



# PROJECT MANUAL

## VOLUME 2 (of 3)

Divisions 07 thru 22

Architect's Project Number: 02208.000

### Flatwoods Middle School

3544 US 401 S  
Lillington, NC 27546

Harnett County Schools  
1008 South 11th Street  
Lillington, North Carolina 27546

November 8, 2024  
Construction Documents  
Revisions December 13, 2024



Set Number: \_\_\_\_\_



**SECTION 00 01 01**  
**PROJECT TITLE PAGE**

**Date** November 8, 2024  
Construction Documents  
Revisions December 13, 2024

**Project Identification** Flatwoods Middle School  
3544 US 401 S  
Lillington NC 27546  
  
Architect Project No.: 02208.000

**Owner** Harnett County Schools Board of Education  
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**Electrical Engineer**  
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**Kitchen Equipment Designer**    Food Design Associates  
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Matthews, NC 28105  
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**END OF SECTION**

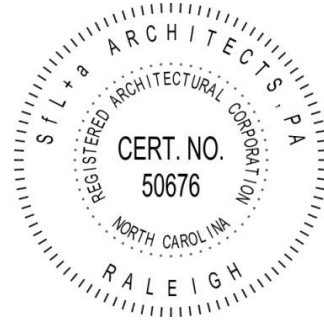


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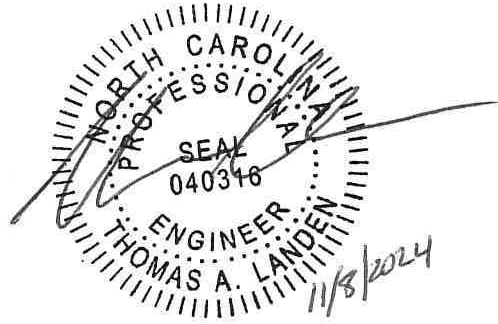
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11/8/2024

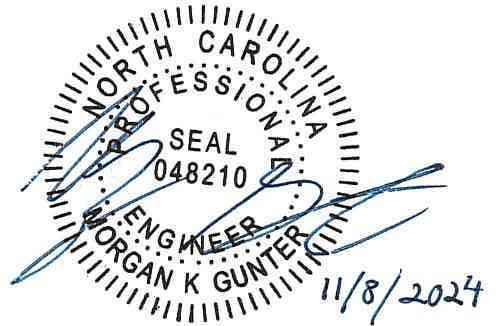
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**SECTION 07 11 00**  
**DAMPPROOFING****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Bituminous dampproofing.
- B. Related Requirements:
  - 1. Section 04 20 00 - Unit Masonry.

**1.2 REFERENCE STANDARDS**

- A. ASTM International (ASTM):
  - 1. ASTM D1187/D1187M - Standard Specification for Asphalt-Base Emulsions for Use as Protective Coatings for Metal; 2011, Reapproval 2018.
  - 2. ASTM D1227/D1227M - Standard Specification for Emulsified Asphalt Used as a Protective Coating for Roofing; 2013, Editorial Revisions 2019.
- B. National Roofing Contractors Association (NRCA):
  - 1. NRCA (WM) - The NRCA Waterproofing Manual; 2021.

**1.3 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide properties of primer, bitumen, and mastics.
- C. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

**1.4 QUALIFICATIONS**

- A. Installer Qualifications: Company specializing in performing the work of this section with minimum three (3) years experience.

**1.5 FIELD CONDITIONS**

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after installation of Work.
- B. Maintain ambient temperatures above 40 degrees F for 24 hours before and during application until dampproofing has cured.

**PART 2 PRODUCTS****2.1 MANUFACTURERS**

- A. Manufacturers:
  - 1. Henry Company: [www.henry.com](http://www.henry.com).
  - 2. Karnak Corporation: [www.karnakcorp.com](http://www.karnakcorp.com).
  - 3. Mar-Flex Systems, Inc: [www.mar-flex.com/sle](http://www.mar-flex.com/sle).
  - 4. W.R. Meadows, Inc: [www.wrmeadows.com/sle](http://www.wrmeadows.com/sle).
  - 5. Substitutions: See Section 01 60 00 - Product Requirements.

## 2.2 DAMPPROOFING PRODUCTS

- A. Bituminous Dampproofing: Cold-applied water-based emulsion; asphalt with mineral colloid or chemical emulsifying agent; with or without fiber reinforcement; asbestos-free; suitable for application on vertical and horizontal surfaces.
  - 1. Composition - Vertical Application: ASTM D1227/D1227M Type III or ASTM D1187/D1187M Type I.
  - 2. Composition - Horizontal and Low-Slope Application: ASTM D1227/D1227M Type II or III.
  - 3. VOC Content: Not more than permitted by local, State, and federal regulations.
  - 4. Applied Thickness: 1/16 inch (1.5 mm), minimum, wet film. Provide thicker wet film if recommended by dampproofing manufacturer.
- B. Primers, Mastics, and Related Materials: Type as recommended by dampproofing manufacturer.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify existing conditions before starting work.
- C. Verify substrate surfaces are durable, free of matter detrimental to adhesion or application of dampproofing system.
- D. Verify that items that penetrate surfaces to receive dampproofing are securely installed.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Protect adjacent surfaces not designated to receive dampproofing.
- D. Clean and prepare surfaces to receive dampproofing in accordance with manufacturer's instructions.
- E. Do not apply dampproofing to surfaces unacceptable to manufacturer.
- F. Apply mastic to seal penetrations, small cracks, or minor honeycomb in substrate.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Perform work in accordance with manufacturer's instructions and NRCA (WM) applicable requirements.
- C. Install dampproofing system to surfaces and locations as indicated on Drawings
- D. Prime surfaces in accordance with manufacturer's instructions.
- E. Apply dampproofing with tools or equipment as recommended by manufacturer.
- F. Apply dampproofing at a temperature limited by equiviscous temperature (EVT) plus or minus 25 degrees F; do not exceed finish blowing temperature for four hours.

- G. Apply each coat of dampproofing in continuous and uniform coat at a rate of 1 gal per 25 sq ft.
- H. Seal penetrations and items projecting through dampproofing surface. Seal watertight with mastic compatible and recommended by dampproofing manufacturer.

### **3.4 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect work from damage.

**END OF SECTION**





**SECTION 07 13 00**  
**SHEET WATERPROOFING**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Self-adhered modified bituminous sheet membrane system.
- B. Related Requirements:
  - 1. Section 03 30 00 - Cast-in-Place Concrete: Concrete substrate.
  - 2. Section 07 21 00 - Thermal Insulation: Insulation used for protective cover.
  - 3. Section 07 62 00 - Sheet Metal Flashing and Trim: Counterflashing.
  - 4. Section 07 90 00 - Joint Protection: Joint sealing of substrate required prior to installation of work of this section.
  - 5. Sections related to collection, piping, and drainage of ground water.

