1	EA	RAIN DRIP	142	ZER
1	EA	MULLION SEAL	8780	ZER
1	EA	WEATHERSTRIPPING	BY DOOR SUPPLIER	B/O
2	EA	DOOR SWEEP	8198	ZER
1	EA	THRESHOLD	8655	ZER
1	EA	CREDENTIAL READER	BY SECURITY SUPPLIER	B/O
2	EA	DOOR POSITION SWITCH	679	SCE
1	EA	POWER SUPPLY	PS902 900-2RS	VON
1	EA	WIRING DIAGRAMS	RISER AND POINT-TO-POINT	

FUNCTION: DUMMY TRIM PANIC HARDWARE WITH ELECTRIC LATCH RETRACTION. FIXED OUTSIDE TRIM. INSIDE PUSH PAD RETRACTS LATCH FOR EGRESS. LATCH ELECTRICALLY RETRACTED BY ELECTRONIC ACCESS CONTROL SYSTEM FOR PUSH/PULL OPERATION.

HW SET: 44.1

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
2	EA	POWER TRANSFER	EPT10	VON
1	EA	REMOVABLE MULLION	KR4954 STAB	VON
2	EA	ELEC PANIC HARDWARE	RX-QEL-99-DT	VON
1	EA	CYLINDER HOUSING	AS REQUIRED	
1	EA	KEY CYLINDER CORE	AS REQUIRED	
2	EA	OH STOP	100S	GLY
2	EA	SURFACE CLOSER	4050A / 4050A EDA	LCN
1	EA	RAIN DRIP	142	ZER
1	EA	MULLION SEAL	8780	ZER
1	EA	WEATHERSTRIPPING	BY DOOR SUPPLIER	B/O
2	EA	DOOR SWEEP	8198	ZER
1	EA	THRESHOLD	8655	ZER
2	EA	DOOR POSITION SWITCH	679	SCE
1	EA	POWER SUPPLY	PS902 900-2RS	VON
1	EA	WIRING DIAGRAMS	RISER AND POINT-TO-POINT	

FUNCTION: DUMMY TRIM PANIC HARDWARE WITH ELECTRIC LATCH RETRACTION. FIXED OUTSIDE TRIM. INSIDE PUSH PAD RETRACTS LATCH FOR EGRESS. LATCH ELECTRICALLY RETRACTED BY ELECTRONIC ACCESS CONTROL SYSTEM FOR PUSH/PULL OPERATION.

HW SET: 45

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	POWER TRANSFER	EPT10	VON
1	EA	FIRE EXIT HARDWARE	9927-EO-F-LBR	VON
1	EA	ELEC FIRE EXIT HARDWARE	RX-QEL-9927-L-NL-F-LBR	VON
1	EA	CYLINDER HOUSING	AS REQUIRED	
1	EA	KEY CYLINDER CORE	AS REQUIRED	
2	EA	FIRE/LIFE HOLDER	4040SEH	LCN
2	EA	SURFACE CLOSER	4050A CUSH	LCN
2	EA	KICK PLATE	8400 10"	IVE
1	EA	PERIMETER SEAL	188S	ZER
2	EA	MEETING STILE SEAL	8193 (1 EA LEAF)	ZER
1	EA	CREDENTIAL READER	BY SECURITY SUPPLIER	B/O
2	EA	DOOR POSITION SWITCH	679	SCE
1	EA	POWER SUPPLY	PS902 900-2RS	VON
1	EA	WIRING DIAGRAMS	RISER AND POINT-TO-POINT	
1	EA	N/C FIRE ALARM RELAY	BY FIRE ALARM CONTRACTOR	B/O

FUNCTION: NIGHT LATCH PANIC HARDWARE WITH ELECTRIC LATCH RETRACTION. FIXED OUTSIDE TRIM - LATCH RETRACTED BY KEY. INSIDE PUSH PAD RETRACTS LATCH FOR EGRESS.

LATCH ELECTRICALLY RETRACTED BY ELECTRONIC ACCESS CONTROL SYSTEM FOR PUSH/PULL OPERATION.

ELECTRONIC HOLDER TO RELEASE UPON ACTUATION OF FIRE ALARM SYSTEM.

HW SET: 46 - Not Used

HW SET: 47

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	POWER TRANSFER	EPT10	VON
1	EA	PANIC HARDWARE	LD-9927-EO-LBR	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-9927-NL-LBR	VON
1	EA	CYLINDER HOUSING	AS REQUIRED	
1	EA	KEY CYLINDER CORE	AS REQUIRED	
2	EA	SURFACE CLOSER	4050A / 4050A EDA	LCN
2	EA	KICK PLATE	8400 10"	IVE
2	EA	FIRE/LIFE WALL MAG	SEM7800	LCN
1	EA	CREDENTIAL READER	BY SECURITY SUPPLIER	B/O
2	EA	DOOR POSITION SWITCH	679	SCE
1	EA	POWER SUPPLY	PS902 900-2RS	VON
1	EA	WIRING DIAGRAMS	RISER AND POINT-TO-POINT	
	EA	ACCESS CONTROL RELAY	BY SECURITY SUPPLIER	B/O

FUNCTION: NIGHT LATCH PANIC HARDWARE WITH ELECTRIC LATCH RETRACTION. FIXED OUTSIDE TRIM - LATCH RETRACTED BY KEY. INSIDE PUSH PAD RETRACTS LATCH FOR EGRESS.

LATCH ELECTRICALLY RETRACTED BY ELECTRONIC ACCESS CONTROL SYSTEM FOR PUSH/PULL OPERATION.

ELECTRONIC HOLDER TO RELEASE BY SIGNAL FROM ELECTRONIC ACCESS CONTROL SYSTEM.

HW SET: 48

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
2	EA	POWER TRANSFER	EPT10	VON
1	EA	REMOVABLE MULLION	KR4954 STAB	VON
1	EA	ELEC PANIC HARDWARE	LD-RX-99-EO	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-99-NL	VON
2	EA	CYLINDER HOUSING	AS REQUIRED	
2	EA	KEY CYLINDER CORE	AS REQUIRED	
2	EA	SURFACE CLOSER	4050A SCUSH	LCN
2	EA	KICK PLATE	8400 10"	IVE
1	EA	RAIN DRIP	142	ZER
1	SET	GASKETING	429	ZER
			(MOUNT PRIOR TO CLOSER)	
1	EA	MULLION SEAL	8780	ZER
2	EA	DOOR SWEEP	8198	ZER
1	EA	THRESHOLD	8655	ZER
1	EA	CREDENTIAL READER	BY SECURITY SUPPLIER	B/O
2	EA	DOOR POSITION SWITCH	679	SCE
1	EA	POWER SUPPLY	PS902 900-2RS	VON
1	EA	WIRING DIAGRAMS	RISER AND POINT-TO-POINT	

FUNCTION: NIGHT LATCH PANIC HARDWARE WITH ELECTRIC LATCH RETRACTION. FIXED OUTSIDE TRIM - LATCH RETRACTED BY KEY. INSIDE PUSH PAD RETRACTS LATCH FOR EGRESS.

LATCH ELECTRICALLY RETRACTED BY ELECTRONIC ACCESS CONTROL SYSTEM FOR PUSH/PULL OPERATION.

HW SET: 49

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	POWER TRANSFER	EPT10	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-99-NL	VON
1	EA	CYLINDER HOUSING	AS REQUIRED	
1	EA	KEY CYLINDER CORE	AS REQUIRED	
1	EA	OH STOP	100S	GLY
1	EA	SURF. AUTO OPERATOR	4642	LCN
2	EA	ACTUATOR, WALL OR JAMB MOUNT	8310-853 OR 8310-818 AS REQD (VERIFY TYPE AND MOUNTING LOCATION)	LCN
1	EA	CREDENTIAL READER	BY SECURITY SUPPLIER	B/O
1	EA	DOOR POSITION SWITCH	679	SCE
1	EA	POWER SUPPLY	PS902 900-2RS	VON
1	EA	WIRING DIAGRAMS	RISER AND POINT-TO-POINT	

FUNCTION: NIGHT LATCH PANIC HARDWARE WITH ELECTRIC LATCH RETRACTION. FIXED OUTSIDE TRIM - LATCH RETRACTED BY KEY. INSIDE PUSH PAD RETRACTS LATCH FOR EGRESS.

LATCH ELECTRICALLY RETRACTED BY ELECTRONIC ACCESS CONTROL SYSTEM FOR PUSH/PULL OPERATION.

OUTSIDE ACTUATOR AUTOMATICALLY OPENS DOOR ONLY WHILE LATCH IS RETRACTED. INSIDE ACTUATOR RETRACTS LATCH AND AUTOMATICALLY OPENS DOOR AT ALL TIMES.

HW SET: 50

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	POWER TRANSFER	EPT10	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-99-NL	VON
1	EA	CYLINDER HOUSING	AS REQUIRED	
1	EA	KEY CYLINDER CORE	AS REQUIRED	
1	EA	OH STOP	100S	GLY
1	EA	SURF. AUTO OPERATOR	4642	LCN
2	EA	ACTUATOR, WALL OR JAMB MOUNT	8310-853 OR 8310-818 AS REQD (VERIFY TYPE AND MOUNTING LOCATION)	LCN
1	EA	CREDENTIAL READER	BY SECURITY SUPPLIER	B/O
1	EA	INTERCOM / REMOTE RELEASE SWITCH	BY SECURITY SUPPLIER	B/O
1	EA	DOOR POSITION SWITCH	679	SCE
1	EA	POWER SUPPLY	PS902 900-2RS	VON
1	EA	WIRING DIAGRAMS	RISER AND POINT-TO-POINT	

FUNCTION: NIGHT LATCH PANIC HARDWARE WITH ELECTRIC LATCH RETRACTION. FIXED OUTSIDE TRIM - LATCH RETRACTED BY KEY. INSIDE PUSH PAD RETRACTS LATCH FOR EGRESS.

LATCH ELECTRICALLY RETRACTED BY ELECTRONIC ACCESS CONTROL SYSTEM FOR PUSH/PULL OPERATION.

OUTSIDE ACTUATOR AUTOMATICALLY OPENS DOOR ONLY WHILE LATCH IS RETRACTED. INSIDE ACTUATOR RETRACTS LATCH AND AUTOMATICALLY OPENS DOOR AT ALL TIMES.

HW SET: 51

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	POWER TRANSFER	EPT10	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-99-NL	VON
1	EA	CYLINDER HOUSING	AS REQUIRED	
1	EA	KEY CYLINDER CORE	AS REQUIRED	
1	EA	OH STOP	100S	GLY
1	EA	SURF. AUTO OPERATOR	4642	LCN
2	EA	ACTUATOR, WALL OR JAMB MOUNT	8310-853 OR 8310-818 AS REQD (VERIFY TYPE AND MOUNTING LOCATION)	LCN
1	EA	RAIN DRIP	142	ZER
1	EA	WEATHERSTRIPPING	BY DOOR SUPPLIER	B/O
1	EA	DOOR SWEEP	8198	ZER
1	EA	THRESHOLD	8655	ZER
1	EA	CREDENTIAL READER	BY SECURITY SUPPLIER	B/O
1	EA	DOOR POSITION SWITCH	679	SCE
1	EA	POWER SUPPLY	PS902 900-2RS	VON
1	EA	WIRING DIAGRAMS	RISER AND POINT-TO-POINT	

FUNCTION: NIGHT LATCH PANIC HARDWARE WITH ELECTRIC LATCH RETRACTION. FIXED OUTSIDE TRIM - LATCH RETRACTED BY KEY. INSIDE PUSH PAD RETRACTS LATCH FOR EGRESS.

LATCH ELECTRICALLY RETRACTED BY ELECTRONIC ACCESS CONTROL SYSTEM FOR PUSH/PULL OPERATION.

OUTSIDE ACTUATOR AUTOMATICALLY OPENS DOOR ONLY WHILE LATCH IS RETRACTED. INSIDE ACTUATOR RETRACTS LATCH AND AUTOMATICALLY OPENS DOOR AT ALL TIMES.

HW SET: 51.1

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	POWER TRANSFER	EPT10	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-99-NL	VON
2	EA	CYLINDER HOUSING	AS REQUIRED	
2	EA	KEY CYLINDER CORE	AS REQUIRED	
1	EA	OH STOP	100S	GLY
1	EA	SURF. AUTO OPERATOR	4642	LCN
2	EA	ACTUATOR, WALL OR JAMB MOUNT	8310-853 OR 8310-818 AS REQD (VERIFY TYPE AND MOUNTING LOCATION)	LCN
1	EA	RAIN DRIP	142	ZER
1	EA	WEATHERSTRIPPING	BY DOOR SUPPLIER	B/O
1	EA	DOOR SWEEP	8198	ZER
1	EA	THRESHOLD	8655	ZER
1	EA	CREDENTIAL READER	BY SECURITY SUPPLIER	B/O
1	EA	KEY SWITCH	653 AS REQUIRED	SCE
1	EA	DOOR POSITION SWITCH	679	SCE
1	EA	POWER SUPPLY	PS902 900-2RS	VON
1	EA	WIRING DIAGRAMS	RISER AND POINT-TO-POINT	

FUNCTION: NIGHT LATCH PANIC HARDWARE WITH ELECTRIC LATCH RETRACTION. FIXED OUTSIDE TRIM - LATCH RETRACTED BY KEY. INSIDE PUSH PAD RETRACTS LATCH FOR EGRESS.

LATCH ELECTRICALLY RETRACTED BY WALL-MOUNTED KEY SWITCH FOR PUSH/PULL OPERATION.

OUTSIDE ACTUATOR AUTOMATICALLY OPENS DOOR ONLY WHILE LATCH IS RETRACTED. INSIDE ACTUATOR RETRACTS LATCH AND AUTOMATICALLY OPENS DOOR AT ALL TIMES.

HW SET: 52

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	ELEC PANIC HARDWARE	QEL-ESL-WS-T-9927-L-DT	VON
1	EA	LATCH GUARD	WS-LGO-3 / WS-LGO-4 (AS REQUIRED PER DOOR WIDTH)	VON
1	EA	CYLINDER HOUSING	AS REQUIRED	
1	EA	KEY CYLINDER CORE	AS REQUIRED	
2	EA	SURFACE CLOSER	4111 SCUSH	LCN
1	EA	KICK PLATE	8400 10"	IVE
1	EA	RAIN DRIP	142	ZER
1	SET	GASKETING	429 (MOUNT PRIOR TO CLOSER)	ZER
2	EA	DOOR SWEEP	8198	ZER
1	EA	THRESHOLD	8655	ZER

FUNCTION: DUMMY LEVER PANIC HARDWARE. INSIDE PUSH PAD RETRACTS LATCH FOR EGRESS.

LATCH RETRACTION BY ELECTRONIC ACCESS CONTROL SYSTEM FOR PUSH/PULL OPERATION. INSIDE KEY CYLINDER DISABLES ELECTRONIC LATCH RETRACTION TO MAINTAIN LATCHING DURING WINDSTORM EVENT.

NOTE: HARDWARE IS TESTED AS A COMPLETE ASSEMBLY AND MUST BE INSTALLED ON STEELCRAFT OR REPUBLIC WINDSTORM RATED DOOR TO MAINTAIN WINDSTORM RATING.

HW SET: 53

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	ELEC FIRE EXIT HARDWARE	QEL-ESL-WS-T-9927-L-DT-F	VON
1	EA	FIRE EXIT HARDWARE	WS-T-9927-EO-F	VON
2	EA	LATCH GUARD	WS-LGO-3 / WS-LGO-4 (AS REQUIRED PER DOOR WIDTH)	VON
1	EA	CYLINDER HOUSING	AS REQUIRED	
1	EA	KEY CYLINDER CORE	AS REQUIRED	
2	EA	SURFACE CLOSER	4111 SCUSH	LCN
2	EA	KICK PLATE	8400 10"	IVE
1	EA	PERIMETER SEAL	188S	ZER
2	EA	MEETING STILE SEAL	8193 (1 EA LEAF)	ZER

FUNCTION: DUMMY LEVER PANIC HARDWARE. INSIDE PUSH PAD RETRACTS LATCH FOR EGRESS.

LATCH RETRACTION BY ELECTRONIC ACCESS CONTROL SYSTEM FOR PUSH/PULL OPERATION. INSIDE KEY CYLINDER DISABLES ELECTRONIC LATCH RETRACTION TO MAINTAIN LATCHING DURING WINDSTORM EVENT.

NOTE: HARDWARE IS TESTED AS A COMPLETE ASSEMBLY AND MUST BE INSTALLED ON STEELCRAFT OR REPUBLIC WINDSTORM RATED DOOR TO MAINTAIN WINDSTORM RATING.

HW SET: 54

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	PANIC HARDWARE	LD-WS-T-9927-EO	VON
1	EA	ELEC PANIC HARDWARE	QEL-ESL-WS-T-9927-L-KC	VON
2	EA	LATCH GUARD	WS-LGO-3 / WS-LGO-4 (AS REQUIRED PER DOOR WIDTH)	VON
2	EA	CYLINDER HOUSING	AS REQUIRED	
2	EA	KEY CYLINDER CORE	AS REQUIRED	
2	EA	SURFACE CLOSER	4111 SCUSH	LCN
2	EA	KICK PLATE	8400 10"	IVE
1	EA	RAIN DRIP	142	ZER
1	SET	GASKETING	429 (MOUNT PRIOR TO CLOSER)	ZER
2	EA	MEETING STILE SEAL	8193 (1 EA LEAF)	ZER
2	EA	DOOR SWEEP	8198	ZER
1	EA	THRESHOLD	8655	ZER

FUNCTION: KEY CAPTURE LEVER PANIC HARDWARE. INSIDE PUSH PAD RETRACTS LATCH FOR EGRESS. OUTSIDE LEVER RETRACTS LATCH ONLY WHILE KEY IS INSERTED IN OUTSIDE TRIM. REMOVING KEY LOCKS OUTSIDE TRIM.

LATCH RETRACTION BY ELECTRONIC ACCESS CONTROL SYSTEM FOR PUSH/PULL OPERATION. INSIDE KEY CYLINDER DISABLES ELECTRONIC LATCH RETRACTION TO MAINTAIN LATCHING DURING WINDSTORM EVENT.

NOTE: HARDWARE IS TESTED AS A COMPLETE ASSEMBLY AND MUST BE INSTALLED ON STEELCRAFT OR REPUBLIC WINDSTORM RATED DOOR TO MAINTAIN WINDSTORM RATING.

HW SET: 55

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	POWER TRANSFER	EPT10	VON
1	EA	ELEC PANIC HARDWARE	LD-RX-99-EO	VON
1	EA	OH STOP	100S	GLY
1	EA	SURFACE CLOSER	4050A / 4050A EDA	LCN
1	EA	RAIN DRIP	142	ZER
1	EA	WEATHERSTRIPPING	BY DOOR SUPPLIER	B/O
1	EA	DOOR SWEEP	8198	ZER
1	EA	THRESHOLD	8655	ZER
1	EA	DOOR POSITION SWITCH	679	SCE

FUNCTION: EXIT-ONLY PANIC HARDWARE - NO OUTSIDE TRIM. INSIDE PUSH PAD RETRACTS LATCH FOR EGRESS.

HW SET: 56

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	PANIC HARDWARE	LD-99-EO	VON
1	EA	SURFACE CLOSER	4050A SCUSH	LCN
1	EA	KICK PLATE	8400 10"	IVE

FUNCTION: EXIT ONLY PANIC HARDWARE - NO OUTSIDE TRIM. INSIDE PUSH PAD RETRACTS LATCH FOR EGRESS.

HW SET: 57

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	POWER TRANSFER	EPT10	VON
1	EA	ELEC PANIC HARDWARE	LD-RX-99-EO	VON
1	EA	SURFACE CLOSER	4050A SCUSH	LCN
1	EA	KICK PLATE	8400 10"	IVE
1	EA	RAIN DRIP	142	ZER
1	EA	WEATHERSTRIPPING	BY DOOR SUPPLIER	B/O
1	EA	DOOR SWEEP	8198	ZER
1	EA	THRESHOLD	8655	ZER
1	EA	DOOR POSITION SWITCH	679	SCE

FUNCTION: EXIT-ONLY PANIC HARDWARE - NO OUTSIDE TRIM. INSIDE PUSH PAD RETRACTS LATCH FOR EGRESS.

HW SET: 58

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	FIRE EXIT HARDWARE	9927-EO-F-LBR	VON
1	EA	FIRE EXIT HARDWARE	9927-EO-F-LBRAFL	VON
2	EA	FIRE/LIFE HOLDER	4040SEH	LCN
2	EA	SURFACE CLOSER	4050A CUSH	LCN
2	EA	KICK PLATE	8400 10"	IVE
1	EA	PERIMETER SEAL	188S	ZER
2	EA	MEETING STILE SEAL	8193 (1 EA LEAF)	ZER
1	EA	N/C FIRE ALARM RELAY	BY FIRE ALARM CONTRACTOR	B/O

FUNCTION: EXIT-ONLY PANIC HARDWARE - NO OUTSIDE TRIM. INSIDE PUSH PAD RETRACTS LATCH FOR EGRESS.

ELECTRONIC HOLDER TO RELEASE UPON ACTUATION OF FIRE ALARM SYSTEM.

HW SET: 59 - Not Used**HW SET: 60 - Not Used**

HW SET: 61

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED (STAINLESS STEEL)	IVE
1	EA	PANIC HARDWARE	LD-99-L	VON
1	EA	CYLINDER HOUSING	AS REQUIRED	
1	EA	KEY CYLINDER CORE	AS REQUIRED	
1	EA	SURFACE CLOSER	4050A SRI / 4050 EDA SRI	LCN
1	EA	WALL STOP	WS406	IVE

FUNCTION: LEVER EXIT HARDWARE. OUTSIDE LEVER LOCKED/UNLOCKED BY KEY. INSIDE PUSH PAD RETRACTS LATCH FOR FREE EGRESS.

HW SET: 61.1

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED (STAINLESS STEEL)	IVE
1	EA	PANIC HARDWARE	LD-99-L	VON
1	EA	CYLINDER HOUSING	AS REQUIRED	
1	EA	KEY CYLINDER CORE	AS REQUIRED	
1	EA	SURFACE CLOSER	4050 SCUSH SRI	LCN

FUNCTION: LEVER EXIT HARDWARE. OUTSIDE LEVER LOCKED/UNLOCKED BY KEY. INSIDE PUSH PAD RETRACTS LATCH FOR FREE EGRESS.

HW SET: 61.2 - Not Used

HW SET: 62 - Not Used

HW SET: 63 - Not Used

HW SET: 64 - Not Used

HW SET: 65 - Not Used

HW SET: 66

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	FIRE EXIT HARDWARE	9927-EO-F-LBRAFL	VON
1	EA	FIRE EXIT HARDWARE	9927-L-F-2SI-LBR	VON
2	EA	CYLINDER HOUSING	AS REQUIRED	
2	EA	KEY CYLINDER CORE	AS REQUIRED	
1	EA	RIM CYL THUMBTURN	XB11-979 (INSIDE)	SCH
2	EA	FIRE/LIFE HOLDER	4040SEH	LCN
2	EA	SURFACE CLOSER	4050A CUSH	LCN
2	EA	KICK PLATE	8400 10"	IVE
1	EA	PERIMETER SEAL	188S	ZER
2	EA	MEETING STILE SEAL	8193 (1 EA LEAF)	ZER
1	EA	N/C FIRE ALARM RELAY	BY FIRE ALARM CONTRACTOR	B/O

FUNCTION: CLASSROOM PANIC HARDWARE. OUTSIDE LEVER LOCKED/UNLOCKED BY OUTSIDE KEY OR BY INSIDE TURN. INDICATOR ON INSIDE CENTER CASE DISPLAYS LOCKED/UNLOCKED STATUS OF OUTSIDE LEVER. INSIDE PUSH PAD RETRACTS LATCH FOR FREE EGRESS.

HW SET: 67

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	FIRE EXIT HARDWARE	9927-EO-F-LBRAFL	VON
1	EA	FIRE EXIT HARDWARE	9927-L-F-LBR	VON
1	EA	CYLINDER HOUSING	AS REQUIRED	
1	EA	KEY CYLINDER CORE	AS REQUIRED	
2	EA	SURFACE CLOSER	4050A / 4050A EDA	LCN
2	EA	KICK PLATE	8400 10"	IVE
2	EA	FIRE/LIFE WALL MAG	SEM7800	LCN
1	EA	PERIMETER SEAL	188S	ZER
2	EA	MEETING STILE SEAL	8193 (1 EA LEAF)	ZER
	EA	N/C FIRE ALARM RELAY	BY FIRE ALARM CONTRACTOR	B/O

FUNCTION: CLASSROOM LEVER PANIC HARDWARE. OUTSIDE LEVER LOCKED/UNLOCKED BY OUTSIDE OR INSIDE KEY. INSIDE PUSH PAD RETRACTS LATCH FOR FREE EGRESS. ELECTRONIC HOLDER TO RELEASE UPON ACTUATION OF FIRE ALARM SYSTEM.

HW SET: 68 - Not Used

HW SET: 69

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
2	EA	PANIC HARDWARE	CD-9927-L-LBR	VON
4	EA	CYLINDER HOUSING	AS REQUIRED	
4	EA	KEY CYLINDER CORE	AS REQUIRED	
2	EA	SURFACE CLOSER	4050A / 4050A EDA	LCN
2	EA	KICK PLATE	8400 10"	IVE
2	EA	WALL STOP	WS406	IVE

FUNCTION: CLASSROOM PANIC HARDWARE. OUTSIDE LEVER LOCKED/UNLOCKED BY KEY.
 INSIDE PUSH PAD RETRACTS LATCH FOR FREE EGRESS.
 LATCH DOGGED BY INSIDE CYLINDER FOR PUSH/PULL OPERATION.

HW SET: 70

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	FIRE EXIT HARDWARE	9927-EO-F-LBRAFL	VON
1	EA	FIRE EXIT HARDWARE	9927-L-BE-F-LBR	VON
2	EA	SURFACE CLOSER	4050A / 4050A EDA	LCN
2	EA	KICK PLATE	8400 10"	IVE
2	EA	FIRE/LIFE WALL MAG	SEM7800	LCN
1	EA	PERIMETER SEAL	188S	ZER
2	EA	MEETING STILE SEAL	8193 (1 EA LEAF)	ZER
	EA	N/C FIRE ALARM RELAY	BY FIRE ALARM CONTRACTOR	B/O

FUNCTION: PASSAGE LEVER PANIC HARDWARE. OUTSIDE LEVER ALWAYS UNLOCKED. INSIDE
 PUSH PAD RETRACTS LATCH FOR FREE EGRESS.
 ELECTRONIC HOLDER TO RELEASE UPON ACTUATION OF FIRE ALARM SYSTEM.

HW SET: 71

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
2	EA	PANIC HARDWARE	CD-9927-L-BE-LBR	VON
2	EA	CYLINDER HOUSING	AS REQUIRED	
2	EA	KEY CYLINDER CORE	AS REQUIRED	
2	EA	SURFACE CLOSER	4050A / 4050A EDA	LCN
2	EA	KICK PLATE	8400 10"	IVE
2	EA	WALL STOP	WS406	IVE

FUNCTION: PASSAGE PANIC HARDWARE. OUTSIDE LEVER ALWAYS UNLOCKED. INSIDE PUSH
 PAD RETRACTS LATCH FOR FREE EGRESS.
 LATCH DOGGED BY INSIDE CYLINDER FOR PUSH/PULL OPERATION.

HW SET: 72

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	PANIC HARDWARE	LD-99-L-NL	VON
1	EA	CYLINDER HOUSING	AS REQUIRED	
1	EA	KEY CYLINDER CORE	AS REQUIRED	
1	EA	SURFACE CLOSER	4050A / 4050A EDA	LCN
1	EA	KICK PLATE	8400 10"	IVE
1	EA	WALL STOP	WS406	IVE

FUNCTION: NIGHT LATCH EXIT HARDWARE. FIXED OUTSIDE TRIM - LATCH RETRACTED BY KEY. INSIDE PUSH PAD RETRACTS LATCH FOR FREE EGRESS.

HW SET: 73

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	PANIC HARDWARE	LD-99-L-NL	VON
1	EA	CYLINDER HOUSING	AS REQUIRED	
1	EA	KEY CYLINDER CORE	AS REQUIRED	
1	EA	SURFACE CLOSER	4050A SCUSH	LCN
1	EA	KICK PLATE	8400 10"	IVE

FUNCTION: NIGHT LATCH EXIT HARDWARE. FIXED OUTSIDE TRIM - LATCH RETRACTED BY KEY. INSIDE PUSH PAD RETRACTS LATCH FOR FREE EGRESS.

HW SET: 74

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	FIRE EXIT HARDWARE	99-L-NL-F	VON
1	EA	CYLINDER HOUSING	AS REQUIRED	
1	EA	KEY CYLINDER CORE	AS REQUIRED	
1	EA	SURFACE CLOSER	4050A SCUSH	LCN
1	EA	KICK PLATE	8400 10"	IVE
1	EA	PERIMETER SEAL	188S	ZER

FUNCTION: NIGHT LATCH PANIC HARDWARE. FIXED OUTSIDE TRIM - LATCH RETRACTED BY KEY. INSIDE PUSH PAD RETRACTS LATCH FOR EGRESS.

HW SET: 75

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	REMOVABLE MULLION	KR4954 STAB	VON
1	EA	PANIC HARDWARE	LD-99-EO	VON
1	EA	PANIC HARDWARE	LD-99-L-NL	VON
2	EA	CYLINDER HOUSING	AS REQUIRED	
2	EA	KEY CYLINDER CORE	AS REQUIRED	
2	EA	SURFACE CLOSER	4050A / 4050A EDA	LCN
2	EA	KICK PLATE	8400 10"	IVE
2	EA	WALL STOP	WS406	IVE

FUNCTION: NIGHT LATCH EXIT HARDWARE. FIXED OUTSIDE TRIM - LATCH RETRACTED BY KEY. INSIDE PUSH PAD RETRACTS LATCH FOR FREE EGRESS.

HW SET: 76

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
2	EA	PUSH PLATE	8200 6" X 16"	IVE
2	EA	SURFACE CLOSER	4050A / 4050A EDA	LCN
2	EA	KICK PLATE	8400 10"	IVE
2	EA	WALL STOP/HOLDER	WS40	IVE

FUNCTION: PUSH/PUSH.

HW SET: 77

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	PUSH/PULL BAR	9103 10"	IVE
1	EA	OH STOP	100S	GLY
1	EA	SURF. AUTO OPERATOR	4642	LCN
2	EA	ACTUATOR, WALL OR JAMB MOUNT	8310-853 OR 8310-818 AS REQD (VERIFY TYPE AND MOUNTING LOCATION)	LCN

FUNCTION: PUSH/PULL. INSIDE OR OUTSIDE ACTUATOR AUTOMATICALLY OPENS DOOR.

HW SET: 78

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	PUSH/PULL BAR	9103 10"	IVE
1	EA	OH STOP	100S	GLY
1	EA	SURFACE CLOSER	4050A / 4050A EDA	LCN

FUNCTION: PUSH/PULL.

HW SET: 79

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
2	EA	PUSH/PULL BAR	9103 10"	IVE
2	EA	OH STOP	100S	GLY
2	EA	SURFACE CLOSER	4050A / 4050A EDA	LCN

FUNCTION: PUSH/PULL.

HW SET: 80

QTY		DESCRIPTION	CATALOG NUMBER	MFR
1	EA	SLIDING DOOR HARDWARE	C-411-W KIT	KNC
1	EA	SLIDING DOOR LOCK	2001ADAP-2	ACC
2	EA	KEY CYLINDER CORE	AS REQUIRED	

FUNCTION: SLIDING POCKET DOOR. INSIDE OR OUTSIDE KEY LOCKS/UNLOCKS DOOR.

HW SET: 81

QTY		DESCRIPTION	CATALOG NUMBER	MFR
1	EA	SLIDING DOOR HARDWARE	C-411-W KIT	KNC
1	EA	BACK-BACK PULLS	7200P	ACC

FUNCTION: SLIDING POCKET DOOR.

HW SET: 82

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
1	EA	PUSH PLATE	8200 6" X 16"	IVE
1	EA	PULL PLATE	8303 10" 4" X 16"	IVE
1	EA	SURFACE CLOSER	4050A / 4050A EDA	LCN
1	EA	KICK PLATE	8400 10"	IVE
1	EA	WALL STOP	WS406	IVE

FUNCTION: PUSH/PULL.

HW SET: 83

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HINGE	AS REQUIRED	IVE
2	EA	PUSH PLATE	8200 6" X 16"	IVE
2	EA	PULL PLATE	8303 10" 4" X 16"	IVE
2	EA	SURFACE CLOSER	4050A / 4050A EDA	LCN
2	EA	KICK PLATE	8400 10"	IVE
2	EA	WALL STOP	WS406	IVE

FUNCTION: PUSH/PULL.

HW SET: 84

QTY		DESCRIPTION	CATALOG NUMBER	MFR
1	EA	CYLINDER HOUSING	AS REQUIRED	
1	EA	KEY CYLINDER CORE	AS REQUIRED	
1	EA	CREDENTIAL READER	BY SECURITY SUPPLIER	B/O
	EA	REMAINING HARDWARE	BY INTEGRATED DOOR SUPPLIER	

FUNCTION: CLASSROOM PANIC HARDWARE WITH ELECTRIC LATCH RETRACTION. OUTSIDE LEVER LOCKED/UNLOCKED BY KEY. INSIDE PUSH PAD RETRACTS LATCH FOR EGRESS. LATCH ELECTRICALLY RETRACTED BY ELECTRONIC ACCESS CONTROL SYSTEM FOR PUSH/PULL OPERATION.

ELECTRONIC HOLD-OPEN HOLDS DOORS OPEN DURING HOURS OF OPERATION. ELECTRONIC HOLD-OPEN TO RELEASE UPON ACTUATION OF FIRE ALARM SYSTEM OR SIGNAL FROM ELECTRONIC ACCESS CONTROL SYSTEM.

HW SET: 85

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	ALL HARDWARE	BY INTEGRATED DOOR SUPPLIER	B/O

FUNCTION: PASSAGE PANIC HARDWARE. OUTSIDE LEVER ALWAYS UNLOCKED. INSIDE PUSH PAD RETRACTS LATCH FOR FREE EGRESS.

ELECTRONIC HOLD-OPEN HOLDS DOORS OPEN DURING HOURS OF OPERATION. ELECTRONIC HOLD-OPEN TO RELEASE UPON ACTUATION OF FIRE ALARM SYSTEM OR SIGNAL FROM ELECTRONIC ACCESS CONTROL SYSTEM.

HW SET: 85.1 - Not Used**HW SET: 85.2 - Not Used****HW SET: 86**

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	ALL HARDWARE	BY DOOR SUPPLIER	B/O

HW SET: 87

QTY		DESCRIPTION	CATALOG NUMBER	MFR
1	EA	DOOR POSITION SWITCH	679	SCE
	EA	REMAINING HARDWARE	EXISTING	

HW SET: 88

QTY		DESCRIPTION	CATALOG NUMBER	MFR
1	EA	DOOR CONTACT	674-OH	SCE
	EA	REMAINING HARDWARE	EXISTING	

HW SET: 89

QTY		DESCRIPTION	CATALOG NUMBER	MFR
1	EA	SURF. DOOR POSITION SWITCH	7766	SCE
	EA	REMAINING HARDWARE	EXISTING	

HW SET: 90

QTY		DESCRIPTION	CATALOG NUMBER	MFR
1	EA	SURF. AUTO OPERATOR	4642	LCN
2	EA	ACTUATOR, WALL OR JAMB MOUNT	8310-853 OR 8310-818 AS REQD (VERIFY TYPE AND MOUNTING LOCATION)	LCN
	EA	REMAINING HARDWARE	EXISTING	

HW SET: 91

QTY		DESCRIPTION	CATALOG NUMBER	MFR
2	EA	FIRE/LIFE WALL MAG	SEM7800 (AS REQUIRED)	LCN
	EA	ACCESS CONTROL RELAY	BY SECURITY SUPPLIER	B/O
	EA	REMAINING HARDWARE	EXISTING	

INTEGRATE MAGNETIC HOLD OPEN INTO ACCESS CONTROL SYSTEM TO AUTOMATICALLY CLOSE DOORS UPON SIGNAL FROM ACCESS CONTROL SYSTEM.

HW SET: 92

QTY		DESCRIPTION	CATALOG NUMBER	MFR
2	EA	CYLINDER HOUSING	AS REQUIRED	
2	EA	KEY CYLINDER CORE	AS REQUIRED	
	EA	REMAINING HARDWARE	BY FIRE-RATED STOREFRONT SUPPLIER	

FUNCTION: CLASSROOM PANIC HARDWARE. OUTSIDE LEVER LOCKED/UNLOCKED BY OUTSIDE KEY OR BY INSIDE TURN. INDICATOR ON INSIDE CENTER CASE DISPLAYS LOCKED/UNLOCKED STATUS OF OUTSIDE LEVER. INSIDE PUSH PAD RETRACTS LATCH FOR FREE EGRESS.

HW SET: B603

QTY		DESCRIPTION	CATALOG NUMBER	MFR
	EA	HARDWARE	SALVAGE AND REUSE	

SALVAGE AND REUSE EXISTING DOOR HARDWARE WITH NEW HARDWARE MODIFICATIONS FOR NEW DOOR PER "SALVAGE AND REINSTALLED" DOOR SCHEDULE.

HW SET: S&R

QTY	DESCRIPTION	CATALOG NUMBER	MFR
EA	HARDWARE	SALVAGE AND REUSE	

SALVAGE AND REUSE EXISTING DOOR HARDWARE WITH NEW HARDWARE MODIFICATIONS FOR NEW DOOR PER "SALVAGE AND REINSTALLED" DOOR SCHEDULE.

END OF SECTION

SECTION 09 2116 - GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Performance criteria for gypsum board assemblies.
- B. Metal stud wall framing.
- C. Metal channel ceiling framing.
- D. Acoustic insulation.
- E. Gypsum sheathing.
- F. Cementitious backing board.
- G. Gypsum wallboard.
- H. 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. AISI S220 - North American Standard for Cold-Formed Steel Nonstructural Framing; 2020.
- B. AISI S240 - North American Standard for Cold-Formed Steel Structural Framing; 2015, with Errata (2020).
- C. ANSI A108.11 - American National Standard Specifications for Interior Installation of Cementitious Backer Units; 2023.
- D. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units; 2023.
- E. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members; 2015.
- F. ASTM C1007 - Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories; 2020 (Reapproved 2024).
- G. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2017 (Reapproved 2022).
- H. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2020.
- I. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2024.
- J. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base; 2019.
- K. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2024.
- L. ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel; 2024.
- M. ASTM C1280 - Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing; 2018 (Reapproved 2023).
- N. ASTM C1325 - Standard Specification for Fiber-Mat Reinforced Cementitious Backer Units; 2022, with Editorial Revision (2023).

- O. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2024.
- P. ASTM C1629/C1629M - Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels; 2024.
- Q. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2021.
- R. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009 (Reapproved 2016).
- S. ASTM E413 - Classification for Rating Sound Insulation; 2022.
- T. GA-216 - Application and Finishing of Gypsum Panel Products; 2024.
- U. GA-600 - Fire Resistance and Sound Control Design Manual; 2024.
- V. UL (FRD) - Fire Resistance Directory; Current Edition.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on metal framing, gypsum board, glass mat faced gypsum board, accessories, and joint finishing system.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

- A. Provide completed assemblies complying with ASTM C840 and GA-216.
- B. Shaft Walls at Elevator Shafts: Provide completed assemblies with the following characteristics:
 1. Air Pressure Within Shaft: Intermittent loads of 5 lbf/sq ft (0.24 kPa) with maximum mid-span deflection of L/240.
 2. Acoustic Attenuation: STC of 35-39 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.
- C. Fire-Resistance-Rated Assemblies: Provide completed assemblies with the following characteristics:
 1. Gypsum Association File Numbers: Comply with requirements of GA-234 and GA-600 for the particular assembly.
 2. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL (FRD).

2.02 METAL FRAMING MATERIALS

- A. Steel Sheet: ASTM A1003/A1003M, subject to the ductility limitations indicated in AISI S220 or equivalent.
- B. Basis of Design: ClarkDietrich; www.clarkdietrich.com.
- C. Other Acceptable Manufactures provided they meet or exceed the Basis of Design performance requirements - Metal Framing, Connectors, and Accessories:
 1. MarinoWARE: www.marinoware.com/#sle.
 2. SCAFCO Corporation: www.scafco.com.
 3. Steel Construction Systems: www.steelconsystems.com.
 4. Substitutions: See Section 01 6000 - Product Requirements.
- D. Nonstructural Framing System Components: AISI S220; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/120 at 5 psf (L/120 at 240 Pa).

1. Provide minimum CP 90 corrosion protection where installed in exterior applications and humid environments.
 2. Studs: "C" shaped with flat or formed webs with knurled faces.
 - a. (MET STUD-2): Provide 20 gauge studs unless noted otherwise.
 3. Runners: U shaped, sized to match studs.
 4. Furring Members (FUR-1): Hat-shaped sections, minimum depth of 7/8 inch (22 mm).
 5. Furring (FUR-2): 'Z' furring channels. See drawings for depth.
- E. Shaft Wall Studs and Accessories: AISI S220; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 and specified performance requirements.
1. C-H Studs (MET STUD-5): Gauge as required by UL listing.
- F. Thermal Sub-Framing Spacer (FUR-5): Pultruded fiber glass and thermoset resin insulation clip.
1. Spacer Thickness: 3/16 inches, nominal.
 2. Spacer Depth: As indicated in drawings. Provide manufacturer's recommended corrosion resistant fasteners.
 3. Provide 'Z' furring channels as indicated on the drawings and as specified above.
 4. Basis of Design:
 - a. Advanced Architectural Products SMARTci Systems: GreenGirt-Simple Z; www.smartcisystems.com.
 - b. Cascadia Windows, Inc: Cascadia Clip; www.cascadiaclip.com.
 - c. exoGIRT; www.exo-girt.com.
 - d. Knight Wall Systems: KWS MFI System Cladding Attachment; knightwallsystems.com.
 - e. Northern Facades; ISO Clip: www.northernfacades.com.
 - f. Strongwell: Strongirt; www.strongirt.com.
 - g. Substitutions: See Section 01 6000 - Product Requirements.

2.03 BOARD MATERIALS

- A. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
1. Material ID:
 - a. (GYP BD-1): 5/8 inch Type X.
 - b. (GYP BD-2): 1/2 inch.
 2. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
 3. At Assemblies Indicated with Fire-Resistance Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
 4. Basis of Design: USG Corporation; Sheetrock Brand EcoSmart Gypsum Panels: www.usg.com.
 5. Other Acceptable Paper-Faced Products provided they meet or exceed the Basis of Design performance requirements:
 - a. CertainTeed Corporation; Type X Drywall: www.certainteed.com.
 - b. Georgia-Pacific Gypsum; ToughRock: www.gpgypsum.com.
 - c. Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond Fire-Shield Gypsum Board: www.goldbondbuilding.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- B. Impact Rated Wallboard (GYP BD-10): Tested to Level 3 soft-body and hard-body impact in accordance with ASTM C1629.
1. Locations: As indicated on drawings.
 2. Soft Body Impact: Level 3, minimum, when tested in accordance with ASTM C1629/C1629M.

3. Hard Body Impact: Level 2, minimum, when tested in accordance with ASTM C1629/C1629M.
 4. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 5. Type: Fire-resistance-rated Type X, UL or WH listed.
 6. Thickness: 5/8 inch (16 mm).
 7. Edges: Tapered.
- C. Backing Board For Wet Areas:
1. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 2. ANSI Cement-Based Board: Non-gypsum-based; aggregated Portland cement panels with glass fiber mesh embedded in front and back surfaces complying with ANSI A118.9 or ASTM C1325.
 - a. Basis of Design: USG Corporation; Durock Brand Cement Board with EdgeGuard: www.usg.com.
 - b. Thickness (CEM BD-2): 5/8 inch (15.9 mm).
 - c. Other Acceptable Products provided they meet or exceed the Basis of Design performance requirements:
 - 1) PermaBASE Building Products, LLC provided by National Gypsum Company; PermaBase Cement Board: www.goldbondbuilding.com/#sle.
 - 2) Substitutions: See Section 01 6000 - Product Requirements.
 3. Glass Mat Faced Board: Tile backing at non-wet areas. Coated glass mat water-resistant gypsum backing panel as defined in ASTM C1178/C1178M.
 - a. Regular Type (GYP BD-16): Thickness: 5/8 inch (15.9 mm).
 - b. Basis of Design: USG Corporation; Durock Brand Glass Mat Tile Backer Board: www.usg.com.
 - c. Other Acceptable Products provided they meet or exceed the Basis of Design performance requirements:
 - 1) Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond eXP Fire-Shield Tile Backer: www.goldbondbuilding.com.
 - 2) Substitutions: See Section 01 6000 - Product Requirements.
- D. 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 behind thinset tile, except in wet areas.
 2. Type X Thickness (GYP BD-6): 5/8 inch (16 mm).
 3. Edges: Tapered.
 4. Sustainability Requirements: Manufacturers must be able to provide the following, or equivalent, product documentations:
 - a. Living Building Challenge Red List Free or Compliant.
 - b. Declare Label.
 - c. Environmental Product Declaration (EPD).
 - d. Health Product Declaration (HPD).
 5. Basis of Design: USG Corporation; Sheetrock Brand Mold Tough EcoSmart.
 6. Other Acceptable Products provided they meet or exceed the Basis of Design performance requirements:
 - a. Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond XP Fire-Shield Gypsum Board: www.goldbondbuilding.com/#sle.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- E. Exterior Sheathing Board: Sizes to minimize joints in place; ends square cut.

1. Application: Exterior sheathing, unless otherwise indicated.
 2. Glass Mat Faced Sheathing: Glass mat faced gypsum substrate as defined in ASTM C1177/C1177M.
 3. Core Type: Type X.
 4. Type X Thickness (GYP SHTG-2): 5/8 inch (16 mm).
 5. Edges: Square.
 6. Basis of Design: USG Corporation; Securerock Brand Ultralight Glass-Mat Sheathing: www.usg.com.
 7. Other Acceptable Products provided they meet or exceed the Basis of Design performance requirements:
 - a. CertainTeed Corporation; GlasRoc Type X Exterior Sheathing: www.certainteed.com.
 - b. Georgia-Pacific Gypsum; DensGlass Sheathing: www.gpgypsum.com.
 - c. Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond eXP Fire-Shield Sheathing: www.goldbondbuilding.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- F. Shaftwall and Coreboard (GYP BD-20): Type X; 1 inch (25 mm) thick by 24 inches (610 mm) wide, beveled long edges, ends square cut.
1. Paper-Faced Type: Gypsum shaftliner board or gypsum coreboard as defined ASTM C1396/C1396M; water-resistant faces.
 2. Basis of Design: USG Corporation; Sheetrock Brand Glass-Mat Liner Panels Mold Tough: www.usg.com.
 3. Other Acceptable Products provided they meet or exceed the Basis of Design performance requirements:
 - a. CertainTeed Corporation; GlasRoc Shaftliner Type X: www.certainteed.com.
 - b. Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond eXP Shaftliner: www.goldbondbuilding.com.
 - c. Substitutions: See Section 01 6000 - Product Requirements.

2.04 GYPSUM BOARD ACCESSORIES

- A. Acoustic Insulation (INSUL-80): ASTM C665; preformed fiber glass or mineral fiber, friction fit type, unfaced. Thickness: 3-1/2 inch (84 mm), minimum. Insulation should fill the cavity.
 1. Basis of Design: Owens Corning Unfaced Ecotouch Insulation.
 - a. Other Acceptable Products provided they meet or exceed the Basis of Design performance requirements.
- B. (INSUL-81) Sound Attenuation Fire Batts (SAFB): ASTM C423; performed mineral fiber, friction fit type, unfaced. Thickness: As indicated in the drawings or to fill the cavity unless noted otherwise.
 1. Basis of Design: Johns Manville SAFB.
- C. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.
- D. Finishing Accessories: ASTM C1047, extruded aluminum alloy (6063 T5) or galvanized steel sheet ASTM A924/A924M G90, unless noted otherwise.
 1. Reveal Molding (MT-#): Basis of Design: As indicated on drawings.
 - a. Types: As detailed or required for finished appearance.
- E. Non-parabolic Cyclorama Seamless Joints (GYP ACC-1): Non-parabolic sound reflecting system; ABS Plastic:

1. Basis of Design: Pro Cyc; System Super 2.5EZ: www.ProCyc.com.
 2. Floor Cove: 30 inch radius.
 3. Expansion: 12 inch flat.
- F. 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.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that project conditions are appropriate for work of this section to commence.

3.02 SHAFT WALL INSTALLATION

- A. Shaft Wall Framing: Install in accordance with GA-600 requirements.
1. Fasten runners to structure with short leg to finished side, using appropriate power-driven fasteners at not more than 24 inches (600 mm) on center.
 2. Install studs at spacing required to meet performance requirements.
- B. Shaft Wall Liner: Cut panels to accurate dimensions and install sequentially between special friction studs.
1. On walls over sixteen feet high, screw-attach studs to runners top and bottom.
 2. Seal perimeter of shaft wall and penetrations with acoustical sealant.

3.03 FRAMING INSTALLATION

- A. Metal Framing: Install in accordance with ASTM C1007/AISI S220 and manufacturer's instructions.
- B. Suspended Ceilings and Soffits: Space framing and furring members as indicated.
- C. Studs: Space studs at 16 inches on center (at 406 mm on center).
1. Extend partition framing to structure where indicated and to ceiling in other locations.
 2. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.
- D. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.
- E. Standard Wall Furring: Install at concrete 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.
- F. Furring for Fire-Resistance Ratings: Install as required for fire-resistance ratings indicated and to GA-600 requirements.

3.04 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.

3.05 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 Nonrated: 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. Fire-Resistance-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.
- D. Exterior Sheathing: Comply with ASTM C1280. Install sheathing vertically, with edges butted tight and ends occurring over firm bearing.
 - 1. Paper-Faced Sheathing: Immediately after installation, protect from weather by application of water-resistive barrier.
- E. Cementitious Backing Board: Install over steel framing members and plywood substrate where indicated, in accordance with ANSI A108.11 and manufacturer's instructions.
- F. Installation on Metal Framing: Use screws for attachment of gypsum board.

3.06 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.
 - 2. Provide a control joint at both sides of the wall at every door frame. Locate at hinge side of door.
 - 3. Provide a control joint at both sides of the wall at openings in the wall. Provide on one side of the opening for openings 48 inches wide or less. For openings over 48 inches, provide on both sides of the opening.
- B. Corner Beads: Install at external corners, using longest practical lengths.
- C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

3.07 JOINT TREATMENT

- A. Glass Mat Faced Gypsum Board and Exterior Glass Mat Faced Sheathing: Use fiberglass joint tape, embed and finish with setting type joint compound.
- B. Paper Faced Gypsum Board: Use paper joint tape, embed with drying type joint compound and finish with drying type joint compound.
- C. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
 - 1. Level 5: Walls and ceilings to receive semi-gloss or gloss paint finish, walls called out to have vinyl graphics applied and other areas specifically indicated.
 - 2. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
 - 3. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.
 - 4. Level 1: Wall areas above finished ceilings, whether or not accessible in the completed construction.
- D. 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).
- E. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.

3.08 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.
- C. Non-ceramic trim.

1.02 RELATED REQUIREMENTS

- A. Section 07 9200 - Joint Sealants: Sealing joints between tile work and adjacent construction and fixtures.

1.03 REFERENCE STANDARDS

- A. ANSI A108/A118/A136 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium); 2024.
- B. ANSI A108.19 - American National Standard Specifications for Interior Installation of Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs by the Thin-Bed Method Bonded with Modified Dry-Set Cement Mortar or Improved Modified Dry-Set Cement Mortar; 2020.
- C. ANSI A108.20 - American National Standard Specifications for Exterior Installation of Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs; 2020.
- D. ANSI A118.3 - American National Standard Specifications for Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive; 2021.
- E. ANSI A118.7 - American National Standard Specifications for High Performance Cement Grouts for Tile Installation; 2019.
- F. ANSI A118.15 - American National Standard Specifications for Improved Modified Dry-Set Cement Mortar; 2023.
- G. ANSI A137.1 - American National Standard Specifications for Ceramic Tile; 2012.
- H. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation; 2025.
- I. TCNA (HB-GP) - Handbook for Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs Installation; 2023.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by affected installers.

1.05 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 St. Cloud School District 742's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.