**1.2 REFERENCES**

- A. ASTM International (ASTM):
  - 1. ASTM C366/C366M - Standard Test Methods for Measurement of Thickness of Sandwich Cores; 2016, Editorial Revisions 2022.
  - 2. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension; 2016, Reapproval 2021.
  - 3. ASTM D570 - Standard Test Method for Water Absorption of Plastics; 2022.
  - 4. ASTM D882 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting; 2018.
  - 5. ASTM D903 - Standard Test Method for Peel or Stripping Strength of Adhesive Bonds; 1998, Reapproval 2017.
  - 6. ASTM D1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics; 2016, Reapproval 2023.
  - 7. ASTM D1777 - Standard Test Method for Thickness of Textile Materials; 1996, Reapproval 2019.
  - 8. ASTM D1876 - Standard Test Method for Peel Resistance of Adhesives (T-Peel Test); 2008, Reapproval 2023.
  - 9. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2021.
  - 10. ASTM D3776/D3776M - Standard Test Methods for Mass Per Unit Area (Weight) of Fabric; 2020.
  - 11. ASTM D4491/D4491M - Standard Test Methods for Water Permeability of Geotextiles by Permittivity; 2022.
  - 12. ASTM D4632/D4632M - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles; 2015a, Reapproval 2023.
  - 13. ASTM D4716/D4716M - Standard Test Method for Determining the (In-plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head; 2022.
  - 14. ASTM D5261 - Standard Test Method for Measuring Mass per Unit Area of Geotextiles; 2010, Reapproval 2018.
  - 15. ASTM D5295/D5295M - Standard Guide for Preparation of Concrete Surfaces for Adhered (Bonded) Membrane Waterproofing Systems; 2018.

16. ASTM D5385/D5385M - Standard Test Method for Hydrostatic Pressure Resistance of Waterproofing Membranes; 2020.
  17. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2022a, Editorial Revisions 2023.
  18. ASTM E154/E154M - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover; 2013, Reapproval 2019.
- B. National Roofing Contractors Association (NRCA):
1. NRCA (WM) - The NRCA Waterproofing Manual; 2021.

### 1.3 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

### 1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Provide data for water proofing system components and accessories. Data to include, but is not limited to, surface conditioners, primers, flexible flashings, joint cover sheet, and joint and crack sealants, with temperature range for application of waterproofing membrane. Include product data for drainage panel and protection board.
- C. Shop Drawings: Indicate details for joint, corner, termination conditions, drainage panel and protection board. Include conditions of interface with other materials and construction such as drainage.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Manufacturer's qualifications certification.
- F. Installer's qualifications certification.
- G. Manufacturer's Installation Instructions: Indicate special procedures.
- H. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

### 1.5 CLOSEOUT SUBMITTALS

- A. Section 01 77 00 - Closeout Procedures.
- B. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

### 1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with NRCA (WM) - Waterproofing Manual.
- B. Sheet Waterproofing System: All materials, components, and accessories are to be as recommended by manufacturer of sheet waterproofing membrane material.

### 1.7 QUALIFICATIONS

- A. Membrane Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five (5) years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three (3) years of documented experience.

## 1.8 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after installation of Work.
- B. Maintain ambient temperatures above 40 degrees F (5 degrees C) for 24 hours before and during application and until liquid or mastic accessories have cured.

## 1.9 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Manufacturer's Warranty: Provide five (5) year warranty to correct waterproofing system work that fails to resist penetration of water. Remedial work is to include removal and replacement of materials concealing waterproofing at no extra cost to Owner.
  - 1. Exception: Except where such failures are the result of structural failures of building. Hairline cracking of concrete due to temperature change or shrinkage is not considered a structural failure.

## PART 2 PRODUCTS

### 2.1 MEMBRANE MATERIALS

- A. Self-Adhered Modified Bituminous Sheet Membrane:
  - 1. Manufacturers:
    - a. Carlisle Coatings & Waterproofing Inc. - MiraDRI 860/861.
    - b. GCP Applied Technologies - Bituthene 3000.
    - c. Henry Company - Blueskin WP 200.
    - d. Polyguard Products, Inc. - 650 Membrane.
    - e. W.R. Meadows, Inc. - MEL-ROL Series.
    - f. Substitutions: See Section 01 60 00 - Product Requirements.
  - 2. Thickness: 60 mil, 0.060 inch (1.5 mm), minimum.
  - 3. Sheet Width: 36 inch (0.914 m) roll width, minimum.
  - 4. Tensile Strength:
    - a. Film: 5000 pounds per square inch (34.57 MPa), minimum, measured according to ASTM D882 and at grip-separation rate of 2 inches (50 mm) per minute.
    - b. Membrane: 325 pounds per square inch (2.24 MPa), minimum, measured according to ASTM D412 Method A, using die C and at spindle-separation rate of 2 inches (50 mm) per minute.
  - 5. Elongation at Break: 300 percent, minimum, measured according to ASTM D412.
  - 6. Water Vapor Permeance: Less than 0.1 perms, measured in accordance with ASTM E96/E96M.
  - 7. Low Temperature Flexibility: Unaffected when tested according to ASTM D1970/D1970M at minus 15 degrees F (or less), 180 degree bend on 1 inch (25 mm) mandrel.
  - 8. Peel Strength: 7 pounds per inch (1226 N/m), minimum, when tested according to ASTM D903.
  - 9. Lap Adhesion Strength: 5 pounds per inch (875.6 N/m), minimum, when tested according to ASTM D1876.
  - 10. Puncture Resistance: 48 pounds minimum, measured in accordance with ASTM E154/E154M.
  - 11. Water Absorption: 0.1 percent increase in weight, maximum, measured in accordance with ASTM D570, 24 hour immersion.

12. Hydrostatic Resistance: Resists the weight of 200 feet (61 m) when tested according to ASTM D5385/D5385M.
  13. Adhesives, Sealants, Tapes, and Accessories: As recommended by membrane manufacturer.
- B. Seaming Materials: As recommended by membrane manufacturer.
  - C. Membrane Sealant: As recommended by membrane manufacturer.
  - D. Flexible Flashings: As recommended by membrane manufacturer.
  - E. Termination Bars: Aluminum; compatible with membrane and adhesives.
  - F. Surface Conditioner: As recommended by membrane manufacturer.
  - G. Adhesives: As recommended by membrane manufacturer.
  - H. Thinner and Cleaner: As recommended by adhesive manufacturer; compatible with sheet membrane.