2. Extra Tile: 10 sq ft (1 sq m) of each size, color, and surface finish combination.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. See Section 01 7419 - Construction Waste Management and Disposal for packaging waste requirements.
- B. 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 above 50 degrees F (10 degrees C) and below 100 degrees F (38 degrees C) during installation and curing of setting 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. Tile (T-#): ANSI A137.1 standard grade.
 1. Basis of Design: See drawings for product information.

2.02 TRIM AND ACCESSORIES

- A. Non-Ceramic Trim (MT-#): Brushed stainless steel, style and dimensions to suit application, set with tile mortar or adhesive.
 1. Basis of Design: See drawings for product information.

2.03 SETTING MATERIALS

- A. Improved Latex-Portland Cement Mortar Bond Coat: ANSI A118.15.
 1. Applications: Use this type of bond coat where indicated, and where no other type of bond coat is indicated.
 - a. Typical Floors:
 - 1) LATICRETE 254 Platinum.
 - 2) TEC Specialty Full Flex.
 - b. Typical Walls:
 - 1) LATICRETE Tri Lite.
 - 2) TEC Specialty Ultimate Large Tile.
 2. Products:
 - a. H.B. Fuller Construction Products, Inc: www.tecspecialty.com/#sle.
 - b. LATICRETE International, Inc: www.laticrete.com/#sle.
 - c. Mapei Corporation: www.mapei.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.

2.04 GROUTS

- A. High Performance Polymer Modified Grout (GT-#): 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. Color: As selected by Architect from manufacturer's full line.
 4. Basis of Design:
 - a. H.B. Fuller Construction Products, Inc; TEC AccuColor Plus Grout: www.tecspecialty.com/#sle.
 - b. LATICRETE International, Inc; LATICRETE PERMACOLOR Select Grout: www.laticrete.com/#sle.
 - c. Mapei Corporation; Ultracolor Plus FA: www.mapei.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- B. Epoxy Grout (GT-#): ANSI A118.3 chemical resistant and water-cleanable epoxy grout.
1. Applications: Use where indicated on drawings.
 2. Color: As selected by Architect from manufacturer's full line.
 3. Basis of Design:
 - a. Tile Floors:
 - 1) H.B. Fuller Construction Products, Inc; TEC AccuColor EFX Epoxy Special Effects Grout: www.tecspecialty.com.
 - 2) LATICRETE International, Inc; LATICRETE SpectraLOCK PRO Premium Grout.
 - 3) Mapei Corporation: www.mapei.com.

2.05 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: As selected by Architect from manufacturer's full line.
 3. Products:
 - a. LATICRETE International, Inc; LATICRETE LATASIL: www.laticrete.com/#sle.
 - b. TEC Specialty; Silicone Caulk.
 - c. Substitutions: See Section 01 6000 - Product Requirements.

2.06 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, ceilings and floors in showers only.
 2. Fluid or Trowel Applied Type:
 - a. Products:
 - 1) LATICRETE International, Inc; LATICRETE HYDRO BAN: www.laticrete.com/#sle.
 - 2) TEC Specialty; HydraFlex.
 - 3) Substitutions: See Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify subfloor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive tile.
- B. Verify wall surfaces are smooth and flat within tolerances specified for that type of work, are dust-free, and are ready to receive tile.

- C. Verify that subfloor surfaces are dust free and free of substances that could impair bonding of setting materials to subfloor surfaces.
- D. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

- A. Vacuum clean surfaces and damp clean.
- B. Seal substrate surface cracks with filler.
- C. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

3.03 INSTALLATION - GENERAL

- A. Install tile, thresholds, and stair treads and grout in accordance with applicable requirements of ANSI A108/A118/A136, manufacturer's instructions, and TCNA (HB) or TCNA (HB-GP) recommendations, as applicable.
- B. Lay tile to pattern indicated on drawings. 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. Install non-ceramic trim in accordance with manufacturer's instructions.
- G. Sound tile after setting. Replace hollow sounding units.
- H. Keep control and expansion joints free of mortar, grout, and adhesive.
- I. Prior to grouting, allow installation to completely cure; minimum of 48 hours.
- J. Grout tile joints unless otherwise indicated on drawings. Use standard grout unless otherwise indicated on drawings.
- K. 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 tile unless other underlayment is indicated on drawings.

3.05 INSTALLATION - SHOWERS AND BATHTUB WALLS

- A. At walls install in accordance with TCNA (HB) Method B412, over cementitious backer units with waterproofing membrane.
- B. Grout with standard grout.

3.06 INSTALLATION - WALL TILE

- A. Over coated glass mat backer board on studs, install in accordance with TCNA (HB) Method W245.
- B. 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.

3.07 CLEANING

- A. Clean tile and grout surfaces.

3.08 PROTECTION

- A. Do not permit traffic over finished floor surface for 4 days after installation.

END OF SECTION

SECTION 09 5100 - ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Suspended metal grid ceiling system.
- B. Acoustical units.

1.02 RELATED REQUIREMENTS

- A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Divisions 21 through 28 for mechanical and electrical components in acoustical ceilings.

1.03 REFERENCE STANDARDS

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2017.
- B. ASTM C635/C635M - Standard Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2022.
- C. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels; 2019 (Reapproved 2025).
- D. 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; 2024a.
- E. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2023.

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. Maintenance Materials: Furnish the following for St. Cloud School District 742'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.armstrongceilings.com.
 - 2. CertainTeed Corporation: www.certainteed.com.
 - 3. USG Corporation: www.usg.com/ceilings.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Suspension Systems:
 - 1. Armstrong World Industries, Inc: www.armstrongceilings.com.
 - 2. CertainTeed Corporation: www.certainteed.com.
 - 3. Rockfon, LLC: www.rockfon.com.
 - 4. USG Corporation: www.usg.com/ceilings.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 ACOUSTICAL UNITS

- A. Acoustical Units - General: ASTM E1264, Class A.
 - 1. VOC Content: As specified in Section 01 6116.
- B. Acoustical Panels (ACT-#): Painted mineral fiber:
 - 1. Basis of Design: As indicated on drawings.

2.03 SUSPENSION SYSTEMS

- A. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with perimeter moldings, hold-down clips, stabilizer bars, clips, and splices as required.
 - 1. Materials:
 - a. Steel Grid: ASTM A653/A653M, G30 coating, unless otherwise indicated.
- B. Exposed Suspension System: Hot-dipped galvanized steel grid with aluminum cap.
 - 1. Structural Classification: Intermediate-duty, when tested in accordance with ASTM C635/C635M.
 - 2. Profile: Tee; 15/16 inch (24 mm) face width.
 - 3. Finish: Baked enamel.
 - 4. Color: White.
 - 5. Products:
 - a. USG Corporation; Donn Brand DX/DXL Suspension System: www.usg.com.

2.04 ACCESSORIES

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application and ceiling system flatness requirement specified.
- B. Hanger Wire: 12 gauge, 0.08 inch (2 mm) galvanized steel wire.
- C. Hold-Down Clips: Manufacturer's standard clips to suit application.
- D. Perimeter Moldings: Same metal and finish as grid.
 - 1. Size: As required for installation conditions.
 - 2. Angle Molding: L-shaped, for mounting at same elevation as face of grid.
- E. 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, 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. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
 - 1. Use longest practical lengths.
 - 2. Miter corners.
- E. Suspension System, Non-Seismic: 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 (152 mm) of each corner, or support components independently.
- I. Do not eccentrically load system or induce rotation of runners.

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 acoustical units level, in uniform plane, and free from twist, warp, and dents.
- E. Cutting Acoustical Units:
 - 1. Make field cut edges of same profile as factory edges.
 - 2. Double cut and field paint exposed reveal edges.
- F. Where round obstructions occur, provide preformed closures to match perimeter molding.
- G. 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 5426 - SUSPENDED WOOD CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Suspended wood ceilings.
- B. Metal suspension system.

1.02 RELATED REQUIREMENTS

- A. Section 09 5100 - Acoustical Ceilings: Metal suspension systems.

1.03 REFERENCE STANDARDS

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2017.
- B. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.
- C. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
- D. ASTM C635/C635M - Standard Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2022.
- E. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels; 2019 (Reapproved 2025).
- F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018.
- G. 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; 2024a.
- H. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2023.
- I. CISCA (WC) - Wood Ceilings Technical Guidelines; 2009.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Sequence work to ensure ceilings are not installed until building is enclosed, dust generating activities have terminated, and overhead work is completed.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate grid layout and related dimensioning, attachment of wood ceiling components to grid, accessory attachments, junctions with other ceiling finishes, and mechanical and electrical items installed in the ceiling.
- C. Product Data: Provide data on wood ceiling components and suspension system components.
- D. Samples: Submit two full size samples illustrating material and finish of wood ceiling components.
- E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- F. Designer's qualification statement.
- G. Manufacturer's qualification statement.
- H. Installer's qualification statement.
- I. Maintenance Materials: Furnish the following for St. Cloud School District 742's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements for additional provisions.

1.06 QUALITY ASSURANCE

- A. Designer Qualifications for Seismic Design: Perform design under direct supervision of Professional Structural Engineer experienced in design of this type of work and licensed in the State in which the Project is located.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section, with at least three years documented experience.
- C. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.

1.07 MOCK-UPS

- A. See Section 01 4000 - Quality Requirements for additional requirements.
- B. Locate where directed.
- C. Mock-up may remain as part of the work.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver wood ceiling components to project site in original, unopened packages.
- B. Store in fully enclosed space, flat, level and off the floor.

1.09 FIELD CONDITIONS

- A. Do not install suspended wood ceiling system until wet construction work is complete and permanent heat and air conditioning is installed and operating.

PART 2 PRODUCTS

2.01 SUSPENDED WOOD CEILING SYSTEM

- A. Performance Requirements:
 - 1. Design for maximum deflection of 1/360 of span.
- B. Wood-Based Materials:
 - 1. Solid Wood: Clear, dry, sound, plain sawn, selected for compatible species, grain and color, no defects.
 - 2. Composite Wood Panels: Containing no urea-formaldehyde resin binders.
- C. Suspended Wood Ceilings (WCT-#):
 - 1. Basis of Design: As indicated on drawings.

2.02 FABRICATION

- A. Shop fabricate wood ceiling components to the greatest extent possible.
- B. Fabricate components to allow access to ceiling plenum as required.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Do not install ceiling until after interior wet work is dry.

3.02 PREPARATION

- A. Coordinate the location of hangers with other work.
- B. Provide hanger clips during steel deck erection. Provide additional hangers and inserts as required.
- C. Layout wood ceiling components in pattern according to reflected ceiling plan and as shown on shop drawings.

- D. Acclimate wood ceiling materials by removing from packaging in installation area a minimum of 48 hours prior to installation.

3.03 INSTALLATION

- A. General: Install suspended wood ceiling system in accordance with CISCA (WC).
- B. Suspension System:
 - 1. Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, and manufacturer's instructions and as supplemented in this section.
 - 2. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
 - 3. 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.
 - 4. 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.
 - 5. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
 - 6. Support fixture loads using supplementary hangers located within 6 inches (152 mm) of each corner, or support components independently.
 - 7. Do not eccentrically load system or induce rotation of runners.
- C. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
- D. Wood Ceiling:
 - 1. Install wood ceilings in accordance with manufacturer's instructions.
 - 2. Fit wood components in place, free from damaged edges or other defects detrimental to appearance and function.
 - 3. Install components in uniform plane, and free from twist, warp, and dents.
 - 4. Cut to fit irregular grid and perimeter edge trim.
 - 5. Make field cut edges of same profile as factory edges, seal and finish according to manufacturer.

3.04 TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet (3 mm in 3 m).

3.05 CLEANING

- A. Clean and touch up minor finish damage. Remove and replace components that cannot be successfully cleaned and repaired.

END OF SECTION

SECTION 09 6500 - RESILIENT FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Resilient sheet flooring.
- B. Resilient tile flooring.
- C. Resilient base.
- D. Installation accessories.

1.02 RELATED REQUIREMENTS

- A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 03 3000 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors to receive adhesive-applied resilient flooring.

1.03 REFERENCE STANDARDS

- A. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2023.
- B. ASTM F970 - Standard Test Method for Measuring Recovery Properties of Floor Coverings after Static Loading; 2022.
- C. ASTM F1303 - Standard Specification for Sheet Vinyl Floor Covering with Backing; 2004 (Reapproved 2021).
- D. ASTM F1344 - Standard Specification for Rubber Floor Tile; 2021a.
- E. ASTM F1861 - Standard Specification for Resilient Wall Base; 2021 (Reapproved 2025).
- F. ASTM F2195 - Standard Specification for Linoleum Floor Tile; 2018 (Reapproved 2023).
- G. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2023.

1.04 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 St. Cloud School District 742's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Extra Flooring Material: 100 square feet (9.29 square meters) of each type and color.
 - 3. Extra Wall Base: 20 linear feet (6.1 linear meters) of each type and color.

1.05 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).

1.06 WARRANTY

- A. Manufacturer's standard limited 5 year commercial warranty.

PART 2 PRODUCTS

2.01 SHEET FLOORING

- A. Vinyl Sheet Flooring (VSF-#): Color and pattern throughout wear layer thickness, with backing:
 - 1. Basis of Design: See drawings for product information.
 - 2. Minimum Requirements: Comply with ASTM F1303, Type II, with Class A fibrous backing.
 - 3. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648, NFPA 253, ASTM E648, or NFPA 253.
 - 4. Wear Layer Thickness: 0.020 inch (0.51 mm) minimum.
 - 5. Total Thickness: 0.080 inch (2.0 mm) minimum.
 - 6. Sheet Width: 72 inch (1830 mm) minimum.
 - 7. Static Load Resistance: 125 psi (860 kPa) minimum, when tested as specified in ASTM F970.
 - 8. (VSFB-#) Integral coved base with cap strip.

2.02 TILE FLOORING

- A. Rubber Tile (RBT-#): Type I- Homogeneous, color and pattern throughout thickness; Type II- Heterogeneous, laminated.
 - 1. Minimum Requirements: Comply with ASTM F1344, of Class corresponding to type specified.
 - 2. Size: 18 by 18 inch (457 by 457 mm) nominal.
 - 3. Total Thickness: 0.125 inch (3.2 mm).
- B. Luxury Vinyl Tile (LVT-#): Homogeneous wear layer bonded to backing, with color and pattern through wear layer thickness.
 - 1. Basis of Design: See drawings for product information.
 - 2. Minimum Requirements: Comply with ASTM 1700, Class 3 Type B.
 - 3. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648, NFPA 253, ASTM E648, or NFPA 253.
 - 4. Backing: Synthetic fabric.
 - 5. Thickness: 0.100 inch (2.5 mm), minimum, excluding backing.

2.03 RESILIENT BASE

- A. Resilient Base (RB-#): ASTM F1861, Type TS rubber, vulcanized thermoset; style as scheduled.
 - 1. Basis of Design: See drawings for product information.
 - 2. Height: 4 inches (100 mm).
 - 3. Thickness: 0.125 inch (3.2 mm).
 - 4. Finish: Satin.
 - 5. Length: Roll.

2.04 ACCESSORIES

- A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.
- B. Primers, Adhesives, and Seam Sealer: Waterproof; types recommended by flooring manufacturer.
- C. Moldings, Transition and Edge Strips (RTS-#): Same material as resilient base.
- D. Filler for Coved Base: Plastic.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.
- 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 resilient base.
- C. Cementitious Subfloor Surfaces: Verify that substrates are ready for resilient flooring installation by testing for moisture and alkalinity (pH).
 - 1. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.
- D. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

- A. Remove subfloor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with subfloor filler to achieve smooth, flat, hard surface.
- B. Prohibit traffic until filler is fully cured.
- C. Clean substrate.
- D. Apply primer as required to prevent "bleed-through" or interference with adhesion by substances that cannot be removed.

3.03 INSTALLATION - GENERAL

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install in accordance with manufacturer's written instructions.
- C. Adhesive-Applied Installation:
 - 1. Spread only enough adhesive to permit installation of materials before initial set.
 - 2. Fit joints and butt seams tightly.
 - 3. Set flooring in place, press with heavy roller to attain full adhesion.
- D. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.
- E. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.04 INSTALLATION - SHEET FLOORING

- A. Lay flooring with joints and seams parallel to longer room dimensions, to produce minimum number of seams. Lay out seams to avoid widths less than 1/3 of roll width; match patterns at seams.
- B. Coved Base: Install as detailed on drawings, using coved base filler as backing at floor to wall junction. Extend sheet flooring vertically to height indicated, and cover top edge with metal cap strip.

3.05 INSTALLATION - TILE FLOORING

- A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.
- B. Lay flooring with joints and seams parallel to building lines to produce symmetrical pattern, unless indicated otherwise in drawings.

3.06 INSTALLATION - 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.

3.07 CLEANING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean in accordance with manufacturer's written instructions.

3.08 PROTECTION

- A. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION

SECTION 09 6566 - RESILIENT ATHLETIC FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Rubber sheet flooring, adhesively installed.

1.02 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's printed data sheets for products specified.
- C. Shop Drawings: Fabrication and installation details, and layout, colors, and widths of game lines and equipment locations.
- D. Verification Samples: Actual flooring material specified, not less than 12 inch (305 mm) square, mounted on solid backing.

1.03 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least three years of documented experience.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to project site in unopened containers clearly labeled with manufacturer's name and identification of contents.
- B. Store materials in dry and clean location until needed for installation. During installation, handle in a manner that will prevent marring and soiling of finished surfaces.

1.05 FIELD CONDITIONS

- A. Maintain temperature in spaces to receive adhesively installed resilient flooring within range of 70 to 95 degrees F (21 to 35 degrees C) for not less than 48 hours before the beginning of installation and for not less than 48 hours after installation has been completed. Subsequently, do not allow temperature in installed spaces to drop below 50 degrees F (10 degrees C) or to go above 100 degrees F (38 degrees C).

PART 2 PRODUCTS

2.01 FLUID-APPLIED ATHLETIC FLOORING

- A. Polyurethane Flooring Over Rubberized Base Mat (RAF-#):
 1. Basis of Design: Pulastic Classic 110: www.pulastic.sika.com.
 2. Total System Thickness: Minimum 1/4 inch (6.4 mm); with minimum 0.07 inch (1.8 mm) polyurethane.
 3. Base Mat: Prefabricated rubber mat of recycled rubber granules in polyurethane binder.
 4. Sealer: Manufacturer's standard two-component polyurethane compound designed to seal base mat before application of resin topcoat.
 5. Resin: Two-component, solid, pigmented, self-leveling polyurethane without fillers, zero mercury formulation, with properties as follows:
 - a. Tensile Strength: Minimum 1000 psi (6.9 MPa), per ASTM D412.
 - b. Durometer Hardness, Type A: Minimum of 70, when tested in accordance with ASTM D2240.
 - c. Ultimate Elongation: Minimum 100 percent
 6. Finish: Manufacturer's standard pigmented two-component polyurethane topcoat, matte finish, in color as selected from manufacturer's standard range.

2.02 ACCESSORIES

- A. Leveling Compound: Latex-modified cement formulation as recommended by flooring manufacturer for substrate conditions.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates for conditions detrimental to installation of athletic flooring. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of athletic flooring to substrate.
- C. Cementitious Subfloor Surfaces: Verify that substrates are ready for resilient flooring installation by testing for moisture and alkalinity (pH).
 - 1. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.

3.02 PREPARATION

- A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- B. Concrete: Use leveling compound as necessary to achieve substrate flatness of plus or minus 1/8 inch within 10 ft radius (1/1000).
- C. Remove coatings that are incompatible with flooring adhesives, using methods recommended by flooring manufacturer.
- D. Broom clean areas to receive athletic flooring immediately before beginning installation.

3.03 INSTALLATION

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install in accordance with manufacturer's written instructions and approved shop drawings.

3.04 CLEANING

- A. Clean flooring using methods recommended by manufacturer.

3.05 PROTECTION

- A. Protect finished athletic flooring from construction traffic to ensure that it is without damage upon Date of Substantial Completion.

END OF SECTION

SECTION 09 6623 - RESINOUS MATRIX TERRAZZO FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Epoxy matrix terrazzo with ground and polished finish.
- B. Divider strips.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Concrete subfloor with steel trowel finish.
- B. Section 09 9600 - High-Performance Coatings: Slip resistant coating applied to terrazzo flooring.

1.03 REFERENCE STANDARDS

- A. NTMA (GRAD) - Aggregate Gradation Standards; Current Edition.
- B. NTMA (EPOXY) - Epoxy Terrazzo Specifications; Current Edition.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for divider strips, control joint strips, expansion joints, and sealer; include printed copy of current NTMA recommendations for type of terrazzo specified.
- C. Shop Drawings: Indicate divider strip and control and expansion joint layout, and details of adjacent components. For precast units, detail profile and anchorage requirements.
- D. Samples: Submit two samples, 12 inch (304 mm) by 12 inch (305 mm) in size illustrating color, chip size and variation, chip gradation, matrix color, and typical divider strip.
- E. Cleaning and Maintenance Data: Include procedures for stain removal, stripping, and sealing.

1.05 QUALITY ASSURANCE

- A. Perform work in accordance with NTMA recommendations as posted at their web site at www.ntma.com.
- B. Installer Qualifications: Company specializing in performing the type of work specified in this section.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store terrazzo materials in a dry, secure area.
- B. Maintain minimum temperature of 60 degrees F (16 degrees C).
- C. Keep products away from fire or open flame.

1.07 FIELD CONDITIONS

- A. Do not install terrazzo when temperature is below 50 degrees F (10 degrees C) or above 90 degrees F (32 degrees C).
- B. Maintain temperature within specified range 24 hours before, during, and 72 hours after installation of flooring.
- C. Provide ambient lighting level of 50 ft candles (540 lx), measured at floor surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Resinous Matrix Terrazzo Flooring:
 - 1. Key Resin Company: www.keyresin.com.

2. Sherwin-Williams High Performance Flooring: www.sherwin-williams.com/resin-flooring.
3. Terrazzo & Marble Supply Companies: www.tmsupply.com.
4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 EPOXY MATRIX TERRAZZO APPLICATIONS

- A. Floors (TERR-1):
 1. Thickness: 3/8 inch (9 mm), nominal.

2.03 MATERIALS

- A. Epoxy Matrix Terrazzo: Aggregate and matrix mix applied to substrate, troweled flat, and ground smooth.
 1. Mix Proportions: As required to achieve appearance specified.
- B. Matrix: Two component resin and epoxy hardener with mineral filler and color pigment, non-volatile, thermo-setting.
- C. Aggregate: Type as indicated; sized in accordance with NTMA aggregate gradation standards; color(s) as indicated, uniform in color.
- D. Finishing Grout: Epoxy, color to match terrazzo matrix.

2.04 ACCESSORIES

- A. Divider Strips (MT-#): 1/8 inch (3 mm) thick zinc exposed top strip, zinc coated steel concealed bottom strip, with anchoring features.
- B. Control Joint Strips: 1/8 inch (3 mm) nominal width zinc exposed top strips, zinc coated steel concealed bottom strips, 1/8 inch (3 mm) wide neoprene filler strip between vertical strips, with anchoring features.
- C. Divider and Control Joint Strip Height: To suit thickness of terrazzo topping, with allowance for grinding.
- D. Crack Suppression Membrane: Provide manufacturer's recommended crack suppression system under all terrazzo.
- E. Base Cap, Base Divider Strip, and Separator Strip: Match divider strips.
- F. Non-Slip Inserts: Provide channel-shaped inserts filled with a mixture of resin and fine, abrasive aggregate.
- G. Sealer: Colorless, non-yellowing, penetrating liquid type to completely seal matrix surface; not detrimental to terrazzo components.
- H. Wood Subfloor Filler: Latex type.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that subfloor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive terrazzo.
- 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 terrazzo.
- C. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of materials to subfloor surfaces.
- D. Cementitious Subfloor Surfaces: Verify that substrates are ready for terrazzo flooring installation by testing for moisture and alkalinity (pH).
 1. Obtain instructions if test results are not within limits recommended by terrazzo flooring manufacturer.

- E. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

- A. Clean substrate of foreign matter.
- B. Prepare concrete subfloor by mechanically abrading surface in accordance with manufacturer's instructions.
- C. Apply primer in accordance with manufacturer's instructions.

3.03 INSTALLATION

- A. Install control joint strips straight and flat to locations indicated.
- B. Install divider strips according to pattern approved on shop drawings.
- C. Install recessed floor mat frames.
- D. Install base and border divider and control joint strips to match floor pattern.
- E. Install terminating cap strip at top of base; attach securely to wall substrate.
- F. Place terrazzo mix over substrate to thickness indicated.

3.04 FINISHING

- A. Finish terrazzo to NTMA requirements.
- B. Produce terrazzo finish surface to match approved mock-up, with 70 percent chip exposed.
- C. Grind terrazzo surfaces with power disc machine; sequence with coarse to fine grit abrasive, using a wet method or using a dry grinder with vacuum to control dust.
- D. Apply grout to fill voids exposed from grinding.
- E. Remove grout coat by grinding, using a fine grit abrasive.
- F. Hand grind vertical and curved surfaces similarly.

3.05 TOLERANCES

- A. Maximum Variation from Flat Surface: 1/4 inch in 10 feet (6 mm in one m).
- B. Maximum Variation from Level (Except Surfaces Sloping to Drain): 1/8 inch (3 mm).

3.06 CLEANING

- A. Scrub and clean terrazzo surfaces with neutral pH cleaner in accordance with manufacturer's instructions. Let dry.
- B. Immediately after terrazzo has dried, apply sealer in accordance with manufacturer's instructions.
- C. Polish surfaces in accordance with manufacturer's instructions.

3.07 PROTECTION

- A. Protect finished terrazzo from damage due to subsequent construction until Date of Substantial Completion.

END OF SECTION

SECTION 09 6700 - FLUID-APPLIED FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fluid-applied flooring and base.

1.02 RELATED REQUIREMENTS

- A. Section 09 9600 - High-Performance Coatings: Base coating for fluid-applied flooring.

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 and colors available.
- C. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and application rate for each coat.
- D. Maintenance Data: Include maintenance procedures, recommended maintenance materials, procedures for stain removal, repairing surface, and suggested schedule for cleaning.
- E. Maintenance Materials: Furnish the following for St. Cloud School District 742's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Extra Top Coat Materials: 2 gallons (8 liters).

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Applicator Qualifications: Company specializing in performing the work of this section.
 - 1. Minimum five years of documented experience.
 - 2. Approved by manufacturer.

1.05 MOCK-UPS

- A. Mock-ups: Before installing fluid-applied flooring, build mockups to verify selections made under sample submittals and to demonstrate typical joints, surface finish, texture, tolerances, and standard of workmanship. Build mock-ups in areas indicated by Construction Manager (areas not intended for fluid-applied flooring, but used for the mockup, such as a janitor's closet. Anticipate that a minimum of three mockups will be required. Build mockups to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Obtain Architect's approval of mockups before installing flooring in other areas.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store resin materials in a dry, secure area.
- B. Store materials for three days prior to installation in area of installation to achieve temperature stability.

1.07 FIELD CONDITIONS

- A. Maintain minimum temperature in storage area of 55 degrees F (13 degrees C).

- B. Store materials in area of installation for minimum period of 24 hours prior to installation.
- C. Maintain ambient temperature required by manufacturer 72 hours prior to, during, and 24 hours after installation of materials.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Fluid-Applied Flooring:
 - 1. Tnemec, Inc: www.tnemec.com.
 - 2. Key Resin Company: www.keyresin.com/#sle.
 - 3. Sherwin-Williams Company: High Performance Flooring: www.generalpolymers.com/#sle.
 - 4. Stonhard: www.stonhard.com.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 FLUID-APPLIED FLOORING SYSTEMS

- A. Fluid-Applied Flooring (HPF-#): Cementitious-urethane flooring system with quartz aggregate.
 - 1. Basis of Design: As indicated on drawings.
 - 2. Primer: Manufacturer's recommended primer.
 - 3. Thickness: 2 mm, nominal when dry.
 - 4. Texture: Smooth.
 - 5. Aggregate: Brightly colored quartz broadcast aggregate.
 - 6. Aggregate size: 1/16 inch flakes.
 - 7. Base: Integral cove base; seamless with floor.
 - 8. Color: As indicated on drawings.

2.03 ACCESSORIES

- A. Base Caps: Zinc with projecting base of 1/8 inch (3 mm); color as selected.
- B. Subfloor Filler: Type recommended by fluid-applied flooring manufacturer.
- C. Primer: Type recommended by fluid-applied flooring manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that subfloor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive flooring.
- 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 flooring.
- C. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of materials to subfloor surfaces.
- D. Cementitious Subfloor Surfaces: Verify that substrates are ready for fluid-applied flooring installation by testing for moisture and alkalinity (pH).
 - 1. Obtain instructions if test results are not within limits recommended by fluid-applied flooring manufacturer.
- E. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

- A. Remove subfloor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with subfloor filler.

- B. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Grind irregularities above the surface level. Prohibit traffic until filler is cured.
- C. Vacuum clean substrate.
- D. Apply primer to surfaces required by flooring manufacturer.

3.03 INSTALLATION - FLOORING

- A. Apply in accordance with manufacturer's instructions.
- B. Apply each coat to minimum thickness required by manufacturer.
- C. Finish to smooth level surface.
- D. Cove at vertical surfaces.

3.04 PROTECTION

- A. Prohibit traffic on floor finish for 48 hours after installation.
- B. Barricade area to protect flooring until fully cured.

END OF SECTION

SECTION 09 6813 - TILE CARPETING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Carpet tile, fully adhered.

1.02 RELATED REQUIREMENTS

- A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 03 3000 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors to receive adhesive-applied flooring.

1.03 REFERENCE STANDARDS

- A. ASTM D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials; 2016 (Reapproved 2021).
- B. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2022.
- C. CRI 104 - Standard for Installation of Commercial Carpet; 2015.

1.04 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. Operation and Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.
- F. Maintenance Materials: Furnish the following for St. Cloud School District 742'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.

1.05 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.

1.06 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-#): Each type manufactured in one color dye lot.
 - 1. See drawings for schedule of carpet tiles.

2.02 ACCESSORIES

- A. Subfloor Filler: White premix latex; type recommended by flooring material manufacturer.
- B. Edge Strips: Rubber, color as selected by Architect.
- C. 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.
- D. Carpet Tile Adhesive: Recommended by carpet tile manufacturer; releasable type.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that subfloor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive carpet tile.
- B. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to subfloor surfaces.
- C. Cementitious Subfloor Surfaces: Verify that substrates are ready for flooring installation by testing for moisture and alkalinity (pH).
 - 1. Obtain instructions if test results are not within limits recommended by flooring material manufacturer and adhesive materials manufacturer.
- D. 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 subfloor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with subfloor 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 subfloor 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. Trim carpet tile neatly at walls and around interruptions.
- F. 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 7200 - WALL COVERINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Wall covering.

1.02 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's data sheets for wall covering and adhesive. Indicate compliance with specified flame spread and smoke developed ratings.
- C. Shop Drawings: Indicate wall elevations with seaming layout.
- D. Manufacturer's Instructions: Indicate installation special procedures.
- E. Maintenance Materials: Furnish the following for St. Cloud School District 742's use in project maintenance:
 - 1. See Section 01 6000 - Product Requirements for additional provisions.
 - 2. Extra Stock Materials: 25 feet (8 m) of each color and pattern of wall covering.
 - a. Package and label each roll by manufacturer, color, pattern, and destination room number.

1.04 QUALITY ASSURANCE

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

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Inspect roll materials for damage upon arrival.
- B. Protect packaged adhesive from temperature cycling and cold temperatures.
- C. Do not store roll goods on end.

1.06 FIELD CONDITIONS

- A. Maintain adhesive and wall covering manufacturer's recommended temperature ranges 24 hours before, during, and after installation.

PART 2 PRODUCTS

2.01 WALL COVERINGS

- A. Performance Requirements:
 - 1. Surface Burning Characteristics: Flame spread index of 25, maximum, and smoke developed index of 50, maximum, when tested in accordance with ASTM E84.
- B. Wall Covering (WC-#): Fabric-backed vinyl roll stock; Type II.
 - 1. Basis of Design: See drawings for product information.

2.02 ACCESSORIES

- A. Adhesive: Type recommended by wall covering manufacturer.

- B. Substrate Filler: As recommended by adhesive and wall covering manufacturers; compatible with substrate.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work, and conform to requirements of the wall covering manufacturer.
- B. Measure moisture content of substrates with electronic moisture meter. Do not apply wall coverings if moisture content of substrate exceeds level recommended by wall covering manufacturer.
- C. Verify flatness tolerance of surfaces does not vary more than 1/8 inch in 10 feet (3 mm in 3 m) or at rate greater than 1/16 inch/ft (5 mm/m).
- D. Notify Architect of detrimental conditions affecting wall covering installation.
- E. Correct detrimental conditions before starting installation.

3.02 PREPARATION

- A. Remove wall plates and accessories impeding wall covering installation.
- B. Substrate Priming and Preparation:
 - 1. Fill cracks in substrate and correct irregularities with filler; sand smooth.
 - 2. For marks capable of bleeding through surface finishes, seal with shellac.
 - 3. Apply one coat of primer sealer to substrate surfaces. Allow to dry. Lightly sand smooth.
- C. Wash impervious surfaces with tetra-sodium phosphate; rinse and neutralize; wipe dry.
- D. Surface Appurtenances: Remove or mask electrical plates, hardware, light fixture trim, escutcheons, and fittings before preparing surfaces or finishing.
- E. Correct surface defects affecting work of this section and clean surfaces. Remove existing coatings exhibiting loose surface defects.
- F. Vacuum surfaces to remove loose particles.

3.03 INSTALLATION

- A. Apply adhesive and wall covering in accordance with manufacturer's instructions.
- B. Apply adhesive to wall immediately before applying wall covering.
- C. Use wall covering in roll number sequence.
- D. Razor trim edges of wall covering. Do not razor trim on gypsum board surfaces.
- E. Smoothly apply wall covering without wrinkles, gaps, or overlaps. Eliminate air pockets and ensure full bond to substrate surface.
- F. Butt edges tightly.
- G. Horizontal seams are not permitted.
- H. Do not seam within 2 inches (51 mm) of internal corners or within 6 inches (152 mm) of external corners.
- I. Install wall covering before installing bases and items attached to, abutting, or located within 1 inch (25 mm) of wall surface.
- J. Do not install wall covering more than 1/4 inch (6 mm) below top of resilient base.
- K. Cover spaces above and below windows and above doors in pattern sequence from roll.
- L. Where wall covering tucks into reveals, metal wallboard, or plaster stops, use contact adhesive within 6 inches (152 mm) of wall covering termination. Ensure complete contact bond.
- M. Remove excess adhesive from seams while wet and before proceeding to next wall covering sheet.

N. Reinstall wall plates and accessories removed to accommodate work of this section.

3.04 CLEANING

A. See Section 01 7000 - Execution and Closeout Requirements for additional requirements.

B. Clean wall coverings of dust, dirt, excess adhesive, and other contaminants.

3.05 PROTECTION

A. Protect installed products from damage until Substantial Completion.

END OF SECTION

SECTION 09 7800 - INTERIOR WALL PANELING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Decorative plastic wall paneling.
- B. Accessories.

1.02 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturer's descriptive literature for each specified product. Include anchorage devices specific to project substrate types.
- C. Shop Drawings: Submit elevations for each application and location. Indicate details of joints and attachments.
- D. Samples: Submit two 12-inch (300 mm) long frames; finish as specified.

1.03 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to project site in manufacturer's original packaging, marked with manufacturer's product identification.
- B. Store panels flat, indoors, on a clean, dry surface. Remove packaging and allow panels to acclimate to room temperature for 48 hours prior to installation.

PART 2 PRODUCTS

2.01 DECORATIVE PLASTIC WALL PANELING

- A. Decorative Plastic Wall Paneling (DPNL-#):
 - 1. Basis of Design: As indicated on drawings.
 - 2. Surface Texture: Smooth.
 - 3. Printed Images: Digitally printed pattern images with manufacturer's standard scratch-resistant, UV-resistant protective coating.
 - a. Custom Image: As indicated on drawings.
 - 4. Edges: Square.
- B. Accessories:
 - 1. Adhesive: Type recommended by panel manufacturer.
 - 2. Sealant: Type recommended by paneling manufacturer; clear.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces for adhered items are clean and smooth.
 - 1. Test painted or wall covering surfaces for adhesion in inconspicuous area, as recommended by manufacturer.
- B. Start of installation constitutes acceptance of project conditions.

3.02 INSTALLATION

- A. Install panels in accordance with manufacturer's instructions.
- B. Apply adhesive to back side of panel using trowel recommended by adhesive manufacturer.

- C. Apply panels to wall with vertical joints plumb and horizontal joints level and pattern aligned with adjoining panels.
- D. Using a roller, apply pressure to panel face to ensure proper adhesion between surfaces.
- E. Install panels with manufacturer's recommended gaps for panel field and corner joints.
- F. Install trim with adhesive.
- G. Seal joints at wall base and between panels with approved sealant to prevent moisture intrusion.
- H. Remove excess sealant after paneling is installed and prior to curing.

3.03 CLEANING

- A. Clean panel faces using cleaning agents and methods recommended by manufacturer to remove soiling.

3.04 CLOSEOUT ACTIVITIES

- A. See Section 01 7800 - Closeout Submittals for closeout submittals.

3.05 PROTECTION

- A. Protect installed interior wall paneling from subsequent construction operations.

END OF SECTION

SECTION 09 8430 - SOUND-ABSORBING WALL AND CEILING UNITS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Sound-absorbing panels.
- B. Sound-absorbing ceiling baffles.

1.02 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's printed data sheets for products specified.
- C. Shop Drawings: Fabrication and installation details, panel layout, fabric orientation, and wood grain orientation.
- D. Verification Samples: Fabricated samples of each type of panel specified; 12 by 12 inch (305 by 305 mm), showing construction, edge details, and fabric covering.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with at least three years of documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Protect acoustical units from moisture during shipment, storage, and handling. Deliver in factory-wrapped bundles; do not open bundles until units are needed for installation.
- B. Store units flat, in dry, well-ventilated space; do not stand on end.
- C. Protect edges from damage.

PART 2 PRODUCTS

2.01 FABRIC-COVERED SOUND-ABSORBING UNITS

- A. Manufacturers:
 - 1. Conwed Designscape/Wall Technology: www.conweddesignscape.com.
 - 2. Egan Visual Corporation: www.egan.com.
 - 3. Essi Acoustical Products Company: www.essiacoustical.com.
 - 4. G&S Acoustics: www.gsacoustics.com.
 - 5. Rockfon; Baffles: www.rockfon.com.
 - 6. TECHLITE: www.techlite.com.
 - 7. Substitutions: See Section 01 6000 - Product Requirements.
- B. General:
 - 1. Prefinished, factory assembled fabric-covered panels.
 - 2. Surface Burning Characteristics: Flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
- C. Fabric-Covered Acoustical Panels for Walls (SAWP-#):
 - 1. Panel Core: As indicated on the drawings.
 - 2. Panel Thickness: As indicated on the drawings.

3. Edges: As indicated on the drawings.
 4. Corners: As indicated on the drawings.
 5. Fabric: As indicated on the drawings.
 6. Color: As indicated on the drawings.
 7. Mounting Method: Back-mounted with mechanical fasteners.
- D. Fabric-Covered Acoustical Ceiling Baffles (SACP-#):
1. Basis of Design: As indicated on drawings.
 2. Baffle Core: Manufacturer's standard rigid or semi-rigid fiberglass core.
- E. Sound Diffusers (DIFF-#):
1. Basis of Design: As indicated on drawings.

2.02 FABRICATION

- A. Fabric Wrapped, General: Fabricate panels to sizes and configurations as indicated, with fabric facing installed without sagging, wrinkles, blisters, or visible seams.
- B. Tolerances: Fabricate to finished tolerance of plus or minus 1/16 inch (1.6 mm) for thickness, overall length and width, and squareness from corner to corner.

2.03 ACCESSORIES

- A. Back-Mounting Accessories: Manufacturer's standard accessories for concealed support, designed to allow panel removal, and as follows:
1. Two-part clip and base-support bracket system; brackets designed to support full weight of panels and clips designed for lateral support, with one part mechanically attached to back of panel and the other attached to substrate.
- B. Ceiling-Suspended Accessories: Manufacturer's standard accessories at locations as indicated on each acoustical unit, sized appropriately for weight of acoustical unit.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates for conditions detrimental to installation of acoustical units. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Install acoustical units in locations as indicated, following manufacturer's installation instructions.
- B. Install mounting accessories and supports in accordance with shop drawings.
- C. Align panels accurately, with edges plumb and top edges level. Scribe to fit accurately at adjoining work and penetrations.
- D. Suspend ceiling baffles at locations and heights as indicated.
- E. Install acoustical units to construction tolerances of plus or minus 1/16 inch (1.6 mm) for the following:
1. Plumb and level.
 2. Flatness.
 3. Width of joints.

3.03 CLEANING

- A. Clean sound-absorptive panels upon completion of installation from dust and other foreign materials, following manufacturer's instructions.

3.04 PROTECTION

- A. Provide protection of installed acoustical panels until Date of Substantial Completion.
- B. Replace panels that cannot be cleaned and repaired to satisfaction of the Architect.

END OF SECTION

SECTION 09 9113 - EXTERIOR PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints.
- C. Scope: Finish exterior surfaces exposed to view, unless fully factory-finished unless noted otherwise including, but not limited to, 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. Marble, granite, slate, and other natural stones.
 - 7. Floors, unless specifically indicated.
 - 8. Glass.
 - 9. Concealed pipes, ducts, and conduits.

1.02 RELATED REQUIREMENTS

- A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 09 9123 - Interior Painting.
- C. Divisions 21 through 26: Identification for mechanical and electrical systems.

1.03 REFERENCE STANDARDS

- A. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials; 2020 (Reapproved 2025).
- B. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.
- C. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).
- D. SSPC-SP 2 - Hand Tool Cleaning; 2024.
- E. SSPC-SP 6/NACE No.3 - Commercial Blast Cleaning; 2006.
- F. SSPC-SP 13/NACE No.6 - Surface Preparation of Concrete; 2018.

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 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 St. Cloud School District 742'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, sheen, type, sheen, surface texture, sheen, 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 paint product manufacturer's temperature ranges.
- 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.
- C. Primer Sealers: Same manufacturer as top coats.
- D. Substitutions: See Section 01 6000 - Product Requirements.

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 described explicitly in manufacturer's product instructions.
- B. Volatile Organic Compound (VOC) Content: Comply with Section 01 6116.
- 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 St. Cloud School District 742.
 - 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 affect 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 in accordance with SSPC-SP 13/NACE No.6.
- 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. Re-prime entire shop-primed item.
 3. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning in accordance with SSPC-SP 6/NACE No.3. 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.
- 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 convactor 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 convactor 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. Marble, granite, slate, and other natural stones.
 - 7. Floors, unless specifically indicated.
 - 8. Ceramic and other tiles.
 - 9. Glass.
 - 10. Concrete masonry units in utility, mechanical, and electrical spaces.
 - 11. Acoustical materials, unless specifically indicated.
 - 12. Concealed pipes, ducts, and conduits.

1.02 RELATED REQUIREMENTS

- A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 09 9113 - Exterior Painting.
- C. Divisions 21 through 26: Identification for mechanical and electrical systems.

1.03 REFERENCE STANDARDS

- A. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials; 2020 (Reapproved 2025).

- B. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.
- C. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).
- D. SSPC-SP 6/NACE No.3 - Commercial Blast Cleaning; 2006.

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 products to be used in project; 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 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 St. Cloud School District 742's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Extra Paint and Finish Materials: 1 gal (4 L) of each color; 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 fc (860 lux) 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. Primer Sealers: Same manufacturer as top coats.
- 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: See Section 01 6116.
- 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 (PT-#): As indicated on drawings.
 - 1. Extend colors to surface edges; colors may change at any edge as directed by Architect.

2.03 PAINT SYSTEMS - INTERIOR

- A. Paint I-OP - Interior Surfaces to be Painted, Unless Otherwise Indicated: Including gypsum board, wood, uncoated steel, shop primed steel, and galvanized steel.
 - 1. Two top coats and one coat primer.
 - 2. Top Coat(s): Interior Latex.
 - a. Basis of Design Products:
 - 1) Benjamin Moore Ultra Spec 500.
 - 2) Sherwin-Williams ProMar 200 Zero VOC.

3. Top Coat Sheen:
 - a. Flat: MPI gloss level 1; use this sheen for ceilings and other overhead surfaces.
 - b. Eggshell: MPI gloss level 3; use this sheen at walls.
 - c. Satin: MPI gloss level 4; use this sheen at walls.
 4. 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, all exposed precast walls or interior faces, walls in classrooms, concrete columns, CMU.
 2. Two top coats and one coat primer.
 3. Top Coat(s): High Performance Architectural Interior.
 - a. Basis of Design Products:
 - 1) Walls: Sherwin-Williams Pro Industrial Pre-Catalyzed Waterbased Epoxy, Eg-Shel. (MPI #139)
 - 2) All other Components: Sherwin-Williams Pro Industrial Pre-Catalyzed Waterbased Epoxy, Semi-Gloss. (MPI #141)
 4. Top Coat(s): Video and photography situation backgrounds
 5. Primer: As recommended by top coat manufacturer for specific substrate.
- C. Paint I-OP-DF - Dry Fall: Metals; exposed structure and overhead-mounted services in utilitarian spaces, including shop primed steel deck, structural steel, metal fabrications, galvanized ducts, galvanized conduit, and galvanized piping, precast tees, hollow core planks.
1. Shop primer by others.
 2. One top coat.
 3. Top Coat: Latex Dry Fall; MPI #118, 155, or 226.
 - a. Basis of Design Products:
 - 1) Sherwin-Williams Waterborne Acrylic Dryfall, Flat. (MPI #155, 226)
 4. Primer: As recommended by top coat manufacturer for specific substrate.
- D. Paint I-OP-C - Film Studio:
1. Basis of Design: Pro Cyc; Cyclorama White Studio Paint: www.ProCyc.com.

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 adequately 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 affect 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 is below the following maximums:
 - 1. Gypsum Wallboard: 12 percent.
 - 2. 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. Masonry:
 - 1. Remove efflorescence and chalk. Do not coat surfaces if moisture content, 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.
- 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. Re-prime entire shop-primed item.
 - 3. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning in accordance with SSPC-SP 6/NACE No.3. 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. 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. 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 9600 - HIGH-PERFORMANCE COATINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. High performance coatings.
- B. Surface preparation.

1.02 RELATED REQUIREMENTS

- A. Section 09 9123 - Interior Painting: Requirements for mechanical and electrical equipment surfaces.

1.03 REFERENCE STANDARDS

- A. ASTM D4258 - Standard Practice for Surface Cleaning Concrete for Coating; 2023.
- B. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association; Current Edition.
- C. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.
- D. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).
- E. SSPC-SP 2 - Hand Tool Cleaning; 2024.
- F. SSPC-SP 6/NACE No.3 - Commercial Blast Cleaning; 2006.
- G. SSPC-SP 13/NACE No.6 - Surface Preparation of Concrete; 2018.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide complete list of all 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 coating system(s) product is to be used in; include description of each system.
 - 4. Manufacturer's installation instructions.
- C. Samples: Submit two samples 8 by 8 inch (203 by 203 mm) in size illustrating colors available for selection.
- D. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- E. Maintenance Data: Include cleaning procedures and repair and patching techniques.
- F. Maintenance Materials: Furnish the following for St. Cloud School District 742's use in maintenance of project.
 - 1. Extra Coating Materials: 1 gallon (4 liters) of each type and color.
 - 2. Label each container with manufacturer's name, product number, color number, and room names and numbers where used.

1.05 QUALITY ASSURANCE

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

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 coating, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Coating 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. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- B. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the coating product manufacturer.
- C. Do not install materials when temperature is below 55 degrees F (13 degrees C) or above 90 degrees F (32 degrees C).
- D. Maintain this temperature range, 24 hours before, during, and 72 hours after installation of coating.
- E. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.
- F. Restrict traffic from area where coating is being applied or is curing.

1.08 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.
- C. Warranty: Include coverage for bond to substrate.

PART 2 PRODUCTS

2.01 TOP COAT MATERIALS

- A. Coatings - General: Provide complete multi-coat systems formulated and recommended by manufacturer for the applications indicated, in the thicknesses indicated; number of coats specified does not include primer or filler coat.
- B. Waterborne Acrylic Enamel (HPC-2):
 - 1. Number of coats: Two.
 - 2. Wet Film Thickness: 4.0 mils.
 - 3. Wet Microns: 102.
 - 4. Dry Film Thickness: 1.5 mils.
 - 5. Dry Microns: 38.
 - 6. Basis of Design.
 - a. PPG; Break-Through! Low VOC: www.ppgpaints.com.
- C. Epoxy Coating (HPC-1#):
 - 1. Number of coats: Two.
 - 2. Top Coat(s): Polyamide Epoxy; MPI #77, #177.
 - a. Color: As selected by Architect.
 - b. Sheen: Gloss.
 - c. Basis of Design Products:

- 1) PPG Protective and Marine Coatings; Amerlock 400 High Solids Epoxy Coating, AK-400 Series, Semi-Gloss: www.ppgpmc.com/#sle.
 - 2) PPG Protective and Marine Coatings; Amerlock 600 Epoxy, AK-600 Series, Semi-Gloss: www.ppgpmc.com/#sle.
 - 3) Sherwin-Williams; Macropoxy 646-100 Epoxy, B58-600 Series: www.protective.sherwin-williams.com/#sle.
 - 4) Sherwin-Williams; Macropoxy 646 Fast Cure Epoxy: www.protective.sherwin-williams.com. (MPI #177)
3. Top Coat(s): Epoxy-Modified Latex; MPI #115, #215.
 4. Primer: As recommended by coating manufacturer for specific substrate.
- D. Acrylic Insulation Coating (THERMBRK-2):
1. Number of Coats: Two.
 2. Product Characteristics:
 3. Intermediate Coat(s): Acrylic insulation coating, one-component.
 - a. Sheen: Flat.
 - b. Products:
 - 1) PPG Paints; Hi-Temp 808: www.ppgpaints.com.
 - 2) Tnemec Company, Inc; Series 971 Aerolon: www.tnemec.com.
 - 3) Substitutions: Section 01 6000 - Product Requirements.
 4. Primer: As recommended by coating manufacturer for specific substrate.
- E. Masonry Filler: Vehicle and resin compatible with topcoats, formulated for applied thickness of 10-20 mils (0.25-0.50 mm); Basis of Design: Kem Cati-Coat HS Epoxy Filler/Sealer manufactured by Sherwin Williams.

2.02 ACCESSORY MATERIALS

- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of coated surfaces.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Do not begin application of coatings until substrates have been properly prepared.
- C. Verify that substrate surfaces are ready to receive work as instructed by the coating manufacturer. Obtain and follow manufacturer's instructions for examination and testing of substrates.
- D. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- E. Masonry: Verify masonry joints are struck flush.

3.02 PREPARATION

- A. Clean surfaces of loose foreign matter.
- B. Remove substances that would bleed through finished coatings. If unremovable, seal surface with shellac.
- C. Remove finish hardware, fixture covers, and accessories and store.
- D. 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. Clean concrete according to ASTM D4258. Allow to dry.
 3. Prepare surface as recommended by coating manufacturer and in accordance with SSPC-SP 13/NACE No.6.
- E. 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 coating manufacturer.
- F. 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.
- G. 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. Re-prime entire shop-primed item.
 3. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning in accordance with SSPC-SP 6/NACE No.3, and protect from corrosion until coated.

3.03 PRIMING

- A. Apply primer to all surfaces, unless specifically not required by coating manufacturer. Apply in accordance with coating manufacturer's instructions.
- B. Concrete Masonry: Apply masonry filler to thickness required to fill holes and produce smooth surface; minimum thickness of 10 mils (0.250 mm).

3.04 COATING APPLICATION

- A. Apply coatings in accordance with manufacturer's written instructions, to thicknesses specified and recommendations in MPI - Architectural Painting and Specification Manual.
- B. Apply in uniform thickness coats, without runs, drips, pinholes, brush marks, or variations in color, texture, or finish. Finish edges, crevices, corners, and other changes in dimension with full coating thickness.

3.05 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.
- B. Clean surfaces immediately of overspray, splatter, and excess material.
- C. After coating has cured, clean and replace finish hardware, fixtures, and fittings previously removed.

3.06 PROTECTION

- A. Protect finished work from damage.

END OF SECTION

SECTION 09 9723 - CONCRETE AND MASONRY COATINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Moisture resistant textured concrete and masonry coatings.
- B. Moisture resistant smooth concrete and masonry coatings.