## 2.2 ACCESSORIES

- A. Sealant for Cracks and Joints in Substrates: Resilient elastomeric joint sealant compatible with substrates and waterproofing materials.
- B. Drainage Panel: To be as recommended by waterproofing membrane manufacturer and as follows:
  1. Drainage layer with geotextile filter fabric on earth side. Minimum 4 feet width roll.
  2. Core: Dimpled polypropylene or high-impact polystyrene core.
    - a. Thickness: 0.40 inch minimum per ASTM D1777 or ASTM C366 (method B).
    - b. Compressive Strength: 11,000 psf minimum per ASTM D1621.
    - c. Water Flow Rate: 17 gal/min/ft minimum per ASTM D4716/D4716M,
  3. Geotextile Filter Fabric: Nonwoven polypropylene; adhered to each core dimple.
    - a. Weight: 4.0 oz/sy minimum per ASTM D3776/D3776M or ASTM D5261.
    - b. Tensile Strength: 100 lbs minimum per ASTM D4632/D4632M.
    - c. Water Flow Rate: 140 gal/min/sf per ASTM D4491/D4491M.
- C. Protection Board:
  1. Extruded Polystyrene Board as specified in Section 07 21 00 - Thermal Insulation.
    - a. 1 inch thick unless indicated otherwise on Drawings.
- D. Cant Strips: Premolded composition material and as recommended by membrane manufacturer.
- E. Flexible Flashings: Type recommended by membrane manufacturer.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify existing conditions are acceptable prior to starting this work.
- C. Verify substrate surfaces are durable and free of matter detrimental to adhesion or application of waterproofing system.
- D. Verify items that penetrate surfaces to receive waterproofing are securely installed.
- E. Verify substrate surface slopes to drain for horizontal waterproofing applications.

- F. Verify that intercepting drainage construction by others is ready to receive the work of this Section.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Protect adjacent surfaces from damage not designated to receive waterproofing.
- D. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions. Vacuum substrate clean.
- E. Do not apply waterproofing to surfaces unacceptable to membrane manufacturer.
- F. Fill non-moving joints and cracks with a filler compatible with waterproofing materials.
- G. Seal moving cracks with sealant and non-rigid filler, using procedures recommended by sealant and waterproofing manufacturers.
- H. Prepare building expansion joints at locations as indicated on drawings.
- I. Surfaces for Adhesive Bonding: Apply surface conditioner at a rate recommended by manufacturer and protect conditioner from rain or frost until dry.
- J. Concrete Surfaces for Adhesive Bonding: Prepare concrete substrate according to ASTM D5295/D5295M.
  - 1. Remove substances that inhibit adhesion including form release agents, curing compounds admixtures, laitance, moisture, dust, dirt, grease, and oil.
  - 2. Repair surface defects including honeycombs, fins, tie holes, bug holes, sharp offsets, ruted cracks, ragged corners, deviations in surface plane, spalling and delamination, as described in the reference standard.
  - 3. Remove and replace areas of defective concrete as specified in Section 03 30 00.
  - 4. Prepare concrete for adhesive bonded waterproofing using mechanical or chemical methods described in the referenced standard.
  - 5. Test concrete surfaces as described in the referenced standards. Verify surfaces are ready to receive adhesive bonded waterproofing membrane system.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Membrane:
  - 1. Install membrane waterproofing in accordance with manufacturer's instructions and NRCA (WM) applicable requirements.
  - 2. Coordinate and provide drainage continuity with other drainage construction elements by others and indicated on Drawings.
  - 3. Roll out membrane and minimize wrinkles and bubbles.
  - 4. Self-Adhering Membrane: Remove release paper layer and roll out onto substrate with a mechanical roller. Install to full contact bond.
  - 5. Overlap edges and ends, minimum 3 inches, seal permanently waterproof by method recommended by manufacturer, and apply uniform bead of sealant to joint edge.
  - 6. Reinforce membrane with multiple thickness of membrane material over joints, whether joints are static or dynamic.
  - 7. Weather lap joints on sloped substrate in direction of drainage. Seal joints and seams.
  - 8. Install building expansion joints at locations as indicated on drawings.

9. Flexible Flashings: Seal items watertight that penetrate through waterproofing membrane with flexible flashings.
10. Seal membrane and flashings to adjoining surfaces.
  - a. Install termination bar along edges.
  - b. Install counterflashing over exposed edges.
- C. Drainage Panel:
  1. Coordinate and provide drainage continuity with other drainage construction elements by others and indicated on Drawings.
  2. Place drainage panel directly against membrane, butt joints, place to direct drainage downward. Scribe and cut boards around projections, penetrations, and interruptions.
- D. Protection Board:
  1. Place protection board directly against drainage panel; butt joints. Scribe and cut boards around projections, penetrations, and interruptions.
  2. Adhere protection board to substrate with compatible adhesive.

### **3.4 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed construction from disturbance and damage.

**END OF SECTION**

**SECTION 07 14 16**  
**COLD FLUID-APPLIED WATERPROOFING**

**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. Surface preparation.
  2. Application of single-component, cold-applied, liquid waterproofing membrane.
- B. Related Requirements:
1. Section 03 30 00 - Cast-in-Place Concrete.
  2. Section 04 20 00 - Unit Masonry.
  3. Section 07 21 00 - Thermal Insulation.
  4. Section 07 62 00 - Sheet Metal Flashing And Trim.
  5. Section 07 90 00 - Joint Protection.

**1.3 REFERENCES**

- A. ASTM International (ASTM):
1. ASTM C1250 - Standard Guide for the Use of the Joint API and ASTM Adjunct for Temperature and Pressure Volume Correction Factors for Generalized Crude Oils, Refined Products, and Lubricating Oils: API MPMS Chapter 11.1; 2019, Editorial Changes 2020.
  2. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension: 2016, Reapproval 2021.
  3. ASTM D2240 - Standard Test Method for Rubber Property—Durometer Hardness; 2015, Reapproval 2021.
  4. ASTM D2369 - Standard Test Method for Volatile Content of Coatings; 2020.
  5. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2022a. Editorial Changes 2023.

**1.4 PRE-INSTALLATION MEETINGS**

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

**1.5 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures.
- B. Product Data: For each type of product. Include manufacturer's written instructions for evaluating, preparing, and treating substrate, technical data, and tested physical and performance properties of waterproofing.
- C. Shop Drawings: Show locations and extent of waterproofing. Include details for substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins to adjoining waterproofing, and other termination conditions.



**1.6 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Obtain waterproofing materials from a single manufacturer regularly engaged in manufacturing the product.
- B. Installer Qualifications: Installer to be experienced and have adequate number of skilled personnel who are thoroughly trained and experienced in the application of fluid applied waterproofing membranes.
- C. Regulatory Requirements: Provide products which comply with all state and local regulations controlling use of volatile organic compounds (VOCs).

**1.7 MOCK-UP**

- A. Section 01 40 00 - Quality Requirements: Mock-up requirements.
- B. Prior to installation of waterproofing membrane, apply waterproofing membrane to 100 sf of deck or wall to demonstrate surface preparation, crack and joint treatment, corner treatment, thickness, and to demonstrate tie-ins with adjoining construction, and other termination conditions, as well as qualities of materials and execution.