1.02 RELATED REQUIREMENTS

- A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 09 9113 - Exterior Painting.

1.03 REFERENCE STANDARDS

- A. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus; 2026.
- B. ASTM D522/D522M - Standard Test Methods for Mandrel Bend Test of Attached Organic Coatings; 2017.
- C. ASTM D714 - Standard Test Method for Evaluating Degree of Blistering of Paints; 2025.
- D. ASTM D968 - Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive; 2025.
- E. ASTM D1653 - Standard Test Methods for Water Vapor Transmission of Organic Coating Films; 2013 (Reapproved 2021).
- F. ASTM D2243 - Standard Test Method for Freeze-Thaw Resistance of Water-Borne Coatings; 2020.
- G. ASTM D2247 - Standard Practice for Testing Water Resistance of Coatings in 100 % Relative Humidity; 2025.
- H. ASTM D2370 - Standard Test Method for Tensile Properties of Organic Coatings; 2016 (Reapproved 2021).
- I. ASTM D4803 - Standard Test Method for Predicting Heat Buildup in PVC Building Products; 2024.
- J. ASTM D6904 - Standard Practice for Resistance to Wind-Driven Rain for Exterior Coatings Applied on Masonry; 2003 (Reapproved 2022).
- K. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018.
- L. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2024a.
- M. ASTM G153 - Standard Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials; 2013 (Reapproved 2021).
- N. ASTM G155 - Standard Practice for Operating Xenon Arc Lamp Apparatus for Exposure of Materials; 2025.
- O. SSPC-SP 13/NACE No.6 - Surface Preparation of Concrete; 2018.
- P. SSPC-SP 2 - Hand Tool Cleaning; 2024.
- Q. SSPC-SP 3 - Power Tool Cleaning; 2024.
- R. SSPC-SP 6/NACE No.3 - Commercial Blast Cleaning; 2006.
- S. SSPC-SP 7/NACE No.4 - Brush-Off Blast Cleaning; 2006.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating coating materials.

- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- E. Maintenance Data: Include cleaning procedures and repair and patching techniques.

1.05 QUALITY ASSURANCE

- A. Maintain one copy of each referenced document that applies to application on site.
- B. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

1.06 MOCK-UP

- A. Provide mock-up of 12 foot 4 inches tall by 8 foot wide, illustrating coating, color, and surface sheen, for each specified coating.
- B. Locate where directed.
- C. Mock-up may remain as part of the Work.

1.07 FIELD CONDITIONS

- A. Do not install materials when temperature is below 55 degrees F (13 degrees C) or above 90 degrees F (32 degrees C).
- B. Maintain this temperature range, 24 hours before, during, and 72 hours after installation of coating.
- C. Restrict traffic from area where coating is being applied or is curing.

1.08 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.
- C. Warranty: Include coverage for bond to substrate.

PART 2 PRODUCTS

2.01 CONCRETE AND MASONRY COATINGS

- A. Provide high-build, weather resistant coating systems that meet the following minimum performance criteria, unless more stringent criteria are specified:
 - 1. Salt Spray Resistance: Passes when tested according to ASTM B117 for 2000 hours.
 - 2. Surface Burning Characteristics: Flame spread/Smoke developed index of 0/0, maximum, when tested in accordance with ASTM E84.
 - 3. Accelerated Outdoor Exposure: Passes when tested according to ASTM G153 for 5,000 hours.

2.02 MATERIALS

- A. Coatings - General: Provide complete systems formulated and recommended by manufacturer for the applications indicated, in the thicknesses indicated.
 - 1. Maximum volatile organic compound (VOC) content: As required by applicable regulations.
- B. Semi-transparent Finish (CONC ST-1): Silicate based mineral stain solution that forms a chemical bond with substrate:
 - 1. Basis of Design: NawTone-K manufactured by Nawkaw: www.NawKaw.com.
 - 2. Viscosity: 72 degrees F.
 - 3. Finish: Flat.
 - 4. VOC: ASTM D6886; 0 g/L.
 - 5. Water Vaporance Permeance: 4.5x10⁻⁶ g/Pa s m².

6. Water Diffusion Resistance: $sd(H_2O) < 0.01$ m.
7. Color: As selected by Architect.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that substrate surfaces are ready to receive work as instructed by the coating manufacturer. Obtain and follow manufacturer's instructions for examination and testing of substrates.
- C. Cementitious Substrates: Do not begin application until substrate has cured 28 days minimum and measured moisture content is not greater than 16 percent.
- D. Masonry: Verify masonry joints are struck flush.

3.02 PREPARATION

- A. Clean surfaces of loose foreign matter.
- B. Remove substances that would bleed through finished coatings.
- C. Remove finish hardware, fixture covers, and accessories and store.
- D. Existing Painted and Sealed Surfaces:
 1. Strip existing paint and coatings from surface.
 2. Remove loose, flaking, and peeling paint. Feather edge and sand smooth edges of chipped paint.
 3. Clean with mixture of trisodium phosphate and water to remove surface grease and foreign matter.
- E. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent.
- F. Ferrous Metal:
 1. Solvent clean.
 2. Remove loose rust, loose mill scale, and other foreign substances using hand tools in accordance with SSPC-SP 2, power tools in accordance with SSPC-SP 3, or blast cleaning in accordance with SSPC-SP 6/NACE No.3 and SSPC-SP 7/NACE No.4.
- G. Protect adjacent surfaces and materials not receiving coating from spatter and overspray; mask if necessary to provide adequate protection. Repair damage.

3.03 PRIMING

- A. Apply primer to all surfaces, unless specifically not required by coating manufacturer. Apply in accordance with coating manufacturer's instructions.
- B. Concrete and Masonry: Prior to priming, patch holes and indentations and fill cracks with manufacturer's recommended crack repair material.

3.04 COATING APPLICATION

- A. Apply coatings in accordance with manufacturer's instructions, to thicknesses specified.
- B. Apply in uniform thickness coats, without runs, drips, pinholes, brush marks, or variations in color, texture, or finish. Finish edges, crevices, corners, and other changes in dimension with full coating thickness.

3.05 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.
- B. Clean surfaces immediately of overspray, splatter, and excess material.

C. After coating has cured, clean and replace finish hardware, fixtures, and fittings previously removed.

3.06 PROTECTION

A. Protect finished work from damage.

END OF SECTION

SECTION 10 1100 - VISUAL DISPLAY UNITS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Porcelain enamel steel markerboards.
- B. Tackboards.

1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Blocking and supports.

1.03 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's data on chalkboard, porcelain enamel steel markerboard, glass markerboard, tackboard, tackboard surface covering, trim, and accessories.
- C. Shop Drawings: Indicate wall elevations, dimensions, joint locations , special anchor details.
- D. Samples: Submit two samples 2 by 2 inch (50 by 50 mm) in size illustrating materials and finish, color and texture of markerboard, tackboard, and trim.
- E. Manufacturer's printed installation instructions.
- F. Maintenance Data: Include data on regular cleaning, stain removal .

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year warranty for markerboard to include warranty against discoloration due to cleaning, crazing or cracking, and staining.

PART 2 PRODUCTS

2.01 VISUAL DISPLAY UNITS

- A. Markerboards (MRKBD-#): Porcelain enamel on steel, laminated to core.
 - 1. Color: As selected from manufacturer's full range.
 - 2. Size: As indicated on drawings.
 - 3. Frame: Extruded aluminum , with concealed fasteners.
 - 4. Frame Finish: Anodized, natural.
 - 5. Accessories: As indicated on drawings.
- B. Tackboards (TKBD-#): Composition cork.
 - 1. Cork Thickness: 1/4 inch (6 mm).
 - 2. Color: As indicated on drawings.
 - 3. Backing: Hardboard, 1/4 inch (6 mm) thick, laminated to tack surface.
 - 4. Surface Burning Characteristics: Flame spread index of 25, maximum, and smoke developed index of 450, maximum, when tested in accordance with ASTM E84.

5. Size: As indicated on drawings.
6. Frame: Same type and finish as for markerboard.

2.02 MATERIALS

- A. Adhesives: Type used by manufacturer.

2.03 ACCESSORIES

- A. Map Rail: Extruded aluminum, manufacturer's standard profile, with cork insert and runners for accessories; 1 inch wide overall (; 25 mm wide overall) , full width of frame.
- B. Marker Tray: Aluminum, manufacturer's standard profile, one piece full length of markerboard, molded ends, concealed fasteners, same finish as frame.
- C. Magnets: 1.25 inches diameter or square, color: white.
- D. Mounting Brackets: Concealed.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that internal wall blocking is ready to receive work and positioning dimensions are as indicated on shop drawings.

3.02 INSTALLATION

- A. Install boards in accordance with manufacturer's instructions.
- B. Secure units level and plumb.

3.03 CLEANING

- A. Clean board surfaces in accordance with manufacturer's instructions.
- B. Remove temporary protective cover at Date of Substantial Completion.

END OF SECTION

SECTION 10 1200 - DISPLAY CASES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface-mounted display cases.

1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Blocking and supports.

1.03 REFERENCE STANDARDS

- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).
- B. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
- C. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.
- D. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2025.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit complete printed data and installation details indicating products to be provided as specified.
- C. Shop Drawings: Submit complete installation details. Include dimensioned elevations.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver display cases and materials to the Project site with manufacturer's protective crate covering and do not open until ready for use.
- B. Protect display cases before, during, and after installation. In case of damage, immediately provide necessary repairs and replacements.

1.06 FIELD CONDITIONS

- A. Field Measurements: Verify field measurements for recessed application for display cases before preparation of shop drawings and before fabrication to ensure proper installation.

1.07 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.

PART 2 PRODUCTS

2.01 DISPLAY CASES (DISPLAY CASE-#)

- A. Recessed Display Case: Factory-fabricated aluminum-framed display case with adjustable glass shelves, finished interior.
 - 1. Basis of Design: As indicated on drawings.
- B. Free-standing Display Case: Factory-fabricated aluminum framed display case with adjustable glass shelves, finished interior.
 - 1. Basis of Design: As indicated on drawings.

2.02 MATERIALS

- A. Aluminum Extrusions for Framing and Trim: Alloy as recommended by manufacturer for construction and specified finish; nominal 1/8 inch (3.2 mm) wall thickness.
- B. Aluminum Extrusions: ASTM B221 (ASTM B221M), 6063 alloy, T5 temper.
 - 1. Finish: Factory anodized; AAMA 611: Clear anodized.
- C. Plywood: Softwood plywood with veneer core, waterproof glue, 3/4 inch (19 mm) thick.
- D. Heat-Strengthened and Fully Tempered Glass: ASTM C1048, Kind FT.

PART 3 EXECUTION

3.01 PREPARATION

- A. Rough openings, electrical pre-wiring, and final finishing are by other trades.

3.02 INSTALLATION

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

3.03 ADJUSTING AND CLEANING

- A. Verify that all accessories are installed as detailed for each unit.
- B. At completion of work, clean glass surfaces, back panels and trim in accordance with manufacturer's recommendations leaving units ready for use.

END OF SECTION

SECTION 10 1416 - PLAQUES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Plaques.

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; 2017.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's product literature for each type of plaque sign, indicating style, font, foreground and background colors, locations, and overall dimensions of each sign.
- C. Shop Drawings: Indicate dimensions, locations, elevations, materials, text and graphic layout, and attachment details.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Package plaque signs as required to prevent damage before installation.
- B. Store under cover and elevated above grade.

PART 2 PRODUCTS

2.01 PLAQUES

- A. Metal Plaques:
 - 1. Material: Bronze casting.
 - 2. Basis of Design: As indicated on drawings.

2.02 ACCESSORIES

- A. Concealed Screws: Noncorroding metal; stainless steel, galvanized steel, chrome plated, or other.
- B. Exposed Screws: Solid brass.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.
- B. Notify Architect if conditions are not suitable for installation of signs; do not proceed until conditions are satisfactory.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install with horizontal edges level.

END OF SECTION

SECTION 10 1419 - DIMENSIONAL LETTER SIGNAGE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Dimensional letter signage.
- B. Illumination system.

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 - 2010 ADA Standards for Accessible Design; 2010.
- C. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. UL 879 - Electric Sign Components; Current Edition, Including All Revisions.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's product literature for each type of dimensional letter sign, indicating style, font, colors, locations, and overall dimensions of each sign.
- C. Shop Drawings:
 - 1. Include dimensions, locations, elevations, materials, text and graphic layout, and attachment details.
 - 2. Show locations of electrical service connections.
 - 3. Include diagrams for power, signal, and control wiring.
- D. Verification Samples: Submit samples showing colors and finishes specified.
- E. Manufacturer's Installation Instructions: Include installation templates and attachment devices.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Package dimensional letter signs as required to prevent damage before installation.
- B. Store under cover and elevated above grade.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Dimensional Letter Signs:
 - 1. Gemini: www.geminimade.com.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 DIMENSIONAL LETTERS

- A. Applications: Building identification.
 - 1. Use individual metal letters.
 - 2. Mounting Location: Exterior as indicated on drawings.
- B. Metal Letters:
 - 1. Material: As indicated on drawings.
 - 2. Thickness: As indicated on drawings.

3. Letter Height: As indicated on drawings.
 4. Text and Typeface: As indicated on drawings.
 5. Finish: As indicated on drawings.
 6. Color: As indicated on drawings.
 7. Mounting: Concealed screws.
 8. Illumination System: Halo-lit reverse channel letters.
 - a. Provide products that are listed and labeled as complying with UL 879, where applicable.
 - b. Power: 120 V, 60 Hz, 1 phase, 15 A.
- C. Plastic Letters:
1. Material: Vinyl sheet, flat cutout.
 2. Thickness: Manufacturer's standard for letter size.
 3. Letter Height: As indicated on drawings.
 4. Text and Typeface:
 - a. Character Font: Helvetica, Arial, or other sans serif font.
 5. Finish: Semi-gloss.
 6. Color: As selected.
 7. Mounting: Concealed or exposed screws.

2.03 ACCESSORIES

- A. Concealed Screws: Noncorroding metal; stainless steel, galvanized steel, chrome plated, or other.
- B. Exposed Screws: Stainless steel.
- C. Electrical Components and Devices: Listed and labeled as defined in NFPA 70 by a qualified testing agency.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.
- B. Verify that electrical service is correctly sized and located to accommodate dimensional letter signs.
- C. Notify Architect if conditions are not suitable for installation of signs; do not proceed until conditions are satisfactory.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install with horizontal edges level.

END OF SECTION

SECTION 10 1423 - PANEL SIGNAGE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Panel signage.
- B. Illumination system.

1.02 REFERENCE STANDARDS

- A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's product literature for each type of panel sign, indicating styles, font, foreground and background colors, locations, and overall dimensions of each sign.
- C. Shop Drawings:
 - 1. Include dimensions, locations, elevations, materials, text and graphic layout, attachment details, and schedules.
 - 2. Show locations of electrical service connections.
 - 3. Include diagrams for power, signal, and control wiring.
 - 4. Schedule: Provide information sufficient to completely define each panel sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.
 - a. When room numbers to appear on signs differ from those on drawings, include the drawing room number on schedule.
 - b. When content of signs is indicated to be determined later, request such information from St. Cloud School District 742 through Architect at least 2 months prior to start of fabrication; upon request, submit preliminary schedule.
 - c. Submit for approval by St. Cloud School District 742 through Architect prior to fabrication.
- D. Verification Samples: Submit samples showing colors, materials, and finishes specified.
- E. Manufacturer's Installation Instructions: Include installation templates and attachment devices.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Package signs as required to prevent damage before installation.
- B. Store under cover and elevated above grade.
- C. Store tape adhesive at normal room temperature.

1.05 FIELD CONDITIONS

- A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.
- B. Maintain minimum ambient temperature during and after installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Panel Signage:
 - 1. Best Sign Systems, Inc: www.bestsigns.com.
 - 2. Inpro Corporation: www.inprocorp.com.
 - 3. Mohawk Sign Systems, Inc: www.mohawksign.com.
 - 4. Seton Identification Products: www.seton.com.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 REGULATORY REQUIREMENTS

- A. Accessibility Requirements: 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 restrictive requirements.

2.03 PANEL SIGNAGE

- A. Panel Signage:
 - 1. Application: Room and door signs.
 - 2. Description: Flat signs with engraved panel media, tactile characters.
 - 3. Sign Size: As indicated on drawings.
 - 4. Total Thickness: 1/8 inch (3 mm).
 - 5. Color and Font: As indicated on drawings.
 - 6. Material: As indicated on drawings.
 - 7. Profile: As indicated on drawings.
 - a. Clear Cover: For customer produced sign media, provide clear cover of polycarbonate plastic, glossy on back, non glare on front.
 - 8. Tactile Letters: As indicated on drawings.
 - 9. Braille: Grade II, ADA-compliant.
 - 10. One-Sided Wall Mounting: Tape adhesive.
 - 11. Illumination System: Reverse cut out panel.
 - a. Power: 120 V, 60 Hz, 1 phase, 15 A.

2.04 SIGNAGE APPLICATIONS - AS INDICATED ON DRAWINGS

2.05 ACCESSORIES

- A. Tape Adhesive: Double-sided tape, permanent adhesive.
- B. Electrical Components and Devices: Listed and labeled as defined in NFPA 70 by a qualified testing agency.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.
- B. Verify that power and data service is correctly sized and located to accommodate panel signs.
- C. Notify Architect if conditions are not suitable for installation of signs; do not proceed until conditions are satisfactory.

3.02 INSTALLATION

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

- B. Install with horizontal edges level.
- C. Locate panel signs and mount at heights indicated on drawings and in accordance with ADA Standards and ICC A117.1.

END OF SECTION

SECTION 10 14 53 - TRAFFIC SIGNAGE

PART 1 GENERAL

1.1 SUMMARY

- A. This work shall consist of furnishing and installing traffic and parking signage in pavement surfaces, in the form of traffic lanes, parking bays, areas restricted to handicapped persons, crosswalks, and other signage, in accordance with the details and finishing plan, or as prescribed by the Owner.

1.2 SUBMITTALS

- A. In accordance with SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, furnish Manufacturer's Certificates and Data certifying that the following materials conform to the requirements specified.

PART 2 PRODUCTS

2.1 SIGNS

- A. Signs shall meet the requirements of MnDOT Standard Specifications for Construction, 2020 Edition, Section 3352, the most current MnDOT special provisions, and the MN MUTCD.

2.2 SIGN POSTS

- A. Sign posts shall meet the requirements of MnDOT Standard Specifications for Construction, 2020 Edition, Section 3401, 3402, and the most current MnDOT special provisions.

PART 3 EXECUTION

3.1 GENERAL

- A. Execution shall be in accordance with MnDOT Standard Specifications for Construction, 2020 Edition, Section 2564, the most current MnDOT special provisions, and the MN MUTCD and as shown in the plans except as modified herein.

3.2 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify location of all undergrounding utilities prior to commencing the work.

3.3 INSTALLATION

- A. Locations of signs on the Plans are approximate. Final locations of the signs shall be approved the Engineer or Owner's Representative prior to installation.
- B. Posts shall be installed plumb and to the requirements set forth in MnDOT specifications and the plans. Posts that are bent or otherwise damaged shall be removed and replaced at no expense to the Owner.
- C. Set posts as shown in the details for signs installed in asphalt, concrete or other pavement surfaces.
- D. Prior to completion, remove all rust and clean post and signs of all grease, oil or other contaminating materials.

3.4 PROTECTION

- A. Conduct installation operations in such a manner that necessary traffic can move without hindrance.
- B. Protect the signs from damage from continuing construction and traffic. Replace damaged signs at no additional cost to the Owner.

3.5 FINAL CLEAN-UP

- A. Remove all debris, rubbish and excess material from the Site.

END OF SECTION

SECTION 10 2113.19 - PLASTIC TOILET COMPARTMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Solid plastic toilet compartments.

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. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2024.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on panel construction, hardware, and accessories.
- C. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall supports, door swings.
- 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. All American Metal Corp - AAMCO: www.allamericanmetal.com.
 - 2. Metpar Corp: www.metpar.com.
 - 3. Sanymetal Products Company: www.sanymetal.com.
 - 4. Scranton Products: www.scrantonproducts.com.
 - 5. Substitutions: Section 01 6000 - Product Requirements.

2.02 PLASTIC TOILET COMPARTMENTS

- A. Solid Plastic Toilet Compartments (COMP-1): Factory fabricated doors, pilasters, and divider panels made of solid molded high density polyethylene (HDPE), Class A, tested in accordance with NFPA 286; floor-mounted unbraced.
 - 1. Color: As indicated on drawings.
- B. Doors:
 - 1. Thickness: 1 inch (25 mm).
 - 2. Width: 24 inch (610 mm).
 - 3. Width for Accessible: 36 inch (915 mm), out-swinging.
 - 4. Width for Ambulatory: 34 inches (864 mm), out-swinging.
 - 5. 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).

2.03 ACCESSORIES

- A. Pilaster Shoes: Stainless steel, satin finish, 3 inches (76 mm) high; concealing floor fastenings.
1. Provide adjustment for floor variations with screw jack through steel saddles integral with pilaster.
- B. Head Rails: Extruded aluminum, anti-grip profile.
1. Size: Manufacturer's standard size.
- C. Wall and Pilaster Brackets: Stainless steel; manufacturer's standard type for conditions indicated on drawings.
- D. Attachments, Screws, and Bolts: Stainless steel, tamper proof type.
1. For attaching panels and pilasters to brackets: Through-bolts and nuts; tamper proof.
- E. Hinges: Stainless steel, manufacturer's standard finish.
1. Pivot hinges, gravity type, adjustable for door close positioning; two per door.
- F. Door Hardware: Stainless steel, manufacturer's standard finish.
1. Door Latch: Slide type with exterior emergency access feature.
 2. Door Strike and Keeper with Rubber Bumper: Mount on pilaster in alignment with door latch.
- G. Coat Hook with Rubber Bumper: One per compartment, mounted on door.

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 inch to 1/2 inch (9 mm 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 2123 - CUBICLE CURTAINS AND TRACK

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Suspended overhead curtain track and guides.
- B. Surface mounted overhead curtain track and guides.
- C. Cubicle curtains.

1.02 RELATED REQUIREMENTS

- A. Section 09 5100 - Acoustical Ceilings: Suspended ceiling system to support track.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for curtain fabric characteristics.
- C. Shop Drawings: Indicate a reflected ceiling plan view of curtain track, hangers and suspension points, attachment details, schedule of curtain sizes.
- D. Maintenance Materials: Furnish the following for St. Cloud School District 742's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Extra Carriers: Ten.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Cubicle Track:
 - 1. A. R. Nelson Co: www.arnelson.com.
 - 2. Construction Specialties, Inc: www.c-sgroup.com.
 - 3. Imperial Fastener Co., Inc: www.imperialfastener.com.
 - 4. Inpro: www.inprocorp.com.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 TRACKS AND TRACK COMPONENTS

- A. Tracks (CUBICLE-1): Extruded aluminum sections; one piece per track run.
 - 1. Profile: Channel.
 - 2. Mounting: ACT Ceiling Grid.
 - 3. Structural Performance: Capable of supporting vertical test load of 50 lbs (23 kg) without visible deflection of track or damage to supports, safely supporting moving loads, and sufficiently rigid to resist visible deflection and without permanent set.
 - 4. Track End Stop: To fit track section.
 - 5. Track Bends: Minimum 12 inch (300 mm) radius; fabricated without deformation of track section or impeding movement of carriers.
 - 6. Suspension Rods: Tubular aluminum sections, sized to support design loads and designed to receive attachment from track and ceiling support.
 - 7. Escutcheons: Where suspension rod meets finished ceiling or structure, provide escutcheons to match rod finish.
 - 8. Finish on Exposed Surfaces: White enamel.

- B. Curtain Carriers: Nylon rollers, size and type compatible with track; designed to eliminate bind when curtain is pulled; fitted to curtain to prevent accidental curtain removal.
- C. Wand: Plastic, attached to lead carrier, for pull-to-close action.
- D. Installation Accessories: Types required for specified mounting method and substrate conditions.

2.03 CURTAINS

- A. (CURTAIN-#): As indicated on drawings.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install curtain track to be secure, rigid, and true to ceiling line.
- B. Suspend track from ceiling system.
- C. Install curtains on carriers ensuring smooth operation.

END OF SECTION

SECTION 10 2130 - PVC STRIP CURTAINS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Suspended overhead pvc strip curtain and bracket.

1.02 RELATED REQUIREMENTS

- A. Section 01 1000 - Summary: St. Cloud School District 742-installed curtains.
- B. Section 06 1000 - Rough Carpentry: Blocking and supports for track.

1.03 REFERENCE STANDARDS

- A. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films; 2023, with Errata.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for curtain fabric characteristics.
- C. Shop Drawings: Indicate a reflected ceiling plan view of curtain track, hangers and suspension points, attachment details, schedule of curtain sizes.
- D. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.
- E. Maintenance Data: Include recommended cleaning methods and materials.

1.05 WARRANTY

- A. Manufacturer's standard 5 year warranty on materials and workmanship.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Accept curtain materials on site and inspect for damage.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Welding Curtains:
 - 1. AmCraft Manufacturing, Inc: www.amcraftindustrialcurtainwall.com.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 UNIVERSAL STRIP DOOR BRACKETS

- A. Suspended Brackets: Resistant to hydrochloric acid and chlorine.

2.03 PVC STRIP DOOR

- A. Strip Door Materials:
 - 1. Naturally flame resistant or flameproofed; capable of passing NFPA 701 test.
 - 2. Manufacturer's standard mounting hardware and supports.
 - 3. Color: As selected by architect from manufacturer's full range.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are ready to receive work of this Section.

3.02 INSTALLATION

- A. Install curtain track to be secure, rigid, and true to ceiling line.
- B. Install curtains on carriers ensuring smooth operation.

END OF SECTION

SECTION 10 2600 - WALL AND DOOR PROTECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Corner guards.

1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Blocking for wall and corner guard anchors.

1.03 REFERENCE STANDARDS

- A. ASTM D256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics; 2010, with Editorial Revision (2015).
- B. ASTM D543 - Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents; 2021.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018.
- D. ASTM F476 - Standard Test Methods for Security of Swinging Door Assemblies; 2023.
- E. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, with Editorial Revision (2021).

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Indicate physical dimensions, features, wall mounting brackets with mounted measurements, anchorage details, and rough-in measurements.
- C. Samples: Submit samples illustrating component design, configurations, joinery, color and finish.
 - 1. Submit two sections of corner guards, 6 inches (152 mm) long.
- D. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in St. Cloud School District 742's name and registered with manufacturer.
- E. Maintenance Materials: Furnish the following for St. Cloud School District 742's use in maintenance of project:
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Extra Stock Materials: One package(s) of minimum 96 inches (2438 mm) long unit of each kind of covers for corner guards.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver wall and door protection items in original, undamaged protective packaging. Label items to designate installation locations.
- B. Protect work from moisture damage.
- C. Protect work from UV light damage.
- D. Do not deliver products to project site until areas for storage and installation are fully enclosed, and interior temperature and humidity are in compliance with manufacturer's recommendations for each type of item.
- E. Store products in either horizontal or vertical position, in compliance with manufacturer's instructions.

1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Manufacturer Warranty: Provide 5-year manufacturer warranty for metal crash rails. Complete forms in St. Cloud School District 742's name and register with manufacturer.

1. Failures include, but are not limited to, the following:
 - a. Structural failures or internal connection failures.
 - b. Deterioration of materials beyond that expected of normal use, as intended by manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Corner Guards:
 1. Construction Specialties, Inc: www.c-sgroup.com.
 2. Inpro: www.inprocorp.com.
 3. Koroseal Interior Products: www.koroseal.com.
 4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PERFORMANCE CRITERIA

- A. Impact Strength: Unless otherwise noted, provide protection products and assemblies that have been successfully tested for compliance with applicable provisions of ASTM D256 and/or ASTM F476.
- B. Chemical and Stain Resistance: Unless otherwise noted, provide protection products and assemblies with chemical and stain resistance complying with applicable provisions of ASTM D543.
- C. Fungal Resistance: Unless otherwise noted, provide protection products and assemblies which pass ASTM G21 testing.

2.03 PRODUCT TYPES

- A. Corner Guards - Surface Mounted (CG-#):
 1. Material: High impact vinyl with full height extruded aluminum retainer; surface mount.
 2. Performance: Impact strength of 30.2 ft-lbs/inch of thickness; as tested in accordance with ASTM D-256-90b.
 3. Surface Burning Characteristics: Provide assemblies with flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
 4. Width of Wings: As indicated on drawings.
 5. Corner: As indicated on drawing
 6. Color: As indicated on drawings.
 7. Length: As indicated on drawings.
- B. Adhesives and Primers: As recommended by manufacturer.
- C. See Section 06 1000 for wood blocking for wall and corner guard anchors.

2.04 FABRICATION

- A. Fabricate components with tight joints, corners and seams.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that rough openings, concealed blocking, and anchors are correctly sized and located.
- B. Verify that field measurements are as indicated on drawings.
- C. Verify that substrate surfaces for adhered items are clean and smooth.
- D. Start of installation constitutes acceptance of project conditions.

3.02 INSTALLATION

- A. Install components in accordance with manufacturer's instructions, level and plumb, secured rigidly in position to supporting construction.
- B. Position corner guard 4 inches (102 mm) above finished floor to ceiling.

3.03 TOLERANCES

- A. Maximum Variation From Required Height: 1/4 inch (6 mm).
- B. Maximum Variation From Level or Plane For Visible Length: 1/4 inch (6 mm).

3.04 CLEANING

- A. See Section 01 7419 - Construction Waste Management and Disposal, for additional requirements.
- B. Clean wall and door protection items of excess adhesive, dust, dirt, and other contaminants.

END OF SECTION

SECTION 10 2800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Commercial toilet accessories.
- B. Commercial shower and bath accessories.
- C. Diaper changing stations.
- D. Adult changing stations.
- E. Utility room accessories.

1.02 RELATED REQUIREMENTS

- A. Section 10 2113.19 - Plastic Toilet Compartments.

1.03 REFERENCE STANDARDS

- A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service; 2025.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2017.
- D. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.
- E. ASTM C1036 - Standard Specification for Flat Glass; 2016.
- F. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror; 2024.

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. Commercial Toilet, Shower, and Bath Accessories:
 - 1. American Specialties, Inc: www.americanspecialties.com.
 - 2. Bradley Corporation: www.bradleycorp.com.
 - 3. Bobrick Washroom Equipment Inc: www.bobrick.com.
 - 4. Substitutions: Section 01 6000 - Product Requirements.
- B. Provide products of each category type by single 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/A666M, Type 304.
- C. Stainless Steel Tubing: ASTM A269/A269M, Grade TP304 or TP316.
- 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: Satin finish, unless otherwise noted.
- B. Back paint components where contact is made with building finishes to prevent electrolysis.

2.04 COMMERCIAL TOILET ACCESSORIES

- A. Framed Mirrors: Stainless steel framed, 6 mm thick tempered glass mirror.
 - 1. Basis of Design: 780 Series manufactured by Bradley.
 - 2. Size:
 - a. (MIR-10): 24 inches x 36 inches.
 - b. (MIR-11): 18 inches x 36 inches.
 - c. (MIR-12): 24 inches x 60 inches.
 - 3. Basis of Design: 7815 Series manufactured by Bradley.
 - 4. Size:
 - a. (MIR-13): 18 inches x 36 inches.
 - 5. Frame: 0.05 inch (1.3 mm) angle shapes, with mitered and welded and ground corners, and tamperproof hanging system; satin finish.
- B. Frameless Mirrors (MIR-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. Basis of Design: 747 Series manufactured by Bradley.
- C. Grab Bars: Stainless steel, textured surface.
 - 1. Standard Duty Grab Bars:
 - a. Push/Pull Point Load: 250 pound-force (1112 N), minimum.
 - b. Dimensions: 1-1/2 inch (38 mm) outside diameter, minimum 0.05 inch (1.3 mm) wall thickness, concealed flange mounting, 1-1/2 inch (38 mm) clearance between wall and inside of grab bar.
 - c. Finish: Satin.
 - d. Length and Configuration (see drawings for which of the following are used):
 - 1) (GB-18): 18 inches. Basis of Design 812 Series by Bradley.
 - 2) (GB-36): 36 inches. Basis of Design 812 Series by Bradley.
 - 3) (GB-42): 42 inches. Basis of Design 812 Series by Bradley.
 - 4) (GB-L): L-Shaped. Basis of Design 800 Series by Bradley.
- D. Sanitary Napkin Disposal Unit (ND-1): Stainless steel, surface-mounted, self-closing door, locking bottom panel with full-length stainless steel piano-type hinge, removable receptacle.
 - 1. Basis of Design: Model 4722-15 manufactured by Bradley.
- E. Coat Hook (HK-1): Stainless steel, 3 inch (75 mm) extension from wall; rectangular-shaped bracket and backplate for concealed attachment, satin finish.
 - 1. Basis of Design: Model 9134 manufactured by Bradley.

2.05 COMMERCIAL SHOWER AND BATH ACCESSORIES

- A. Shower Curtain Rod (ROD-#): Stainless steel tube, 1 inch (25 mm) outside diameter, 0.04 inch (1.0 mm) wall thickness, satin-finished, with 3 inch (75 mm) outside diameter, minimum 0.04 inch (1.0 mm) thick satin-finished stainless steel flanges, for installation with exposed fasteners.
 - 1. Basis of Design: Model 9539 manufactured by Bradley.
 - 2. Length:
 - a. (ROD-1): 36 inches.
 - b. (ROD-2): 60 inches.
- B. Shower Curtain (SCT-#):
 - 1. Material: Opaque vinyl, 0.008 inch (0.2 mm) thick, matte finish, with antibacterial treatment, flameproof and stain-resistant.
 - 2. Size: (SCT-1) 36 by 72 inches; (SCT-2) 60 by 72 inches; hemmed edges.
 - 3. Grommets: Stainless steel; pierced through top hem on 6 inch (150 mm) centers.
 - 4. Color: As selected from manufacturer's standard colors.
 - 5. Shower Curtain Hooks: Chrome-plated or stainless steel spring wire designed for snap closure.
- C. Folding Shower Seat: (SST-1) Wall-mounted surface; welded tubular seat frame, structural support members, swing-down legs, hinges, and mechanical fasteners of Type 304 stainless steel, L-shaped, right hand seat.
 - 1. Basis of Design: Model 9569 manufactured by Bradley.
 - 2. Seat: Phenolic or polymeric composite one-piece seat or seat slats, of color as selected.
 - 3. Size: ADA Standards compliant.

2.06 CHANGING STATIONS

- A. Adult Changing Station (ACS-1): Wall-mounted, folding diaper changing station for use in commercial toilet facilities, height adjustable.
 - 1. Basis of Design: Model 100SSE-SM Special Needs Stainless Steel Diaper Changing Station manufactured by Foundations Worldwide, Inc.
 - 2. Material: Stainless steel.
 - 3. Mounting: Surface.
 - 4. Minimum Rated Load: 500 lb (226.8 kg).

2.07 UTILITY ROOM ACCESSORIES

- A. Combination Utility Shelf/Mop and Broom Holder (MOP-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. Basis of Design: Model 9933 manufactured by Bradley.
 - 2. Hooks: Two, 0.06 inch (1.6 mm) stainless steel rag hooks at shelf front.
 - 3. Mop/broom holders: Three spring-loaded rubber cam holders at shelf front.
 - 4. Length: Manufacturer's standard length for number of holders/hooks.
 - 5. Provide one in each janitor's closet, locations indicated as (MOP-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 drawings.
- B. Install plumb and level, securely and rigidly anchored to substrate.
- C. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.

3.04 PROTECTION

- A. Protect installed accessories from damage due to subsequent construction operations.

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; 2026.
- C. UL (DIR) - Online Certifications Directory; Current Edition.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide extinguisher operational features, extinguisher ratings and classifications, color and finish, and anchorage details.
- 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. Activar Construction Products Group, Inc. - JL Industries: www.activarcpg.com.
 - 2. Ansul, a Tyco Business: www.ansul.com.
 - 3. Kidde, a unit of United Technologies Corp: www.kidde.com.
 - 4. Pyro-Chem, a Tyco Business: www.pyrochem.com.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.
 - 6. Activar Construction Products Group, Inc. - JL Industries: www.activarcpg.com.
 - 7. Larsen's Manufacturing Co: www.larsensmfg.com.
 - 8. 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 gauge.
 - 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. Size: 10 pound (4.54 kg).
 - 5. Finish: Baked polyester powder coat color as selected.
 - 6. 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 (FCAB-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 hinges.
- 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. Fabrication: 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 (FBRKT-1): Formed steel, chrome-plated.
- B. Lettering: "FIRE EXTINGUISHER" decal, or vinyl self-adhering, prespaced black lettering in accordance with authorities having jurisdiction (AHJ).
- C. Fire Department Access Box (FIRE BOX-1):
 - 1. Acceptable manufacturers, subject to compliance with specified requirements:
 - a. Dama, S3 (surface-mount)
 - b. Dama, R3
 - c. Knox-Box, 3200 Series
 - d. Tru-Lock, 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. Locations: As 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 10 5617 - WALL MOUNTED STANDARDS AND SHELVING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Steel shelf standards, brackets, and accessories.
- B. Shelves.
- C. See drawings for locations and configurations.

1.02 REFERENCE STANDARDS

- A. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used.
- C. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Store products under cover and elevated above grade.
- B. Store products in manufacturer's unopened packaging until ready for installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Steel Shelf Standards and Brackets:
 - 1. Knape & Vogt Manufacturing Company: www.knapeandvogt.com/#sle.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 COMPONENTS

- A. Steel Shelf Standards, Brackets, and Accessories:
 - 1. Extra-Duty Shelf Standards and Brackets: Double-slotted channel standards for brackets adjustable in 1 inch (25 mm) increments along entire length of standard, drilled and countersunk for screws.
 - a. Basis of Design Product: KV 85/187.
 - b. Load Capacity: Recommended by manufacturer for loading of 300 to 680 pounds (135 to 310 kg) per pair of standards.
 - c. Finish: Electroplated, chrome-look.
 - d. Brackets: Double tab type, locking into slots; size to suit shelves; same finish as standards.
 - e. Bracket Quantity: Provide one bracket for each 12 inches (305 mm) of standard length.
- B. Shelving:
 - 1. Laminate Faced Shelves: Particleboard or medium density fiberboard covered with high pressure decorative laminate on both sides.
 - a. Edge Finish: Matching laminate, all four edges.
 - b. Substrate Thickness: 3/4 inch (19 mm), nominal.
 - c. Laminate: NEMA LD 3 Type HGL.

- C. Fasteners: Screws as recommended by manufacturer for intended application or as otherwise required by project conditions. Finish of exposed to view fasteners to match finish of standards and other components.

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.

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. Install in accordance with manufacturer's instructions.
- B. Mount standards or brackets to solid backing capable of supporting intended loads.
- C. Install brackets, shelving, and accessories.

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 10 75 00 - FLAGPOLE

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Ground Sleeve cone tapered aluminum flagpoles with internal halyard system, combination LED light/truck assembly, remote power supply, pulleys, fittings and accessories as required for complete finished installation.
- B. Provide all electrical components for exterior flagpole lighting.
 - 1. Electrical contractor shall install components and make all connections.

1.2 REFERENCES

- A. American National Standards Institute (ANSI)
- B. National Association of Architectural Metal Manufacturers (NAAMM)
- C. Metal Flag Pole Manual (FP 1001-07)
- D. International Darksky Association (IDA)

1.3 SYSTEM DESCRIPTION

- A. Performance Requirements: Design pole and anchorage system to resist, without permanent deformation, and non-resonant, largest flag intended to be flown in the highest windspeed to which it will be subjected. LED light/truck assembly compatible with flagpole.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer detail specifications.
- B. Shop Drawings: Indicate dimensions of pole, anchor requirements, all components and sizes, LED light/truck details, 3 Year Warranty.
- C. Samples: Submit pole finish or color.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Spiral wrap flagpole with protective covering and pack in shipping tubes. Wrapping must be removed at the time of arrival to site. Poles should not be stored outside with wrapping material.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Eagle Mountain Flag and Flagpoles – StarGazer.
- B. OR EQUAL.

2.2 MATERIALS

- A. Flagpole: One piece, cone tapered aluminum flagpole; conforming to American National Standards Institute (ANSI), National Association of Architectural Metal Manufacturers (NAAMM): Metal Flag Pole Manual (FP 1001-07).
 - 1. Type: Ground Sleeve Mount.
 - 2. Nominal Height: 30FT.

3. Butt Diameter: To be determined based on pole height and maximum intended flag size for subjected wind load rating.
 4. Wall Thickness: To be determined based on pole height and maximum intended flag size for subjected wind load rating.
 5. Positive lightning protection constructed of 7-strand, 1/2" diameter x 6' long aluminum cable and 5/8" diameter x 5' long copper clad rod.
- B. Aluminum ASTM B221
1. Finish: Manufacture's standard satin aluminum.
- C. Flash Collar – Spun aluminum 1piece.
- D. Ground Sleeve: Direct Burial: Ground Sleeves – Galvanized Corrugated Steel with Steel Lightning Spike,Two-Piece Design
1. Corrugated Steel Ground Sleeves with Steel Lightning Spike are designed for use in Ground Set flagpole installations. 2-piece design contains an upper section manufactured of galvanized 16-gauge corrugated steel tube, a 3/16"-1/2" thick steel base plate, and steel centering wedges welded into the base to assist in plumb installations of the flagpole. The lower section incorporates a threaded top 3/4" diameter steel grounding spike with 6" x 6" steel setting plate, allowing the concrete foundation to completely surround the sleeve.
- E. Internal Halyard Rope Based System: with cam cleat and locking flush access door.
1. Provide snap hooks.
 2. Provide rubber covered counterweight
 3. Provide retainer ring.
- F. Flag – Provided by Owner.
- G. LED light/truck assembly – StarGazer LED light/truck furnished as fully assembled unit, 3000 kelvin or as required by local ordinance. Full cutoff optics with International Darksky Association (IDA) certification. Product must have BUG rating B0-U0-G0. 24 Vdc input to light source, max distance of light source to StarGazer remote power supply is 150 feet.
- H. Pre-wire internal components to terminal strips at the factory.
- I. Provide manufacturers' standard finish, as scheduled on the drawings. Where indicated on the drawings, match finish process and color of pole or support materials.
- J. LED source shall meet the following requirements:
1. Shall be certified, listed and warranted by the manufacturer for operating temperature rating between -40 degrees C (-40 degrees F) and 50 degrees C (122 degrees F)
 2. Correlated Color Temperature (CCT): as indicated on the LIGHTING FIXTURE SCHEDULE
 3. Color Rendering Index (CRI): ≥90
- K. StarGazer remote power supply direct burial (DDLIGDRIVER) and meet the following requirements;
1. LISTED TO UL STANDARD 2108
 2. MANDATORY SECONDARY PROTECTION, AS STATED IN THE NATIONAL ELECTRIC CODE ARTICLE 411, (1993, 1996, 1999, 2002, 2005 AND 2008)
 3. INPUT VOLTAGE RANGE FROM 120-277VAC, 24 VDC, 50/60Hz, 40 watts maximum
 4. NEMA 12 PVC NON-METALLIC BOX WITH BRASS SCREW INSERTS (For DDLIGDRIVER only)
 5. SHORT CIRCUIT / OVER VOLTAGE / OVER TEMPERATURE PROTECTION

6. STANDARD WITH WATER TIGHT 3/4" FITTING FOR PRIMARY VOLTAGE (For DDLIGDRIVER only)
7. STANDARD WITH 3 CUSTOM BRASS FITTINGS FOR LOW VOLTAGE CONNECTION (For DDLIGDRIVER only)
8. MEETS OR EXCEEDS ALL UL, CUL, ANSI/UL, CSA REQUIREMENTS
9. 3 Year Warranty

PART 3 EXECUTION

3.1 PREPARATION

- A. Install ground sleeve and complete foundation for flagpoles correctly sized and positioned according to manufacturer's recommendations and the drawing details.

3.2 INSTALLATION

- A. Install flagpole, lightning protection, and fittings in accordance with manufacturer's recommendations and installation instructions and as indicated on drawings.
 1. LED light/truck low voltage cable assembly with remote power supply installed by electrical contractor.
- B. Install owner specified flag.
- C. Check and adjust installed fittings for a smooth operation.
- D. Instruct Owner's representative in maintenance and operation.

3.3 FIELD QUALITY CONTROL

- A. Materials installed under this Section shall be subject to testing by the Owner at his expense. Materials tested and found to be not in strict conformance with this Section shall be promptly removed and replaced by the Contractor at the Contractor's expense.

END OF SECTION

SECTION 10 8211 - ARCHITECTURAL COILED WIRE GRILLES AND SCREENS -

CASCADE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Architectural coiled wire grilles and screens.

1.02 RELATED REQUIREMENTS

- A. Section 05 5000 - Metal Fabrications: Mounting substrates.
- B. Section 06 1000 - Rough Carpentry: Mounting substrates.

1.03 DEFINITIONS

- A. Coiled Wire Fabric: Building material created by interlocking strands of coiled wire to form a larger flexible sheet; coiled wire fabric is made from various metals and gauges of wire, and in a wide variety of sizes, weaves, finishes, and levels of fullness.
- B. Attachment Systems: Components and materials required to provide coiled wire fabric in designated shape and form (i.e., flat under tension in two directions, under tension in two directions with a percentage of fullness, flat under tension in four directions, hanging in one direction, or wrapping a form, etc.). Attachment systems are used to connect coiled wire fabric to built environment and maintaining designated performance capability. Engineered attachments may allow coiled wire fabric systems to remain in fixed position or to move, either manually or mechanically.

1.04 REFERENCE STANDARDS

- A. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.
- B. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2025.
- C. ASTM F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs; 2024.

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate field measurements and fabrication schedule with progress of construction to avoid construction delays.
- B. Preinstallation Meetings: Conduct meetings including Contractor, Architect, fabricator, installer and other subcontractors whose work involves coiled wire fabric to confirm project requirements, framing and support conditions, mounting surfaces and manufacturer's installation requirements.

1.06 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturer's data sheets on each product used, including preparation instructions, storage and handling requirements, and installation methods.
- C. Shop Drawings: Submit detailed shop drawings for fabrication and installation, including plans and elevations, detailed sections, materials, finishes, fittings, hardware, anchorages, fastening details, and manufacturer's technical and descriptive data.
- D. Samples: Submit samples for color verification of each specified finish, at least 6 inch (254 mm) wide by 10 inch (254 mm) long.

- E. Certificates: Submit certificates signed by manufacturers of coiled wire products certifying that products furnished comply with requirements.
- F. Delegated Design Submittals: Submit comprehensive structural analysis of overall design for specified loads prepared by qualified professional engineer.
- G. Designer's Qualification Statement.
- H. Manufacturer's Qualification Statement.
- I. Installer's Qualification Statement.
- J. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in St. Cloud School District 742's name and registered with manufacturer.
 - 1. Submit "Final Installation Contractor Checklist" to ensure warranty requirements have been met; see CCD website for copy of checklist.

1.07 QUALITY ASSURANCE

- A. Designer Qualifications: Perform structural design under direct supervision of a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than ten years of documented experience.
- C. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years of documented experience.

1.08 MOCK-UPS

- A. See Section 01 4000 - Quality Requirements for additional requirements.
- B. Provide mock-up of coiled wire fabric system for evaluation of desired appearance, performance, application and workmanship; size of mock-up not to exceed 50 sq ft (4.64 sq m).
 - 1. Locate where directed by Architect.
 - 2. Mock-up may remain as part of the Work.
 - 3. Do not proceed with remaining work until mock-up is approved by Architect.
 - 4. Retain mock-up during construction as quality standard.

1.09 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to project site in manufacturer's original, unopened packaging, with labels clearly identifying manufacturer and material.
- B. Exercise care not to scratch, mark, dent, or bend metal components during delivery, storage, and installation.
- C. Store materials indoors, protected from moisture, humidity, and extreme temperature fluctuations until ready for installation.

1.10 FIELD CONDITIONS

- A. Verify dimensions of actual openings by field measurements before fabrication; provide recorded measurements on shop drawings.

1.11 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.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Architectural Coiled Wire Grilles and Screens Manufacturers:
 - 1. Cascade Coil Drapery, Inc, dba Cascade Architectural: www.cascade-architectural.com.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 ARCHITECTURAL COILED WIRE GRILLES AND SCREENS SYSTEMS (MD-1)

- A. Provide architectural coiled wire grilles and screens system with attachment method, materials, weaves, and finish as indicated; manufacturer and contractor to engineer and fabricate components and assemblies as required for installation in accordance with manufacturer's Custom Architectural System.
- B. Attachment Method: Hook with Aluminum Angle.
- C. Fabricoil Architectural Coiled Wire Fabric Weaves:
 - 1. Interior Application:
 - a. Aluminum: 5/16 inch (8 mm) thick, 14 gauge wire.
- D. Factory Finishes: Space Black; powder coatings tested in accordance with ASTM D3451.
- E. Fullness: 25 percent.

2.03 PERFORMANCE REQUIREMENTS

- A. Structural Requirements: Architectural coiled wire fabric systems capable of withstanding applied loads and stresses within designated limits and under conditions as indicated on drawings.
 - 1. Provide coiled wire fabric and attachment system components in accordance with applicable building code to withstand dead and live loads resulting from environmental conditions including, but not limited to, wind, seismic events, vegetation, rain, snow, and ice.
 - 2. Provide coiled wire fabric systems capable of accommodating expansion and contraction of metal components without causing undue stress, buckling, opening of joints, and distortion.
 - 3. Provide structural framing and hardware of coiled wire fabric systems capable of withstanding loads and maintain deflection limitations in accordance with applicable building codes when systems are fully installed.

2.04 COMPONENTS

- A. Wire Attachment: Stainless steel, Type 304.
- B. Angles: Aluminum.
- C. Fasteners: Nuts, bolts, washers, and machine screws; stainless steel, Type 304.
- D. Stainless Steel: Comply with ASTM A666/A666M.
- E. Aluminum Coated Steel Sheet: Aluminum-zinc alloy-coated steel sheet, ASTM A792/A792M, Commercial Steel (CS)) or Forming Steel (FS) with AZ50/AZM150 coating; continuous coil-coated on exposed surfaces with specified finish coating, and manufacturer's standard panel back coating.

2.05 FABRICATION

- A. Tolerances: Verify field dimensions prior to start of shop fabrication.
- B. Fabricate steel and stainless steel components in accordance with manufacturer's requirements and the following:
 - 1. Comply with requirements indicated for metal materials, thickness, design, and details of construction; fabricate metal accurately and without any burrs.

2. Provide welded connections in compliance with American Welding Society (AWS) standards for recommended practice in shop welding.
 3. Provide welds located behind finished surfaces that are without distortion or discoloration of exposed side.
 4. Provide components that are accurately cut, drilled and/or tapped to receive coiled wire fabric, hardware, fasteners, and accessories.
- C. Shop fabricate components in accordance with requirements indicated on drawings and specified performance requirements.
 - D. Shop fabricate hardware, interconnected parts, and assemblies to eliminate necessity for any field cutting adjustments.
 - E. Coordinate system requirements, dimensions and spacing of attachment components to ensure required factory drilled holes in supporting framework are properly located.
 - F. Provide exposed joints that are butt, flush, and hairline.
 - G. Fabricate exterior connections that will be exposed to weather in a manner that prevents water from entering interior portions of structure, in accordance with Architect.

2.06 ACCESSORIES

- A. Fasteners: Comply with ASTM F593 for stainless steel or ASTM A307 for carbon steel, sizes to suit installation conditions.
- B. Anchors and Inserts: Corrosion resistant; type, size, and material required for loading and installation as indicated.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Prior to start of installation, verify that existing conditions are acceptable for installation of coiled wire fabric and attachment systems in accordance with manufacturer's installation instructions.
- B. Coordinate with setting diagrams, plans, templates, and drawings to ensure that proper installation of necessary anchors and supporting devices has been completed.
- C. Ensure that supporting system for coiled wire fabric has been properly prepared for attachment of framework, hardware, anchors, wire rope, and transfer of calculated loading.
- D. Where existing conditions are responsibility of another installer, notify Architect of unsatisfactory conditions prior to proceeding.
- E. Coordinate with appropriate entity to correct any unsatisfactory conditions.
- F. Start of this work indicates acceptance of areas and conditions as satisfactory by installer.