**1.8 DELIVERY, STORAGE, AND HANDLING**

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- C. Store materials in a clean, dry area in accordance with manufacturer's instructions.
- D. Store at temperatures between 40 to 70 deg F (4 to 21 deg C).
- E. Protect materials during handling and application to prevent damage or contamination.

**1.9 ENVIRONMENTAL REQUIREMENTS**

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after installation of Work.
- B. Product not intended for uses subject to abuse or permanent exposure to the elements.
- C. Do not apply membrane when air, material, or surface temperatures are expected to fall below 30 deg F (-1 deg C) within four hours of completed application.
- D. Do not apply membrane if rainfall is forecast or imminent within 12 hours.
- E. Do not apply waterproofing membrane to any surfaces containing frost.
- F. Consult manufacturer for applications to green concrete.

**PART 2 PRODUCTS****2.1 MANUFACTURERS**

- A. Waterproofing Membrane:
  - 1. Carlisle Coatings & Waterproofing, Inc.
  - 2. Henry Company.
  - 3. Tremco Commercial Sealants & Waterproofing.
  - 4. W.R. Meadows, Inc.
  - 5. Substitutions: Section 01 60 00 - Product Requirements.



- B. Basis of Design: W.R. Meadows, Inc.

## 2.2 MATERIALS

- A. Waterproofing Membrane: Single-component, cold-applied, solvent-free, non-shrink, liquid waterproofing membrane.
  - 1. Physical Characteristics:
    - a. Solids Content by Weight: 98 percent, ASTM C1250.
    - b. Tensile Strength: 100 psi, ASTM D412.
    - c. Elongation at Break: 425 percent, ASTM D412.
    - d. Water Vapor Transmission: 0.10 perms, ASTM E96 (Method BW).
    - e. Shore 00 Hardness: 57, ASTM D2240.
    - f. VOC Content: 36 g/L, ASTM D2369.
  - 2. Basis of Design: W.R. Meadows, Inc. - Hydralastic 836 Waterproofing Membrane.

## 2.3 ACCESSORIES

- A. Waterproofing system components and materials to be as recommended by waterproofing membrane manufacturer.
- B. Accessory Joint Tape: 6 inches (150 mm) minimum width, reinforcing fabric for corners, crack, and joint treatment.
  - 1. Basis of Design: W.R. Meadows, Inc. - Reinforcing Fabric HCR.
- C. Reinforced Joint Tape for outside corners subject to backfill.
  - 1. Basis of Design: W.R. Meadows, Inc. - Precon Tape.
- D. Primer: Epoxy type.
  - 1. Basis of Design: W.R. Meadows, Inc. - REZI-WELD LV or REZI-WELD LV STATE.
- E. Detailing Membrane.
  - 1. Basis of Design: W.R. Meadows, Inc. - BEM.
- F. Concrete Repair Materials.
  - 1. Basis of Design: W.R. Meadows, Inc. - Meadow-Patch 5 and Meadow-Patch 20 Concrete Repair Mortars.
- G. Waterproofing Protection Course.
  - 1. Basis of Design: W.R. Meadows, Inc. - Perminator or Protection Course.
- H. Rolled Matrix Drainage System.
  - 1. Basis of Design: W.R. Meadows, Inc. - Mel-Drain.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Examine surfaces to receive membrane. Notify architect if surfaces are not acceptable. Do not begin surface preparation or application until unacceptable conditions have been corrected.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.

- B. Prepare materials to be installed and equipment to be used during installation.
- C. Protect adjacent surfaces not designated to receive waterproofing.
- D. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions.
- E. Do not apply waterproofing to surfaces unacceptable to manufacturer.
- F. Clean concrete surfaces so they are free of all coatings, dirt, oil, paints and any other contaminants.
- G. Patch all holes and voids and smooth out any surface misalignments.
- H. Remove and patch all concrete form ties.
- I. Priming:
  - 1. Apply the low viscosity epoxy with a nap roller or squeegee at a coverage rate of 150 - 200 sq.ft. per gallon (3.75 - 5.0 m<sup>2</sup>/L) providing a uniform coverage over the substrate.
  - 2. Allow the epoxy primer to become tack-free prior to the application of the fluid applied waterproofing membrane.
- J. Treatment of Existing Cracks and All Non-Structural Joints:
  - 1. Identify and install detailing membrane in all cracks and all non-structural joints.
  - 2. Apply a 30 wet mil coat of the fluid applied membrane ensuring that there is a minimum of 3 inches (75 mm) of membrane extending onto the wall in all directions.
  - 3. Embed the non-woven reinforcing fabric over the entire area of this membrane and work in using trowel.
  - 4. Completely cover the glass mesh with a second coat of the fluid applied membrane at 30 wet mils while the first coat is still wet, again extending 3 inches onto the wall in all directions.
- K. Treatment of Inside & Outside Corners:
  - 1. Install detailing membrane to create a minimum 3/4 inch fillet in all inside corners.
  - 2. Apply a 30 wet mil coat of the fluid applied membrane ensuring that there is a minimum of 3 inches (75 mm) of membrane extending onto the wall in all directions.
  - 3. Embed the non-woven reinforcing fabric over the entire area of this membrane and work in using trowel.
  - 4. Completely cover the glass mesh with a second coat of fluid applied membrane at 30 wet mils while the first coat is still wet, again extending 3 inches onto the wall in all directions.
  - 5. On outside corners subject to backfilling, install reinforced joint tape in lieu of fabric joint tape following the same procedure.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Apply waterproofing membrane system in accordance with manufacturer's instructions.
- C. Gently mix membrane prior to application.
- D. Apply membrane by trowel, flat-blade squeegee, or roller, at a minimum coverage rate of 25 sf per 1 U.S. gal (2.3 m<sup>2</sup>/3.78 L), providing a thickness of 60 mils wet.
- E. If a two-coat application is required, apply second coat as soon as possible with no more than eight hours between coats providing a minimum total thickness of 60 mils wet.
- F. Frequently inspect surface area to ensure proper adhesion and consistent thickness is achieved.

- G. Work material into any fluted rib forming indentations.
- H. Provide minimum cured membrane thickness of 60 mils dry.

**3.4 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect membrane with application of waterproofing protection course, drainage board, or other approved material.
- C. Backfill immediately using care to avoid damaging waterproofing membrane system.

**END OF SECTION**



**SECTION 07 21 00**  
**THERMAL INSULATION**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Batt insulation and vapor retarder in exterior framed walls, ceilings, and soffits.
  - 2. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior walls.
- B. Related Requirements:
  - 1. Division 07 - Thermal and Moisture Protection: Roofing insulation requirements.
  - 2. Section 07 21 19 - Foamed-In-Place Insulation: Plastic foam insulation other than boards.
  - 3. Section 09 21 16 - Gypsum Board Assemblies: Acoustic attenuation insulation for interior construction that does not require a thermal barrier between two conditioned spaces.