3.02 PREPARATION

- A. Verify inventory of system components to ensure required components are available for installation; inspect components for damage, and replace damaged components as necessary.
- B. Verify that alignment, support dimensions, and tolerances are correct.
- C. Verify that necessary structural framing is installed prior to mounting coiled wire fabric attachment system components.
- D. Verify that support framing and other surfaces to receive coiled wire fabric and attachment systems are clean and free of obstructions.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's written installation instructions.

- B. Attach coiled wire fabric to structural framing using applicable hardware provided by manufacturer as indicated on approved shop drawings.
- C. Provide necessary anchorage devices and fittings to securely fasten to on-site construction; including additional knife plates, embeds, framework, blocking, threaded rods, and anchors.
- D. Provide for separation of dissimilar materials using bushings, grommets, or washers to prevent electrolytic corrosion.
- E. Upon completion of final adjustments, provide tamper-resistant lock-tight material at mechanical fittings.
- F. Provide for tension in coiled wire fabric as indicated on drawings, or as necessary to remove slack.
- G. Coiled Wire Fabric Attachment System:
 - 1. Install coiled wire fabric attachment system components in accordance with approved shop drawings.
 - 2. Install attachment system assemblies based on manufacturer's dimensions.
 - 3. Install joints that accommodate for expansion and contraction of metal components without causing undue stress, buckling, joint fatigue and/or distortion.
 - 4. Install structural blocking at wall locations used for mounting of attachment system.
 - 5. Install coiled fabric mounting hardware onto attachment systems as indicated on approved shop drawings for specified attachment system; attach with approved fasteners and techniques to ensure that framing members are horizontal and parallel to grade or slab, and straight to within 1/16 inch (1.6 mm) in 4 feet (1.2 m).
 - 6. Install attachment system plumb, level, square, and rigid without having any kinks or sags in coiled wire fabric.
- H. Coiled Wire Fabric:
 - 1. Install coiled wire fabric in accordance with approved shop drawings.
 - 2. Install coiled wire fabric based on manufacturer's dimensions.
 - 3. Install joints that accommodate for expansion and contraction of metal components without causing undue stress, buckling, joint fatigue and/or distortion.
 - 4. Install coiled wire fabric mounting hardware onto coiled wire fabric as indicated on approved shop drawings for specified attachment system; attach with approved fasteners and techniques to ensure that sections are horizontal and parallel to grade or slab, and straight to within 1/16 inch (1.6 mm) in 4 feet (1.2 m).
 - 5. Install coiled wire fabric infill with attachment system plumb, level, square, and rigid without having any kinks or sags.

3.04 CLEANING

- A. Remove temporary protective coverings of adjacent work areas, and clean installed materials prior to Date of Substantial Completion.
- B. In heavy traffic areas, establish cleaning program to pressure wash or hand-wash coiled wire fabric and attachment system on a monthly basis prior to Date of Substantial Completion.
- C. Clean coiled wire fabric system components with mild detergent and water applied with wet wrap and wiped with clean dry rag; abrasive cleaners are not permitted.
- D. Remove from project site and legally dispose of construction debris associated with this work.
- E. See Section 01 7419 - Construction Waste Management and Disposal, for additional requirements.

3.05 PROTECTION

- A. Provide protection of installed coiled wire grilles and screens and finished surfaces to ensure they are without damage until Date of Substantial Completion.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.
- C. Replace defective or damaged components as directed by Architect.

END OF SECTION

SECTION 11 4000 - FOODSERVICE EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Foodservice equipment.
- B. Connections to utilities.

1.02 RELATED REQUIREMENTS

- A. Section 07 9200 - Joint Sealants: Sealing joints between equipment and adjacent walls, floors, and ceilings.

1.03 REFERENCE STANDARDS

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025.
- B. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.
- C. ASTM C1036 - Standard Specification for Flat Glass; 2025.
- D. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2012.
- E. FM (AG) - FM Approval Guide; Current Edition.
- F. ITS (DIR) - Directory of Listed Products; current edition.
- G. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.
- H. NEMA MG 00001 - Motors and Generators; 2024.
- I. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- J. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations; 2024.
- K. NSF 2 - Food Equipment; 2022.
- L. SMACNA (KVS) - Kitchen Ventilation Systems and Food Service Equipment Fabrication and Installation Guidelines; 2001.
- M. UL (DIR) - Online Certifications Directory; Current Edition.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week before starting work of this section.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on appliances; indicate configuration, sizes, materials, finishes, locations, and utility service connection locations, service characteristics, and wiring diagrams.
- C. Certificates: Certify that products of this section meet or exceed specified requirements.
- D. Maintenance Data: Provide lubrication and periodic maintenance requirement schedules.
- E. Warranty: Submit manufacturer warranty and ensure forms have been completed in St. Cloud School District 742's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacture of standard products of the type specified.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Store products clear of floor in a manner to prevent damage.
- B. Coordinate size of access and route to place of installation.

1.08 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work of this section within a five year period after Date of Substantial Completion.
- C. Provide five year manufacturer warranty for replacement or repair of scheduled equipment, refrigerant and compressors, including disconnection and removal of defective unit, and connection of replacement unit.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Foodservice Equipment:
 - 1. Hobart Corp: www.hobartcorp.com/#sle.
 - 2. Sani-Floor Trough Systems; Standard Floor Trough Systems: www.sanifloor.com/#sle.
 - 3. Vulcan Hart Corp: www.vulcanhart.com/#sle.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 REGULATORY REQUIREMENTS

- A. Comply with applicable codes for utility requirements.
- B. Products Requiring Electrical Connection: Listed and classified by FM (AG), ITS (DIR), UL (DIR), or testing agency acceptable to local authorities having jurisdiction as suitable for the purpose specified and indicated.

2.03 EQUIPMENT

- A. Equipment Schedule: Refer to schedule at end of this section.
 - 1. Equipment Eligible for Energy Star Rating: Provide Energy Star Rated equipment
 - 2. Cooler and Freezer Units: Listed by UL (DIR).
 - 3. Electrical Wiring and Components and Self-Contained Refrigeration Systems: Comply with UL (DIR) listed product standards.
 - 4. Exhaust Hoods: Comply with NFPA 96 and SMACNA (KVS).
 - 5. Custom Fabricated Stainless Steel Equipment: See Section 11 4001.
- B. Installation Accessories: Provide rough-in hardware, supports and connections, attachment devices, closure trim, and accessories as required for complete installation.

2.04 MATERIALS

- A. Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G90/Z275 coating.
- B. Stainless Steel Sheet: ASTM A666/A666M Type 304 commercial grade, No. 4 finish.
- C. Glass: ASTM C1036 annealed, and laminated, 4 mm thick; exposed edges ground; cut or drilled to receive hardware.
- D. Laminate Backing Sheets: NEMA LD 3, BKL; unfinished, plastic laminate.
- E. Finish Hardware: Manufacturer's standard.

- F. Work Surfaces: Solid, laminated maple.
- G. Fittings: Sink drains with crumb cup and waste fittings.
- H. Service Outlet Covers and Escutcheons: Stainless Steel.

2.05 FABRICATION

- A. Install rubber button feet on bearing surface of any item positioned on a finished surface.
- B. Isolate rotating or reciprocating machinery to prevent noise and vibration.
- C. Provide indirect drain piping from equipment to terminate over nearest waste receptor.
- D. Accommodate site installation of other services or equipment.

2.06 FINISHES

- A. Components: Shop finish.
- B. Metal (Except Stainless Steel): Degrease and phosphate etch, prime and apply minimum two coats factory baked epoxy, color as selected.
- C. Stainless Steel: No. 4 finish.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify ventilation outlets, service connections, and supports are correct and in required location.
- B. Verify that electric power is available and of the correct characteristics.

3.02 INSTALLATION

- A. Install items in accordance with manufacturers' instructions.
- B. Insulate to prevent electrolysis between dissimilar metals.
- C. Weld and grind joints in steel work tight, without open seams, where necessary due to limitations of sheet sizes or installation requirements.
- D. Sequence installation and erection to ensure correct mechanical and electrical utility connections are achieved.
- E. Use anchoring devices appropriate for equipment and expected usage.

3.03 EXISTING EQUIPMENT

- A. Obtain, move, store, and re-install equipment, ready for utility connection.
- B. Do work in cooperation with St. Cloud School District 742 so that normal function of services is minimally interrupted.
- C. Clean and re-furbish existing equipment to be re-used to original condition.
- D. Where required, remove existing equipment from site for repairs or alterations; handle carefully and return in "like new" condition.
- E. Re-used Equipment: Refer to schedule on drawings for re-used equipment.

3.04 ADJUSTING

- A. Adjust equipment and apparatus to ensure proper working order and conditions.
- B. Remove and replace equipment creating excessive noise or vibration.

3.05 CLEANING

- A. Remove masking or protective covering from stainless steel and other finished surfaces.
- B. Wash and clean equipment.
- C. Polish glass, plastic, hardware, accessories, fixtures, and fittings.

3.06 CLOSEOUT ACTIVITIES

- A. At completion of work, provide qualified and trained personnel to demonstrate operation of each item of equipment and instruct St. Cloud School District 742 in operating procedures and maintenance.
 - 1. Test equipment prior to demonstration.
 - 2. Individual Performing Demonstration: Fully knowledgeable of all operating and service aspects of equipment.

3.07 PROTECTION

- A. Remove protective coverings from prefinished work.
- B. Protect finished work from damage.

3.08 FOODSERVICE EQUIPMENT SCHEDULE

- A. Floor Trough (FT-1):
 - 1. Comply with NSF 2 construction.
 - 2. Construction: 16 gauge, 0.0598 inch (1.52 mm) stainless steel.
 - 3. Number of Grates: 1.
 - 4. Grating: Fiberglass, green.

END OF SECTION

SECTION 12 2400 - WINDOW SHADES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Interior manual roller shades.
- B. Interior motorized roller shades.
- C. Motor controls.

1.02 REFERENCE STANDARDS

- A. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- B. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems; Current Edition, Including All Revisions.
- C. WCMA A100.1 - Standard for Safety of Window Covering Products; 2022.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week prior to commencing work related to products of this section; require attendance of affected installers.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets, including materials, finishes, fabrication details, dimensions, profiles, mounting requirements, and accessories.
- C. Shop Drawings: Include shade schedule indicating size, location and keys to details, head, jamb and sill details, mounting dimension requirements for each product and condition, and operation direction.
- D. Verification Samples: Minimum size 6 inches (150 mm) square, representing actual materials, color and pattern.
- E. Manufacturer's Instructions: Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- F. Operation and Maintenance Data: List of all components with part numbers, sources of supply, and operation and maintenance instructions; include copy of shop drawings.
- G. Warranty: Submit sample of manufacturer's warranty and documentation of final executed warranty completed in St. Cloud School District 742's name and registered with manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver shades in manufacturer's unopened packaging, labeled to identify each shade for each opening.
- B. Handle and store shades in accordance with manufacturer's recommendations.

1.06 FIELD CONDITIONS

- A. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.07 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide manufacturer's warranty from Date of Substantial Completion, covering the following:
 - 1. Shade Hardware: One year.
 - 2. Fabric: One year.

3. Aluminum and Steel Coatings: One year.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Interior Manually Operated Roller Shades:
 1. Draper, Inc: www.draperinc.com.
 2. Hunter Douglas Architectural: www.hunterdouglasarchitectural.com.
 3. MechoShade Systems LLC: www.mechoshade.com.
 4. SWFcontract, a division of Springs Window Fashions, LLC.: www.swfcontract.com.
 5. Substitutions: See Section 01 6000 - Product Requirements.
- B. Interior Motorized Roller Shades, Motors and Motor Controls:
 1. Draper, Inc: www.draperinc.com.
 2. Hunter Douglas Architectural: www.hunterdouglasarchitectural.com.
 3. MechoShade Systems LLC: www.mechoshade.com.
 4. SWFcontract, a division of Springs Window Fashions, LLC: www.swfcontract.com.
 5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 ROLLER SHADES

- A. General:
 1. Provide shade system components that are easy to remove or adjust without removal of mounted shade brackets.
 2. Provide shade system that operates smoothly when shades are raised or lowered.
 3. Motorized Shades: Motor system housed inside roller tube, controlling shade movement via motor controls indicated; listed or recognized to UL 325.
 - a. Comply with NFPA 70.
 - b. Electrical Components: Listed, classified, and labeled as suitable for the purpose intended. Where applicable, system components to be FCC compliant.
 - c. Motors: Size and configuration as recommended by manufacturer for the type, size, and arrangement of shades to be operated; integrated into shade operating components and concealed from view; fully compatible with controls to be installed.
- B. Roller Shades (WT-1) - Basis of Design: MechoShade Systems LLC; Mecho/5 System; www.mechoshade.com.
 1. Description: Single roller, manually operated fabric window shades.
 - a. Drop Position: Regular roll.
 - b. Mounting: Window jamb mounted.
 - c. Size: As indicated on drawings.
 - d. Fabric: As indicated under Shade Fabric article.
 2. Brackets and Mounting Hardware: As recommended by manufacturer for mounting indicated and to accommodate shade fabric roll-up size and weight.
 - a. Material: Steel, 1/8 inch (3 mm) thick.
 - b. Double Roller Brackets: Configured for light-filtering and room-darkening shades in one opening.
 - 1) Light-Filtering Fabric: Room-side of opening.
 - 2) Room-Darkening Fabric: Glass-side of opening.
 - c. Multiple Shade Band Operation: Provide hardware as necessary to operate more than one shade band using a single clutch operator.

3. Roller Tubes:
 - a. Material: Extruded aluminum.
 - b. Size: As recommended by manufacturer; selected for suitability for installation conditions, span, and weight of shades.
 - c. Fabric Attachment: Utilize extruded channel in tube to accept vinyl spline welded to fabric edge. Shade band to be removable and replaceable without removing roller tube from brackets or inserting spline from the side of the roller tube.
 - d. Capable of being removed and reinstalled without affecting roller shade limit adjustments.
4. Hembars: Designed to maintain bottom of shade straight and flat.
 - a. Style: Full wrap fabric covered bottom bar, flat profile with heat sealed closed ends.
 - b. Room-Darkening Shades: Provide a slot in bottom bar with wool-pile light seal.
5. Clutch Operator: Manufacturer's standard material and design integrated with bracket/brake assembly.
 - a. Provide a permanently lubricated brake assembly mounted on an oil-impregnated hub with wrapped spring clutch.
 - b. Brake must withstand minimum pull force of 50 lb (22.7 kg) in the stopped position.
 - c. Mount clutch/brake assembly on the support brackets, fully independent of the roller tube components.
6. Drive Chain: Continuous loop stainless steel beaded ball chain, 95 lb (43 kg) minimum breaking strength. Provide upper and lower limit stops.
 - a. Chain Retainer: Chain tensioning device complying with WCMA A100.1.
7. Accessories:
 - a. Fascia: Extruded aluminum, size as required to conceal shade mounting, attachable to brackets without exposed fasteners; fabric wrapped finish to match shade.
- C. Roller Shades (WT-2) - Basis of Design: MechoShade Systems LLC; ElectroShade with WhisperShade IQ2-DC EDU, low voltage (24 VDC); www.mechoshade.com.
 1. Description: Single roller, motor-operated fabric window shade system complete with mounting brackets, roller tubes, hembars, hardware, and accessories.
 - a. Mounting: Window jamb mounted.
 - b. Size: As indicated on drawings.
 - c. Fabric: As indicated under Shade Fabric article.
 - d. Material: Steel, 1/8 inch (3 mm) thick.
 - e. Double Roller Brackets: Configured for light-filtering and room-darkening shades in one opening.
 - 1) Light-Filtering Fabric: Room-side of opening.
 - 2) Room-Darkening Fabric: Glass-side of opening.
 - f. Multiple Shade Operation: Provide hardware as necessary to operate more than one shade using a single motor.
 - g. Material: Extruded aluminum.
 - h. Size: As recommended by manufacturer; selected for suitability for installation conditions, span, and weight of shades.
 - i. Fabric Attachment: Utilize extruded channel in tube to accept vinyl spline welded to fabric edge. Shade band to be removable and replaceable without removing roller tube from brackets or inserting spline from the side of the roller tube.
 - j. Style: Full wrap fabric covered bottom bar, flat profile with heat sealed closed ends.

- k. Room-Darkening Shades: Provide a slot in bottom bar with wool-pile light seal.
 - 1) Audible Noise: 38 dBA or less measured 3 feet from motor unit, depending on motor torque.
 - 2) Capable of being configured to place motor into Override Mode when local switch commands shade to new position. Upon entering Override Mode, monitor and log positioning commands from automation devices, but do not act upon them until exiting Override Mode.
 - 3) Preventative Maintenance: Internally monitor important operating parameters to ensure motor and shade assembly are functioning properly.
- l. Modes of Operation:
 - 1) Uniform Mode: Shades move only to defined intermediate stop positions to maintain aesthetic uniformity.
 - 2) Normal Mode: Shades move to defined intermediate stop positions plus any position between defined upper and lower limits.
 - 3) Maintenance Mode: Prevent shade from moving to newly commanded positions via dry contact or network control commands until EDU has been serviced or Maintenance Mode has been cleared or disabled.
- m. Control Methods:
 - 1) Local isolated dry contact inputs support local switch control and third-party system integration without separate interface.
 - 2) Bidirectional network communication enables commanding operation of large groups of shades over common backbone.
 - 3) Provide minimum of three customizable preset positions accessible over network connection and local dry contact control inputs.
 - 4) Provide minimum of 32 customizable preset positions, including three local switch presets, accessible via network commands.
- 2. Accessories:
 - a. Fascia: Removable extruded aluminum fascia, size as required to conceal shade mounting, attachable to brackets without exposed fasteners; fabric wrapped finish to match shade.

2.03 SHADE FABRIC

- A. Fabric: Nonflammable, color-fast, impervious to heat and moisture, and able to retain its shape under normal operation.
 - 1. Basis of Design: As indicated on drawings.

2.04 MOTOR CONTROLS

- A. Unless specifically indicated to be excluded, provide all required equipment, conduit, boxes, wiring, connectors, hardware, supports, accessories, software, system programming, etc. as necessary for a complete operating system that provides the control intent indicated.
- B. Provide all components and connections necessary to interface with other systems as indicated.
- C. Manual Controls:
 - 1. Control Functions:
 - a. Open: Automatically open controlled shade(s) to fully open position when button is pressed.
 - b. Close: Automatically close controlled shade(s) to fully closed position when button is pressed.
 - c. Multiple Shade Groups: Provide individual controls for each shade group as indicated.

2. Wall Controls: Provided by shade manufacturer.
 - a. Finish: To be selected by Architect.
 - b. Button Engraving: Manufacturer's standard engraving, unless otherwise indicated.

2.05 ROLLER SHADE FABRICATION

- A. Field measure finished openings prior to ordering or fabrication.
- B. Dimensional Tolerances: Fabricate shades to fit openings within specified tolerances.
 1. Vertical Dimensions: Fill openings from head to sill with 1/2 inch (13 mm) space between bottom bar and window stool.
 2. Horizontal Dimensions - Inside Mounting: Fill openings from jamb to jamb.
- C. At openings requiring continuous multiple shade units with separate rollers, locate roller joints at window mullion centers; butt rollers end-to-end.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine finished openings for deficiencies that may preclude satisfactory installation.
- B. Start of installation shall be considered acceptance of substrates.

3.02 PREPARATION

- A. Prepare surfaces using methods recommended by manufacturer for achieving best result for substrate under the project conditions.
- B. Coordinate with window installation and placement of concealed blocking to support shades.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions and approved shop drawings, using mounting devices as indicated.
- B. Adjust level, projection, and shade centering from mounting bracket. Verify there is no telescoping of shade fabric. Ensure smooth shade operation.

3.04 SYSTEM STARTUP

- A. Motorized Shade System: Provide services of a manufacturer's authorized representative to perform system startup.

3.05 CLEANING

- A. Clean soiled shades and exposed components as recommended by manufacturer.
- B. Replace shades that cannot be cleaned to "like new" condition.

3.06 CLOSEOUT ACTIVITIES

- A. See Section 01 7800 - Closeout Submittals, for closeout submittals.
- B. Demonstration: Demonstrate operation and maintenance of window shade system to St. Cloud School District 742's personnel.
- C. Training: Train St. Cloud School District 742's personnel on operation and maintenance of system.
 1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
 2. Provide minimum of two hours training by manufacturer's authorized personnel at location designated by the St. Cloud School District 742.

3.07 PROTECTION

- A. Protect installed products from subsequent construction operations.
- B. Touch-up, repair, or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 12 3553.13 - METAL LABORATORY CASEWORK

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Metal laboratory casework.
 - 2. Filler and closure panels.
 - 3. Laboratory countertops.
 - 4. Tables.
 - 5. Shelves.
 - 6. Laboratory accessories.
- B. Related Requirements:
 - 1. Section 06 1000 "Rough Carpentry" for wood blocking for anchoring laboratory casework.
 - 2. Section 09 2216 "Gypsum Board Assemblies" for reinforcements in metal-framed partitions for anchoring laboratory casework.
 - 3. Section 09 6500 "Resilient Flooring" for resilient base applied to metal laboratory casework.

1.02 COORDINATION

- A. Coordinate layout and installation of framing and reinforcements for support of laboratory casework.

1.03 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For laboratory casework. Include plans, elevations, sections, and attachment details.
 - 1. Indicate types and sizes of cabinets.
 - 2. Indicate locations of blocking and reinforcements required for installing laboratory casework.
 - 3. Include details of tables.
 - 4. Include details of countertops.
 - 5. Indicate locations of and clearances from adjacent walls, doors, windows, other building components, and other laboratory equipment.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Schedule delivery of casework and equipment so that spaces are sufficiently complete that material can be installed immediately following delivery.
- B. Protect finished surfaces from soiling or damage during handling and installation. Keep covered with polyethylene film or other protective coating.
- C. Protect all work surfaces throughout construction period with 1/4" corrugated cardboard completely covering the top and securely taped to edges. Mark cardboard in large lettering "No Standing."

1.05 FIELD CONDITIONS

- A. Locate concealed framing, blocking, and reinforcements that support casework by field measurements before being enclosed, and indicate measurements on Shop Drawings.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. CIF Lab Solutions: www.cifsolutions.com.

- B. Hamilton Laboratory Solutions: www.hamiltonlab.com.
- C. Kewaunee Scientific Corporation: www.kewaunee.com.
- D. LSI Industries: www.lsicorp.com.
- E. Mott Manufacturing: www.mott.ca.
- F. OnePointe Solutions: www.onepointesolutions.com.
- G. Sheldon Laboratory Systems: www.sheldonlabs.com.
- H. Source Limitations: Obtain laboratory casework from single source from single manufacturer unless otherwise indicated.

2.02 PERFORMANCE REQUIREMENTS

- A. System Structural Performance: Laboratory casework and support framing system shall withstand the effects of the following gravity live loads and stresses without permanent deformation, excessive deflection, or binding of drawers and doors:
 1. Steel base unit load capacity: 500 lbs. per lineal foot.
 2. Drawers in a cabinet body: 150 lbs.
 3. Hanging wall cases: 300 lbs.
 4. Load capacity for shelves of base units, wall cases and tall cases: 40 lbs. per square foot, maximum load – 200 lbs. up to 48" wide.
 5. Work Surfaces: 160 lb/ft. (240 kg/m).
 6. Vertical Riser Upright:
 - a. Unit modules: Support 1,280 lbs. evenly balanced both sides.
 - b. Shelves: Support a minimum of 180 lbs. - 6" to 12" deep shelves; 130 lbs. – 18" deep shelves; 100 lbs. - 24" deep shelves.
- B. Metal Finish Performance Requirements:
 1. Abrasion resistance: Maximum weight loss of 5.5 mg. per 100 cycle when tested on a Taber Abrasion Tester #E40101 with 1000 gm wheel pressure and Calibrase #CS10 wheel.
 2. Humidity resistance: Withstand 1000 hour exposure in saturated humidity at 100 degrees F.
 3. No visible effect to surface finish following 100 hour continuous application of a water soaked cellulose sponge, maintained in a wet condition throughout the test period.
 4. Salt spray: Withstand minimum 200 hour salt spray test.
 5. Laboratory Casework Sefa 8 Metal Standards Requirements: Casework performance characteristics shall be in full compliance with current SEFA 8 Metal standards.

2.03 CASEWORK, GENERAL

- A. General: Provide casework manufacturer's standard integrated system that includes support framing, modular cabinets, filler and closure panels, countertops, and fittings needed to assemble system. System includes hardware and fasteners for securing to permanent construction.
 1. Cabinets shall be fabricated as sectional units and be capable of being removed and reinstalled without use of special tools for relocation within system. Component parts of the unit shall be manufactured ensuring uniformity, interchangeability and accurate alignment. All base cabinets shall have integral enclosed bases.
 2. Base cabinets allow for field conversion of cabinet door and drawer front styles, drawer body suspension systems and cabinet horizontal and vertical support rails with the use of simple hands tools.

3. System includes filler and closure panels to close spaces between support framing, cabinets, shelves, countertops, floors, and walls, unless otherwise indicated. Fabricate panels from same material and with same finish as cabinets and with hemmed or flanged edges.
 4. System includes wall-mounted casework that matches all other laboratory casework in design and material.
- B. Casework Product Standard: Comply with SEFA 8 M, "Laboratory Grade Metal Casework."

2.04 COUNTERTOPS

- A. Countertops:
1. Epoxy Resin Countertops (EPXY-#): Filled epoxy resin molded into homogenous, non-porous sheets; no surface coating and color and pattern consistent throughout thickness; with integral or adhesively seamed components.
 - a. Flat Surface Thickness: 1 inch (25 mm), nominal.
 - b. Surface Finish: Smooth, non-glare.
 - c. Color: Black.
 - d. Exposed Edge Shape: 3/16 inch (5 mm) radius corner.
 - e. Back and End Splashes: Same material, same thickness; separate for field attachment.