**1.2 REFERENCE STANDARDS**

- A. ASTM International (ASTM):
  - 1. ASTM C272/C272M - Standard Test Method for Water Absorption of Core Materials for Sandwich Constructions; 2018.
  - 2. ASTM C303 - Standard Test Method for Dimensions and Density of Preformed Block and Board-Type Thermal Insulation; 2021.
  - 3. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2021.
  - 4. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2022.
  - 5. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2023.
  - 6. ASTM C1338 - Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings; 2019, Reapproval 2022.
  - 7. ASTM D774/D774M - Standard Test Method for Bursting Strength of Paper; 1997, Reapproval 2007.
  - 8. ASTM D1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics; 2016, Reapproval 2023.
  - 9. ASTM D4397 - Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications; 2016.
  - 10. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023b.
  - 11. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2022a, Editorial Revisions 2023.
  - 12. ASTM E970 - Standard Test Method for Critical Radiant Flux of Exposed Attic Floor Insulation Using a Radiant Heat Energy Source; 2017, Editorial Revisions 2022.
- B. GreenSeal (GS):
  - 1. GreenSeal GS-36 - Standard for Adhesives for Commercial Use; 2013.
- C. National Fire Protection Association (NFPA):

1. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components; 2023.
- D. South Coast Air Quality Management District (SCAQMD):
1. SCAQMD Rule 1168 - Adhesive and Sealant Applications; Current Edition, with All Amendments.

### 1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

## PART 2 PRODUCTS

### 2.1 BATT INSULATION MATERIALS

- A. Mineral Fiber Batt Insulation: Flexible or semi-rigid preformed batt or blanket, complying with ASTM C665; friction fit.
  1. Unfaced Type: ASTM C665 Type-I (unfaced); rated flame spread / smoke development of 25 / 50, or less, when tested in accordance with ASTM E84).
    - a. Application Locations: Where indicated on Drawings.
  2. Faced Type: ASTM C665 Type-III (faced); Class-A (FSK (foil-scrim-kraft facing)); Category-I (vapor retarder facing); rated flame spread / smoke development of 25 / 50, or less, when tested in accordance with ASTM E84.
    - a. Application Locations: Where indicated on Drawings.
  3. Thermal Resistance: Minimum R-value of 4.0 per inch thickness, when tested in accordance with ASTM C518 at 75 degrees F.
  4. Combustion Characteristics: Passes when tested in accordance with ASTM E136.
  5. Fungi Resistance: Passes when tested in accordance with ASTM C1338.
  6. Nominal Density: Minimum 2.5 pcf when tested in accordance with ASTM C303.
  7. Corrosivity to Steel: Passes when tested in accordance with ASTM C665.
  8. Blanket Width: Sized to fully friction fit space between framing members.
  9. Blanket Thickness: Sized to fully friction fit cavity, but not less than 3-1/2 inches.
  10. Manufacturers:
    - a. Johns Manville.
    - b. Knauf Insulation.
    - c. Owens Corning.
    - d. Rockwool.

### 2.2 ACCESSORIES

- A. Aluminum Foil Tape: Bright aluminum self-adhering type, mesh reinforced, minimum 2 inches wide, and as recommended by insulation manufacturer.
- B. Tape For Rigid Insulation Boards: Joint tape material to be in accordance with insulation material manufacturers' instructions.
- C. Adhesive: Type recommended by insulation manufacturer for application.
  1. Interior Adhesives: Maximum volatile organic compound content in accordance with SCAQMD Rule 1168.

2. Interior Aerosol Adhesives: Maximum volatile organic compound content in accordance with GreenSeal GS-36.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.
- C. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

### **3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.

### **3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Board Insulation at Foundation Perimeter: (Exception: Where Drawings indicate foamed-in-place insulation, comply with Section 07 21 19 - Foamed-In-Place Insulation.)
  1. Adhere strip of polyethylene sheet over control joint with double beads of adhesive each side of joint between sheets. Extend sheet full height of joint.
  2. Apply adhesive in three continuous beads per board length. Daub adhesive tight to protrusions to ensure continuity of vapor retarder and air seal.
  3. Install boards horizontally on foundation perimeter.
    - a. Place boards to maximize adhesive contact.
    - b. Install in running bond pattern.
    - c. Butt edges and ends tightly to adjacent boards and to protrusions.
  4. Extend boards over expansion joints, unbonded to foundation on one side of joint.
  5. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
  6. Where cavity exists between installed foundation insulation boards and back of masonry veneer and cavity is indicated to be grouted solid, protect cavity from intrusion of soil and/or other debris. Install grout in cleaned cavity within 48 hours of masonry veneer installation.
- C. Batt Insulation:
  1. Install insulation in accordance with manufacturer's instructions.
  2. Install in exterior wall, soffit spaces, ceiling spaces and other locations indicated on Drawings without gaps or voids. Do not compress insulation.
  3. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
  4. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.
  5. Faced Batt Insulation: Install with factory applied face facing warm side of building spaces. Lap ends and side flanges of membrane over framing members.
  6. Tape insulation batts in place.
  7. Tape and seal butt ends, lapped flanges, and minor tears or cuts in membrane.

**3.4 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Do not permit installed insulation to be damaged prior to its concealment.

**END OF SECTION**



**SECTION 07 21 19**  
**FOAMED-IN-PLACE INSULATION**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Section includes foamed-in-place insulation system.
- B. Related Requirements:
  - 1. Section 04 20 00 - Unit Masonry: Insulated masonry cavity walls.
  - 2. Section 07 21 00 - Thermal Insulation.
  - 3. Section 07 27 00 - Air Barriers.

**1.2 REFERENCES**

- A. Air Barrier Association of America (ABAA):
  - 1. ABAA - Quality Assurance Program (ABAA - QAP).
- B. American Association of Textile Chemists and Colorists (AATCC):
  - 1. AATCC 127 - Test Method for Water Resistance: Hydrostatic Pressure; 2018, Editorial Revisions 2019.
- C. ASTM International (ASTM):
  - 1. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission properties by Means of the Heat Flow Meter Apparatus; 2023.
  - 2. ASTM C1029 - Standard Specification for Spray-Applied Rigid Cellular Polyurethane Thermal Insulation; 2020.
  - 3. ASTM C1338 - Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings; 2019, Reapproval 2022.
  - 4. ASTM D1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics; 2016, Reapproval 2023.
  - 5. ASTM D1622 - Standard Test Method for Apparent Density of Rigid Cellular Plastics; 2020.
  - 6. ASTM D1623 - Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics; 2017, Reapproval 2023.
  - 7. ASTM D6226 - Standard Test Method for Open Cell Content of Rigid Cellular Plastics; 2021.
  - 8. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
  - 9. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2023.
  - 10. ASTM E2178 - Standard Test Method for Determining Air Leakage Rate and Calculation of Air Permeance of Building Materials; 2021a.
- D. FM Global (FM):
  - 1. FM 4880 - Evaluating the Fire Performance of Insulated Building Panel Assemblies and Interior Finish Materials; 2022.
- E. National Fire Protection Association (NFPA):
  - 1. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2024.
- F. Underwriters Laboratories Inc. (UL):
  - 1. UL 1040 - Standard for Safety Fire Test of Insulated Wall Construction; Current Edition, Including All Revisions.

2. UL 1715 - Standard for Safety Fire Test of Interior Finish Material; Current Edition, Including All Revisions.

### 1.3 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination, scheduling, and sequencing.
- B. Coordinate the work of this Section with other adjacent and interfacing work.
- C. Sequence the work to permit installation of materials in conjunction with related materials and seals.

### 1.4 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this Section.

### 1.5 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit product description, insulation properties, and preparation requirements.
- C. Manufacturer's Installation Instructions: Submit special procedures, perimeter conditions requiring special attention including around windows, and other special conditions.
- D. Manufacturer's Certificates:
  1. Certify products meet or exceed specified requirements.
  2. Provide test results from large-scale tests such as NFPA 286 (with acceptance criteria of Section 803.2), FM 4880, UL 1040 or UL 1715.
    - a. Such testing shall be related to the actual end-use configuration and be performed in the finished manufactured foam plastic assembly in the maximum thickness intended for use.

### 1.6 MOCKUP

- A. Section 01 40 00 - Quality Requirements: Requirements for mockup.
- B. Provide mockup as part of the mockup requirements for Section 04 20 00 - Unit Masonry.

### 1.7 QUALITY ASSURANCE

- A. Apply label from agency approved by authority having jurisdiction to identify each foam plastic component.

### 1.8 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three (3) years documented experience.
- B. Installer: Company specializing in performing work of this Section, on projects of similar size, with minimum three (3) years documented experience and certified by manufacturer.

### 1.9 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after installation of Work.
- B. Temperature: Install work within range of ambient and substrate temperature, and moisture content recommended by the primary material manufacturer. Do not apply materials to a

damp or wet substrate. Do not install materials when ambient temperature is lower than 50 degrees F unless manufacturer provides written approval.

- C. Field Conditions: Do not install work in snow, rain, fog, or mist. Do not install air barrier when the temperature of substrate surfaces and surrounding air temperatures are below those recommended by the material manufacturer.
- D. Sequencing: Do not install work before the roof assembly and other construction has been sufficiently installed to prevent water infiltration into the substrate construction and building.
- E. Compatibility: Do not allow materials to come in contact with chemically incompatible materials.
- F. Ultra-Violet Exposure: Do not expose air barrier materials to sunlight longer than as recommended by the material manufacturer.

## 1.10 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Requirements for warranties.
- B. Manufacturer's Warranty: Provide manufacturer's warranty covering against faulty materials in foamed-in-place insulation system, components, and accessories provided by manufacturer. Warranty duration to be five (5) years from date of Substantial Completion.
- C. Installer's Warranty: Provide installer's warranty covering against water intrusion and leaks in foamed-in-place insulation system, components, and accessories. Warranty duration to be two (2) years from date of Substantial Completion.

## PART 2 PRODUCTS

### 2.1 GENERAL

- A. Regulatory Requirements: Comply with applicable codes for flame and smoke limitations.
- B. Application: Locations indicated on Drawings including, but not limited to, masonry cavity walls, and at junctions of dissimilar wall and roof materials to achieve thermal, dampproofing, and air barrier.
- C. All materials are to be compatible with the foamed-in-place insulation manufacturer's product.

### 2.2 FOAMED-IN-PLACE INSULATION

- A. Manufacturers:
  - 1. BASF Corporation - Walltite US.
  - 2. Henry Company - Permax 2.0X.
  - 3. Huntsman Building Solutions - Heatlok XT.
  - 4. Johns Manville - Corbond III.
  - 5. NCFI Polyurethanes - InsulBloc.
  - 6. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design: NCFI Polyurethanes - InsulBloc.
- C. Foamed-In-Place Insulation: Conforming to ASTM C1029, medium-density, rigid or semi-rigid, closed cell polyurethane foam; foamed on-site, using blowing agent of water or non-ozone-depleting gas.
  - 1. Closed Cell Content: 90 percent, minimum, in accordance with ASTM D6226.
  - 2. Thermal Resistance: R-value of 6.7, minimum, per 1 inch thickness at 75 degrees F mean temperature when tested in accordance with ASTM C518.

3. Density: 2.0 pcf, minimum, in accordance with ASTM D1622.
4. Compressive Strength: 25 psi, minimum, in accordance with ASTM D1621.
5. Water Vapor Permeance: Vapor retarder; 1.3 perm, maximum, at 1.0 inch thick when tested in accordance with ASTM E96/E96M, desiccant method.
6. Air Permeance: 0.004 cfm per sq ft, maximum, at 1.57 psf pressure differential, in accordance with ASTM E2178.
7. Surface Burning Characteristics:  $\leq 25$  Flame Spread and  $\leq 450$  Smoke Developed, in accordance with ASTM E84.
8. Fungal Growth: None in accordance with ASTM C1338.

### 2.3 ACCESSORIES

- A. All accessories are to be compatible with the foamed-in-place insulation manufacturer's product.
- B. Primer: As recommended by insulation manufacturer.
- C. Joint Filler Foam: As recommended by insulation manufacturer.
- D. Joint Sealer: Single component polyurethane type and as recommended by foamed-in-place insulation manufacturer.
- E. Moisture Detection Paper Strips: MDP Strips.
- F. Mineral Wool: Mineral Wool Board, 4 pcf density.
- G. Transition Strips: Provide transition strips where difference in spray-applied thickness is greater than 2 inches. Strips are to be fastened directly to CMU, or other substrate, and provide transition backer no less than thickness of the larger depth requirement.
- H. Air Barrier Flashing Sheet Seal: Refer to Section 07 27 00 - Air Barriers.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify Work within construction spaces or crevices are complete prior to insulation application.
- C. Verify surfaces are clean, dry, and free of matter capable of inhibiting adhesion work in this Section.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Prime substrate if required by manufacturer.
- D. Mask and protect adjacent surfaces from overspray or dusting.
- E. Mask areas where brick abuts concrete masonry at window and door jambs and other areas where brick abuts concrete masonry.
- F. Fill voids between masonry and structural steel and metal deck with mineral wool.
- G. Install Air Barrier Flashing at all openings and other locations as indicated on the Drawings. Lap seams one inch. Prime substrate as recommended by manufacturer.