2.05 METAL CABINETS (MTL CASE-#)

- A. Fabrication: Assemble and finish units at point of manufacture. Use precision dies for interchangeability of like-size drawers, doors, and similar parts. Perform assembly on precision jigs to provide units that are square. Reinforce units with angles, gussets, and channels. Except where otherwise specified, integrally frame and weld cabinet bodies to form dirt- and vermin-resistant enclosures. Where applicable, reinforce base cabinets for sink support. Maintain uniform clearance around door and drawer fronts of 1/16 to 3/32 inch (1.5 to 2.4 mm).
- B. Flush Doors: Outer and inner pans that nest into box formation, with full-height channel reinforcements at center of door. Fill doors with noncombustible, sound-deadening material.
- C. Hinged Doors: Mortise for hinges and reinforce with angles welded inside inner pans at hinge edge.
- D. Drawers: Fronts made from outer and inner pans that nest into box formation, with no raw metal edges at top. Sides, back, and bottom fabricated in one piece with rolled or formed top of sides for stiffening and comfortable grasp for drawer removal.
- E. Adjustable Shelves: Front, back, and ends formed down 1 inch, with edges returned horizontally at front and back to form reinforcing channels.
- F. Toe Space: Fully enclosed, 4 inches (100 mm) high by 2 - 3 inches (50 - 75 mm) deep, with no open gaps or pockets.
- G. Filler and Closure Panels: Provide where indicated and as needed to close spaces between cabinets and walls, ceilings, and indicated equipment. Fabricate from same material and with same finish as cabinets and with hemmed or flanged edges unless otherwise indicated.
1. Provide knee-space panels (modesty panels) at spaces between base cabinets, where cabinets are not installed against a wall or where space is not otherwise closed. Fabricate from back-to-back panels or of hollow construction to eliminate exposed hemmed or flanged edges.
 2. Provide utility-space closure panels at spaces between base cabinets where utility space would otherwise be exposed, including spaces below countertops.
 3. Provide closure panels at ends of utility spaces where utility space would otherwise be exposed.

2.06 METAL CABINET FINISH

- A. General: Prepare, treat, and finish welded assemblies after assembling. Prepare, treat, and finish components that are to be assembled with mechanical fasteners before assembling. Prepare, treat, and finish concealed surfaces same as exposed surfaces.
- B. Preparation: After assembly, clean surfaces of mill scale, rust, oil, and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it.
- C. Chemical-Resistant Finish: Immediately after cleaning and pretreating, apply laboratory casework manufacturer's standard two-coat, chemical-resistant, baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils (0.05 mm).
 - 1. Electrostatically apply urethane powder coat of selected color and bake in controlled high temperature oven to assure a smooth, hard satin finish. Surfaces shall have a chemical resistant, high grade laboratory furniture quality finish of the following thickness:
 - a. Exterior and interior exposed surfaces: 1.5 mil average and 1.2 mil min.
 - b. Backs of cabinets and other surfaces not exposed to view: 1.2 mil average.
 - c. Interior and shelves of flammable liquid storage cabinets: 3 mil min.
 - d. Chemical and Physical Resistance of Finish System: Finish complies with acceptance levels of cabinet surface finish tests in SEFA 8 M. Acceptance level for chemical spot test shall be no more than four Level 3 conditions.
 - 2. Colors for Metal Laboratory Casework Finish: As indicated on drawings.

2.07 HARDWARE

- A. General: Provide laboratory casework manufacturer's standard, commercial-quality, heavy-duty hardware complying with requirements indicated for each type.
- B. Hinges: Stainless steel, #4 finish, 5-knuckle hinges complying with BHMA A156.9, Grade 1, with antifriction bearings and rounded tips. Provide 2 for doors 48 inches (1200 mm) and less in height and 3 for doors more than 48 inches (1200 mm) in height, four for doors 84" or more in height.
 - 1. Inset steel, stainless steel, 5-knuckle
- C. Drawer and Door Pulls: Pulls fastened from back with two screws. For sliding doors, provide stainless steel or chrome-plated recessed flush pulls. Provide two (2) pulls for drawers more than 24 inches (600 mm) in width.
 - 1. Stainless steel wire.
- D. Door Catches: Nylon-roller spring loaded, self-aligning, catch with a steel strike plate. Double doors without locks shall have a catch on each door. Tall cases shall have latching devices located on the structurally fixed center shelf. The left hand door shall have a positive catch and the right hand door shall have a roller type catch where locks are used. Where locks are used, catches and strike plates shall be used on left hand doors of double door cases and shall be steel, cadmium plated. Provide 2 catches on doors more than 48 inches (1200 mm) in height.
- E. Drawer Slides: Full-extension, heavy-duty, zinc plated drawer slides; designed to prevent rebound when drawers are closed; SEFA 8 Metal complaint and rated for 100 lbs and 150 lbs. full extension slides; 150 lbs slides standard on all file drawers. Drawer slides shall have an integral stop mechanism to avoid inadvertent removal. Self-closing and soft-closing slides are BIFMA rated.
 - 1. 100 lbs. full extension, SEFA 8 Metal
 - 2. 150 lbs. full extension, SEFA 8 Metal

- F. Shelf Adjustment: Adjustable shelf support clips are designed for adjusting shelves on 1.26" (35 mm) centers and shall be painted steel complying with BHMA A156.9, Type B04013. In addition to shelf clips required for initial assembly, six (6) dozen additional clips to be provided to the owner.
- G. Adjustable Leveling Devices: Each base cabinet shall have leveling devices, 3/8"-16, 2.5" long similar to model # 2500T32 as manufactured by McMaster-Carr Supply Company, New Brunswick, NJ.

2.08 COUNTERTOPS

- A. Countertops, General: Provide units with smooth surfaces in uniform plane, free of defects. Make exposed edges and corners straight and uniformly beveled. Provide front and end overhang of 1 inch (25 mm), with continuous drip groove on underside 1/2 inch (13 mm) from edge.
- B. Epoxy Countertops:
 - 1. Countertop Fabrication: Fabricate with cutouts for sinks, holes for service fittings and accessories, and butt joints assembled with epoxy adhesive and concealed metal splines.
 - a. Countertop Configuration: Flat, 1 inch (25 mm) thick, with beveled edge and corners, and with drip groove and integral covered backsplash.

2.09 MISCELLANEOUS MATERIALS

- A. Elastomeric Joint Sealant: ASTM C 920; silicone. Type S (single component), Grade NS (nonsag), Class 25, Use NT (nontraffic) related to exposure, and Use M, G, A, or O as applicable to joint substrates indicated.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances, location of reinforcements, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION OF CABINETS

- A. Comply with installation requirements in SEFA 2.3. Install level, plumb, and true; shim as required, using concealed shims. Where laboratory casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical. Do not exceed the following tolerances:
 - 1. Variation of Tops of Base Cabinets from Level: 1/16 inch in 10 feet (1.5 mm in 3 m).
 - 2. Variation of Bottoms of Upper Cabinets from Level: 1/8 inch in 10 feet (3 mm in 3 m).
 - 3. Variation of Faces of Cabinets from a True Plane: 1/8 inch in 10 feet (3 mm in 3 m).
 - 4. Variation of Adjacent Surfaces from a True Plane (Lippage): 1/32 inch (0.8 mm).
 - 5. Variation in Alignment of Adjacent Door and Drawer Edges: 1/16 inch (1.5 mm).
- B. Base Cabinets: Fasten cabinets to partition framing, wood blocking, or reinforcements in partitions, with fasteners spaced not more than 16 inches (400 mm) o.c. Bolt adjacent cabinets together with joints flush, tight, and uniform.
 - 1. Where base cabinets are installed away from walls, fasten to floor at toe space at not more than 24 inches (600 mm) o.c. and at sides of cabinets with not less than two fasteners per side.
- C. Wall Cabinets: Fasten to hanging strips, masonry, partition framing, blocking, or reinforcements in partitions. Fasten each cabinet through back, near top, at not less than 16 inches (400 mm) o.c.
- D. Install hardware uniformly and precisely. Set hinges snug and flat in mortises.

- E. Adjust laboratory casework and hardware so doors and drawers align and operate smoothly without warp or bind and contact points meet accurately. Lubricate operating hardware as recommended by manufacturer.
- F. The assemblies listed below are to be fastened together with devices of adequate strength to support cabinet or shelf fully loaded. Fully loaded at (40) LBS. per square, up to 200 lbs., foot per shelf for enclosed wall cabinets or open adjustable shelves not inclusive of cabinet, shelf and bracket weight. Securely fasten wall-mounted items to solid supporting material only.
 - 1. Wall cabinet to wall
 - 2. Adjustable shelf to wall
 - 3. Pegboard to wall
 - 4. Adjustable shelf to slotted stud

3.03 INSTALLATION OF COUNTERTOPS

- A. Comply with installation requirements in SEFA 2.3. Abut top and edge surfaces in one true plane with flush hairline joints and with internal supports placed to prevent deflection. Locate joints only where indicated on Shop Drawings.
- B. Field Jointing: Where possible, make in same manner as shop-made joints, using dowels, splines, fasteners, adhesives, and sealants recommended by manufacturer. Shop prepare edges for field-made joints.
- C. Fastening:
 - 1. Secure countertops, except for epoxy countertops, to cabinets with Z-type fasteners or equivalent, using two or more fasteners at each cabinet front, end, and back.
- D. Provide required holes and cutouts for service fittings.
- E. Provide scribe moldings for closures at junctures of countertop, curb, and splash with walls as recommended by manufacturer for materials involved. Match materials and finish to adjacent laboratory casework. Use chemical-resistant, permanently elastic sealing compound where recommended by manufacturer.
- F. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

3.04 INSTALLATION OF LABORATORY ACCESSORIES

- A. Install accessories according to Shop Drawings, installation requirements in SEFA 2.3, and manufacturer's written instructions.
- B. Securely fasten adjustable shelving supports, stainless-steel shelves, and pegboards to partition framing, wood blocking, or reinforcements in partitions.
- C. Install shelf standards plumb and at heights to align shelf brackets for level shelves. Install shelving level and straight, closely fitted to other work where indicated.
- D. Securely fasten pegboards to partition framing, wood blocking, or reinforcements in partitions.

3.05 CLEANING AND PROTECTING

- A. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.
- B. Protect countertop surfaces during construction with 6-mil (0.15-mm) plastic or other suitable water-resistant covering. Tape to underside of countertop at a minimum of 48 inches (1200 mm) o.c.

END OF SECTION

SECTION 12 3553.19 - PLASTIC LAMINATE LABORATORY CASEWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Standard and custom wood cabinets and cabinet hardware.
- B. Laboratory sinks.
- C. Pegboards.
- D. Service fittings and outlets.

1.02 RELATED REQUIREMENTS

- A. Section 01 6000 - Product Requirements: Requirements for sustainably harvested wood.
- B. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions: VOC limitations for adhesives and sealants.
- C. Section 07 9200 - Joint Sealants: Sealing joints between casework and countertops and adjacent walls, floors, and ceilings.

1.03 DEFINITIONS

- A. Exposed: Portions of casework visible when drawers and cabinet doors are closed, including end panels, bottoms of cases more than 42 inches (1.066 m) above finished floor, tops of cases less than 72 inches (1.82 m) above finished floor and all members visible in open cases or behind glass doors.
- B. Semi-Exposed: Portions of casework and surfaces behind solid doors, tops of cases more than 72 inches (1.828 m) above finished floor and bottoms of cabinets more than 30 inches (0.762 m) but less than 42 inches (1.066 m) above finished floor.
- C. Concealed: Sleepers, web frames, dust panels and other surfaces not generally visible after installation and cabinets less than 30 inches (762 mm) above finished floor.

1.04 REFERENCE STANDARDS

- A. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood; 2024.
- B. SEFA 3 - Laboratory Work Surfaces; 2010.
- C. SEFA 7 - Laboratory Fixtures; 2010.
- D. SEFA 8W - Laboratory Grade Wood Casework; 2020.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Component dimensions, configurations, construction details, joint details, attachments; manufacturer's catalog literature on hardware, accessories, and service fittings, if any.
- C. Shop Drawings: Indicate casework types, sizes, and locations, using large scale plans, elevations, and cross sections. Include rough-in and anchors and reinforcements placement dimensions and tolerances, clearances required, and utility locations, if any. Include coordinated information for laboratory equipment specified in another section and/or furnished by Owner.
- D. Samples For Color Selection: Wood samples, fully finished, for color and species selection. Minimum Sample Size: 2 inches by 3 inches (51 mm by 75 mm).
- E. Test Reports: From independent laboratory indicating compliance with referenced chemical-resistance standards for cabinet finish and liner materials.
- F. Manufacturer's installation instructions.

- G. Maintenance Data: Manufacturer's recommendations for care and cleaning.
- H. Finish touch-up kit for each type and color of materials provided.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Protect items provided by this section, including finished surfaces and hardware items during handling and installation. For metal surfaces, use polyethylene film or other protective material standard with the manufacturer.
- B. Acceptance at Site:
 - 1. Do not deliver or install casework until the conditions specified under Part 3, Examination Article of this section have been met. Products delivered to sites that are not enclosed and/or improperly conditioned will not be accepted if warping or damage due to unsatisfactory conditions occurs.
- C. Storage:
 - 1. Store casework in the area of installation. If necessary, prior to installation, temporarily store in another area, meeting the environmental requirements specified under Part 3, "Site Verification of Conditions" paragraph of this section.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Wood Laboratory Casework:
 - 1. CIF Lab Solutions: www.cifsolutions.com.
 - 2. Hamilton Laboratory Solutions: www.hamiltonlab.com.
 - 3. Kewaunee Scientific Corporation: www.kewaunee.com.
 - 4. LSI Industries: www.lsicorp.com.
 - 5. Mott Manufacturing: www.mott.ca.
 - 6. OnePointe Solutions: www.onepointesolutions.com.
 - 7. Sheldon Laboratory Systems: www.sheldonlabs.com.
 - 8. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PLAM LABORATORY CASEWORK

- A. Plam Laboratory Casework (LAB CASE-#): Solid wood and wood panel construction; each unit self-contained and not dependent on adjacent units or building structure for rigidity; in sizes necessary to avoid field cutting except for scribes and filler panels. Include adjustable levelers for base cabinets.
 - 1. Style: Flush overlay. Ease doors and drawer fronts slightly at edges.
 - 2. Cabinet Nominal Dimensions: Unless otherwise indicated, provide cabinets of widths and heights indicated on drawings.
 - 3. Construction: Joints doweled, glued and screwed, except drawers may be lock-shoulder jointed; with interior of units smooth and flush; cabinet bottom flush with top of face frame; without gaps or inaccessible spaces or areas where dirt or moisture could accumulate.
 - 4. Structural Performance: In addition to the requirements of SEFA 3, SEFA 7, and SEFA 8W, components safely support the following minimum loads:
 - a. Base Units: 500 pounds per linear foot (744 kgs/linear m) across the cabinet ends.
 - b. Suspended Units: 300 pounds (136 kg) static load.
 - c. Tables: 300 pounds (136 kg), minimum, on four legs.

- d. Drawers: 125 pounds (57 kg), minimum.
 - e. Hanging Wall Cases: 300 pounds (135 kg).
 - f. Shelves: 100 pounds (45 kg), minimum.
5. Provide movable units with casters at locations indicated for ADA accessibility. Casters shall have locking mechanism to prevent rolling.
 6. Fittings and Fixture Locations: Cut and drill counter tops, backs, and other components for service outlets and fixtures.
 7. Access Panels: Where indicated, for maintenance of utility service and mechanical and electrical components.
 8. Scribes and Fillers: Panels of matching construction and finish, for locations where cabinets do not fit tight to adjacent construction.
 9. Factory-finish all exposed and semi-exposed surfaces with the same finish.
 - a. Finish Performance: Provide finish on all surfaces having chemical resistance of Level 0 (no change) or Level 1 (slight change of gloss or slight discoloration) according to SEFA 8W and no visible effect when surface is exposed to:
 - 1) Hot water at temperature between 190 degrees F (88 degrees C) and 205 degrees F (96 degrees C) trickled down the test surface at 45 degree angle for 5 minutes.
 - 2) Constant moisture in the form of 2 by 3 by 1 inch (51 by 76 by 25 mm) thick cellulose sponge kept continually saturated with water and in contact with test surface for 100 hours.
 - b. Preparation: Wood sanded smooth, free from dust and mill marks.
 - c. Stain: Single application of clean, manufacturer-recommended stain of selected color; tinted coating not acceptable.
 - d. Coating: Clear, superior-quality, chemical-resistant acyclic urethane; applied in accordance with manufacturer instructions, force-dried, sanded and wiped clean.
 - e. Coats: Multiple coats as required to achieve minimum 1.5 mil (0.038 mm) dry film thickness.
 - f. Appearance: Clear satin gloss; not cloudy or muddy.

2.03 CABINET HARDWARE

- A. Manufacturer's standard types, styles, and finishes, and as indicated below.
- B. Finish of exposed stainless steel components: No.4 finish.
- C. Locks: Provide locks on casework drawers and doors where indicated. Lock with 5 pin cylinder and 2 keys per lock.
- D. Shelves in Cabinets:
 1. Shelf Standards and Rests: Vertical standards with rubber button fitted rests, satin chromium plated over nickel on base material.
- E. Swinging Doors:
 1. Hinges: Butt, number as required by referenced standards for width, height, and weight of door.
 - a. European-Style Hinges: For overlay doors, concealed. Steel, nickel-plated, 110 degree opening angle.
 2. Catches: Magnetic.
 3. Pulls: Chrome wire pulls, 4 inches (102 mm) wide.
 4. Drawers:
 - a. Pulls: Chrome wire pulls, 4 inches (102 mm) wide.
 - b. Slides: Steel, full extension arms, ball bearings; self-closing; capacity as recommended by manufacturer for drawer height and width.

2.04 METAL LABORATORY TABLE (LAB TABLE-#)

- A. Basis of Design: OnePointe Solutions: www.onepointesolutions.com.
- B. Product: Mobile tables with 1.5 inch square tubular steel frame ground smooth and epoxy tops. Pin height adjustable from 28 inches to 37 inches. See drawings for sizes.
- C. Frame Material: 1.5 inch square tubular steel frame, fully welded and ground smooth.
 - 1. Finish: Powder-coated.
- D. Top: 1 inch thick epoxy.
- E. Total Locking Casters: 4 inch diameter; Total Height: 5 inches.

2.05 COUNTERTOPS

- A. Epoxy Resin Countertops (EPXY-#): Filled epoxy resin molded into homogenous, non-porous sheets; no surface coating and color and pattern consistent throughout thickness; with integral or adhesively seamed components.
 - 1. Flat Surface Thickness: As indicated on drawings.
 - 2. Surface Finish: As indicated on drawings.
 - 3. Color: As indicated on drawings.
 - 4. Exposed Edge Shape: As indicated on drawings.
 - 5. Back and End Splashes: As indicated on drawings.

2.06 SINKS (SINK-#)

- A. Epoxy: Factory-molded, modified epoxy-resin formulation with smooth, nonspecular finish.
 - 1. Physical Properties:
 - a. Flexural Strength: Not less than 10,000 psi (70 MPa).
 - b. Modulus of Elasticity: Not less than 2,000,000 psi (1400 MPa).
 - c. Hardness (Rockwell M): Not less than 100.
 - d. Water Absorption (24 Hours): Not more than 0.02 percent.
 - e. Heat Distortion Point: Not less than 260 deg F (127 deg C).
 - 2. Chemical Resistance: Epoxy-resin material has the following ratings when tested with indicated reagents according to NEMA LD 3, Test Procedure 3.4.5:
 - a. No Effect: Acetic acid (98 percent), acetone, ammonium hydroxide (28 percent), benzene, carbon tetrachloride, dimethyl formamide, ethyl acetate, ethyl alcohol, ethyl ether, methyl alcohol, nitric acid (70 percent), phenol, sulfuric acid (60 percent), and toluene. Slight Effect: Chromic acid (60 percent) and sodium hydroxide (50 percent).
 - 3. Color: Black.

2.07 PEGBOARDS (PEG BD-#)

- A. Epoxy pegboards with pre-drilled or punched holes in a staggered pattern, designed to accept removable white polypropylene pegs. With each pegboard include a stainless steel drip-trough with drain outlet and matching diameter 36 inches (914 mm) long PVC drain hose.
 - 1. Size: As indicated on drawings.

2.08 LABORATORY EMERGENCY EQUIPMENT PLUMBING FIXTURES

- A. Eyewash/Drench Hose Units: Deck-mounted, dual-purpose units. Designed for use as a fixed eyewash when unit is left in deck flange, and as a drench hose when removed from deck flange.

2.09 SERVICE FITTINGS

- A. General: Comply with requirements of SEFA 7.

- B. Gas Service Fittings and Fixtures: By Mechanical Contractor.
- C. Water Service Fittings and Fixtures: By Mechanical Contractor.
- D. Electrical Fittings and Fixtures: By Mechanical Contractor.

2.10 MATERIALS - PLAM CASEWORK

- A. Adhesives Used for Assembly: Comply with VOC limitation requirements for adhesives and sealants, see Section 01 6116.
- B. Wood-Based Materials:
 - 1. Certified as sustainably harvested, see Section 01 6000.
 - 2. Solid Wood: Air-dried to 4.5 percent moisture content, then tempered to 6 percent moisture content before use.
 - 3. Composite Wood Panels: Containing no urea-formaldehyde resin binders. See Section 01 6116.
- C. Exposed Solid Wood: Clear, dry, sound, plain sawn, selected for compatible grain and color, no defects.
- D. Exposed Hardwood Plywood: Veneer core; HPVA HP-1 Grade AA, Type I; same species as exposed solid wood, clear, compatible grain and color, no defects. Band exposed edges with solid wood of same species as veneer.
- E. Semi-Exposed Solid Wood: Dry, sound, plain sawn, no appearance defects, any species similar in color and grain to exposed portions.
- F. Semi-Exposed Hardwood Plywood: Veneer core; HPVA HP-1 Grade C, Type I; plain sliced, any species similar in color and grain to exposed portions.
- G. Concealed Solid Wood or Plywood: Any species and without defects affecting strength or utility.
- H. Sealant for Use in Casework Construction: Manufacturer's recommended type.

2.11 ACCESSORIES

- A. Upright Rod Socket: Provide (8 per each lab).

PART 3 EXECUTION

3.01 EXAMINATION

- A. Site Verification of Environmental Conditions:
 - 1. Do not deliver casework until the following conditions have been met:
 - a. Building has been enclosed (windows and doors sealed and weather-tight).
 - b. An operational HVAC system that maintains temperature and humidity at occupancy levels has been put in place.
 - c. Ceiling, overhead ductwork, piping, and lighting have been installed.
 - d. Installation areas do not require further "wet work" construction.
- B. Verify adequacy of support framing and anchors.
- C. Verify that service connections are correctly located and of proper characteristics.

3.02 INSTALLATION

- A. Use anchoring devices to suit conditions and substrate materials encountered. Use concealed fasteners to the greatest degree possible. Use exposed fasteners only where allowed by approved shop drawings, or where concealed fasteners are impracticable.
- B. Set casework items plumb and square, securely anchored to building structure.
 - 1. Base Cabinets: Examine floor levelness and flatness of installation space. Do not proceed with installation if encountered floor conditions required more than 3/4 inch (19 mm) leveling

adjustment. When installation conditions are acceptable, for each space, establish the high point of the floor. Set and make level and plumb first cabinet in relation to this high point.

2. Wall Cabinets: Examine wall surfaces in installation space. Do not proceed with installation if the following conditions are encountered:
 - a. Maximum variation from plane of masonry wall exceeds 1/4 inch in 10 ft (6 mm/3 m) and 1/2 inch in 20 ft (13 mm/6 m) or more, and/or maximum variation from plumb exceeds 1/4 inch (6 mm) per story.
 - b. Maximum Variation of finished gypsum board surface from true flatness exceeds 1/8 inch in 10 feet (3 mm in 3 m) in any direction.
- C. Align cabinets to adjoining components, install filler and/or scribe panels where necessary to close gaps.
- D. Fasten together cabinets in continuous runs, with joints flush, uniform and tight. Misalignment of adjacent units not to exceed 1/16 inch (1.6 mm). In addition, do not exceed the following tolerances:
 1. Variation of Tops of Base Cabinets from Level: 1/16 inch (1.6 mm) in 10 feet (3 m).
 2. Variation of Faces of Cabinets from a True Plane: 1/8 inch (3 mm) in 10 feet (3 m).
 3. Variation of Adjacent Surfaces from a True Plane (Lippage): 1/32 inch (0.8 mm).
 4. Variation in Alignment of Adjacent Door and Drawer Edges: 1/16 inch (1.6 mm).
- E. Base Cabinets: Fasten cabinets to service space framing and/or wall substrates, with fasteners spaced not more than 16 inches (407 mm) on center. Bolt adjacent cabinets together with joints flush, tight, and uniform.
- F. Install hardware uniformly and precisely. Set hinges snug and flat in mortises.
- G. Countertops: Install countertops in one true plane, with ends abutting at hairline joints, and no raised edges.
- H. Replace units that are damaged, including those that have damaged finishes.

3.03 ADJUSTING

- A. Adjust operating parts, including doors, drawers, hardware, and fixtures to function smoothly.

3.04 CLEANING

- A. Clean casework and other installed surfaces thoroughly.

3.05 PROTECTION

- A. Do not permit finished casework to be exposed to continued construction activity.
- B. Protect casework and countertops from ongoing construction activities. Prevent installers from standing on or storing tools and materials on casework or countertops.
- C. Repair damage that occurs prior to Date of Substantial Completion, including finishes, using methods prescribed by manufacturer; replace units that cannot be repaired to like-new condition.

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. Division 22 - Plumbing fixtures, sinks.

1.03 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018.
- B. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).
- C. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.1; 2016, with Errata (2017).
- D. ISFA 2-01 - Classification and Standards for Solid Surfacing Material; 2013.
- E. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.
- F. PS 1 - Structural Plywood; 2023.

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. Solid Surfacing Countertops (SSM-#): Solid surfacing sheet or plastic resin casting over continuous substrate.
 - 1. Basis of Design: See drawings for product information.
 - 2. Flat Sheet Thickness: 1/2 inch (12 mm), minimum.
 - 3. Solid Surfacing Sheet and Plastic Resin Castings: Complying with ISFA 2-01 and NEMA LD 3; acrylic or polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.
 - a. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
 - b. Finish on Exposed Surfaces: Matte, gloss rating of 5 to 20.
 - 4. Other Components Thickness: 1/2 inch (12 mm), minimum.
 - 5. Back and End Splashes: Same sheet material, square top; minimum 4 inches (102 mm) high.

2.02 MATERIALS

- A. Wood-Based Components:
 - 1. Wood fabricated from old growth timber is not permitted.
 - 2. Provide sustainably harvested wood, certified or labeled; see Section 01 6000 - Product Requirements.
- 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.
- C. Solid Surfacing: Fabricate tops and wall panels up to 144 inches (3657 mm) long in one piece; join pieces with adhesive sealant in accordance with manufacturer's recommendations and instructions.

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 countertops using compatible adhesive as well as mechanical fasteners.
- C. 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