**3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Apply work in this Section in accordance with manufacturer's instructions.
- C. Apply insulation by spray method to uniform monolithic density without voids and seal around objects embedded or penetrating substrate.
- D. Apply to a cured thickness of not less than that indicated on Drawings and not greater than that indicated thickness plus 1/2 inch. Cured application is to comply with the specified R-value.
- E. Provide minimum of 2 inches overlap onto air barrier materials as indicated on Drawings.
- F. Install trim pieces for transition from full spray insulation to lesser spray thicknesses at more than 2 inches as per thickness indicated on the Drawings.
- G. Where applied to voids and gaps, allow space for expansion to avoid pressure on adjacent materials that may bind operable parts.
- H. Trim excess away for applied trim or remove as required for continuous sealant bead.
- I. Trim excess as required to not interfere with application of cladding or other cover systems by other trades.
- J. Patch damaged areas with same foam insulation product.

**3.4 FIELD QUALITY CONTROL**

- A. Section 01 40 00 - Quality Requirements: Monitor quality of installation and testing.
- B. Inspection will include verification of insulation thickness and density.
- C. Where damage occurs, which violates the insulation's thermal requirements, air seal and moisture seal, repair as needed using the specified spray polyurethane material or foam repair kit material approved by the manufacturer.

**3.5 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Do not permit subsequent construction work to damage the installed work of this Section.
- C. Protect the work of this Section from damage.

**END OF SECTION**



**SECTION 07 22 16.10****ROOF INSULATION FOR MEMBRANE ROOFING****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Roof insulation requirements for membrane roofing systems.
- B. Related Requirements:
  - 1. Section 06 10 53 - Miscellaneous Rough Carpentry.
  - 2. Division 07 - Thermal and Moisture Protection: Roofing membrane, roof drainage, accessories, sheet metal flashing. and trim.

**1.2 REFERENCES**

- A. American Society of Civil Engineers (ASCE):
  - 1. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- B. ASTM International (ASTM):
  - 1. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2017.
  - 2. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2023a.
  - 3. ASTM C1303/C1303M - Standard Test Method for Predicting Long-Term Thermal Resistance of Closed-Cell Foam Insulation; 2023.
  - 4. ASTM D2126 - Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging; 2020.
  - 5. ASTM D4263 - Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method; 1983, Reapproval 2018.
  - 6. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
  - 7. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2023.
  - 8. ASTM E136 - Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C; 2024.
  - 9. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019a.
- C. International Code Council, Inc. (ICC); International Building Code (IBC):
  - 1. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. National Standard of Canada (CAN) / ULC Standards (ULC):
  - 1. CAN/ULC-S770 - Standard Test Method For Determination Of Long-Term Thermal Resistance Of Closed-Cell Thermal Insulating Foams; Reaffirmed 2020.
- E. Underwriters Laboratories Inc. (UL):
  - 1. UL (DIR) - Online Certifications Directory; Current Edition.
  - 2. UL (FRD) - Fire Resistance Directory; Current Edition.

**1.3 PRE-INSTALLATION MEETINGS**

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.

- B. Meeting is to include coordination of requirements for roofing insulation and roofing membrane as a complete roofing system.
- C. Convene minimum one week prior to commencing work of roofing insulation and roofing membrane as a complete roofing system. Review the work requirements, application procedures, quality control, testing and inspection and production schedule.

#### **1.4 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal requirements.
- B. Submittals for roofing insulation and roofing membrane are to coincide as a complete roofing system.
- C. Product Data: Provide data for all materials specified.
- D. Shop Drawings: Indicating plans for fill and tapered insulation types including fastening and adhering details for each roof area.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

#### **1.5 QUALITY ASSURANCE**

- A. Single-Source Responsibility: The requirements of this Section are to be provided by the same company that provides the roofing membrane and is to be an integral part of the overall roofing system.
- B. Requirements of this Section to be provided in accordance with the ICC (IBC).
- C. Requirements of this Section to be provided in accordance with the respective manufacturer's requirements and as a coordinated integral part of the overall roofing system.
- D. System components requiring UL certification but are not bearing UL label at point of delivery, shall be rejected.
- E. System components that are damaged or wetted before, during, or after installation shall be removed from the job site no later than the next working day from the day such damage or moisture contamination is noted.
- F. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum five (5) years of documented experience.
- G. Installer Qualifications: Company specializing in performing the work of this Section with at least five (5) years of documented experience.

#### **1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Materials shall be delivered in the manufacturer's original sealed and labeled shrouds and in quantities to allow continuity of application.
- C. Store materials in weather protected environment. Elevate materials minimum 4 inches above ground. Protect materials for moisture. Modify shipping shrouds and coverings as required to prevent condensation moisture contamination of materials.
- D. Ensure storage and staging of materials does not exceed static and dynamic load-bearing capacities of roof decking.
- E. Protect foam insulation from direct exposure to sunlight and moisture.
- F. Remove damaged or deteriorated materials from the job site.



- G. Handle materials in manner as prevent damage and contamination with moisture or foreign matter.

## 1.7 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after installation of Work.
- B. Do not install materials during precipitation or other unsuitable weather. Contractor assumes all responsibility for starting installation in the event there is a probability of precipitation occurring during application.
- C. Do not apply roofing membrane when ambient temperature is outside of the most restrictive range recommendations of the manufacturers of materials.
- D. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.
- E. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.
- F. Schedule applications so that no partially completed sections of roof are left exposed and without roofing membrane at end of workday.
- G. Prevent roofing construction materials, dust, and debris from entering the structure.

## 1.8 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Warranty for the requirements of this Section shall be included in and shall be an integral part of the warranty requirements indicated for the roofing membrane as an overall roofing system warranty. Refer to Division 07 for roofing membrane specification.

## PART 2 PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Wind Design: Design and install the insulation system to withstand the required wind uplift pressures as specified in Division 07 for roofing membrane.

### 2.2 COMPONENTS

- A. Sheathing Board: Glass mat faced gypsum panels, ASTM C1177/C1177M, Type X, fire resistant type, 500 psi moisture resistant treated core, non-asphaltic primer surfacing, and tested in accordance with ASTM E84 and ASTM E136. Board Size shall be 4 x 8 feet and thickness shall be 5/8 inch.
  - 1. Manufacturers:
    - a. Georgia Pacific: DensDeck Prime Roof Board.
    - b. National Gypsum Company: DEXcell Glass Mat Roof Board.
    - c. USG Corporation: Securock Glass-Mat Roof Board.
    - d. Substitutions: Section 01 60 00 - Product Requirements.
  - 2. Basis of Design: Georgia Pacific: DensDeck Prime Roof Board.
- B. Polyisocyanurate (ISO) Insulation Board: Rigid closed-cell foam panels, complying with ASTM C1289.
  - 1. Classifications:
    - a. Type II:

- 1) Class 1 - Faced with glass fiber reinforced cellulosic felt facers on both major surfaces of core foam.
  - 2) Compressive Strength: Classes 1-2-3, Grade 3 - 25 psi (172 kPa), minimum.
  - 3) Thermal Resistance at 1.5 Inch Thick: 8.4 (1.48) LTTR, minimum when tested at 75 degrees F (24 degrees C) in accordance with ASTM C1303/C1303M or CAN/ULC-S770.
2. Flame Spread Index (FSI): 25 to 75, tested in accordance with ASTM E84.
  3. Smoke Developed Index (SDI): 450 or less, tested in accordance with ASTM E84.
  4. Curing Time: 24 hours minimum, plus an additional 24 hours minimum per inch thickness, at a minimum of 60 degrees F before shipment from the manufacturer.
  5. Dimensional Stability: 2 percent maximum linear change when conditioned at 158 degrees F and 97 percent relative humidity for seven (7) days.
  6. Board Size: Factory formed board units.
    - a. Maximum, 4 x 8 feet for mechanical attachment.
    - b. Maximum, 4 x 4 feet for adhered attachment.
    - c. Field cutting of larger boards is not acceptable.
  7. Board Thickness: Total thickness and thermal resistance requirements to be as indicated on Drawings.
    - a. Layers: Applied in not less than two (2) layers, with staggered and sealed joints.
    - b. Parapet Walls: Thickness above roof level at interior face of parapet walls to be 1 inch, unless indicated otherwise on Drawings.
  8. Board Edges:
    - a. Square.
  9. Tapered Board: Slope as indicated on Drawings, but not less than 1/4 inch per foot; minimum thickness of 1/2 inch.
    - a. Slope for Crickets and Saddles: 1/2 inch per foot.
  10. Manufacturers:
    - a. Atlas Roofing Corporation.
    - b. Johns Manville.
    - c. Rmax, Incorporated.
    - d. Versico Roofing Systems.
    - e. Substitutions: Section 01 60 00 - Product Requirements.
- C. Tapered Edge Strip:
1. For use with polyisocyanurate insulation boards.
    - a. Closed-cell polyisocyanurate foam core integrally bonded to non-asphaltic, fiber-reinforced organic felt or inorganic coated-glass facers. Product to be dimensionally stable providing a "zero edge" slope transition at crickets, drain sumps, and other sloped drainage transitions. Edge strips to be 2 by 24 inches (1 inch per foot slope).
    - b. Basis of Design: Atlas - Gemini Tapered Edge Strip (TES).
- D. Cover Boards: Glass mat faced gypsum panels, ASTM C1177/C1177M, fire resistant type, 500 psi moisture resistant treated core, non-asphaltic primer surfacing, and tested in accordance with ASTM E84 and ASTM E136.
1. Board Size: Factory formed board units.
    - a. 5/8 inch thick and 4 x 8 feet size.
  2. Manufacturers:
    - a. Georgia Pacific: DensDeck Prime Roof Board.
    - b. National Gypsum Company: DEXcell FA (coated) Glass Mat Roof Board.
    - c. USG Corporation: Securock Coated Glass-Mat Roof Board.
    - d. Substitutions: Section 01 60 00 - Product Requirements.

3. Basis of Design: Georgia Pacific - DensDeck Prime Roof Board.

### 2.3 ACCESSORIES

- A. Sound Absorbing Insulation Strips: Refer to Section 05 31 00 - Steel Decking for metal decking with acoustic flutes that provide for sound absorbing insulation strips to be installed in all deck flutes. Sound absorbing insulation strips are to be pre-formed, continuous length and full depth of each flute, and to be as recommended by the metal decking manufacturer.
- B. Primer Materials: For component materials requiring substrate to be primed, use primer recommended by both the substrate manufacturer and the manufacturer of the component requiring the primer.
- C. Sheathing Joint Tape: Minimum 5 inches wide, high temperature and self-adhering type, compatible with subsequent layer material, and as recommended by sheathing manufacturer.
- D. Insulation Joint Tape: Minimum 6 inches wide, high temperature and self-adhering type, glass fiber reinforced type, compatible with roofing materials, and as recommended by insulation manufacturer.
- E. Attachment Materials: Approved by manufacturer of material to be fastened or adhered to installed substrate.
  1. Mechanical Fasteners: For attachment of material to installed metal decking.
    - a. Corrosion resistant 3 inch galvalume stress plate and corrosion resistant screw type fasteners.
    - b. Length, diameter, and configuration to be as required by material type, thickness, and size. Length to provide for penetration through metal deck material by minimum of 3/4 inch and maximum of 1 inch.
  2. Adhesives: Foamed and fluid applied adhesives to be a one or two part, VOC compliant, moisture-cured polyurethane type.

## PART 3 EXECUTION

### 3.1 GENERAL

- A. The following execution requirements are minimum requirements. Where manufacturer's requirements are more stringent, follow the manufacturer's more stringent requirements.
- B. Install all roofing system components in accordance with the design for wind load resistance, Contract Documents, manufacturers' recommendations, applicable code requirements, and in accordance with the recommendations of the entity providing roofing system warranty.
- C. Use equipment and tools recommended by component's manufacturer.

### 3.2 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Inspect substrate for soundness and compliance with project requirements and recommendations of roofing system materials manufacturers.
- C. Commencement of work signifies Contractor's acceptance of substrate. Any defects in roofing work resulting from such accepted substrates shall be corrected to Owner's satisfaction at no additional expense.

### 3.3 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section. Prepare materials to be installed and equipment used during installation.
- B. Roof deck to be dry and broom cleaned of debris and foreign matter.
- C. Metal Decks with Acoustic Flutes:
  - 1. Install preformed sound absorbing insulation strips at full depth and continuous in flutes, and in accordance with manufacturer's instructions.
- D. Concrete Decks:
  - 1. Verify adjacent precast concrete roof members do not vary more than 1/4 inch (6 mm) in height. Verify grout keys are filled flush.
  - 2. Fill surface honeycomb and variations with filler recommended by deck manufacturer and as compatible with subsequent component material application.
  - 3. Do not begin work until concrete substrate has cured at least 28 days and moisture content is 5 percent or less.
    - a. Test as Follows:
      - 1) Concrete Moisture Content: No beading water under plastic after 16 hours when tested in accordance with ASTM D4263.
      - 2) Relative Humidity in Concrete: Not greater than 75 percent when tested in accordance with ASTM F2170.
      - 3) Other tests as recommended by manufacturers of application materials.
      - 4) Where manufacturer's requirements are more stringent, comply with manufacturer's more stringent requirements.

### 3.4 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Primer Materials: Apply primers, when required, in accordance with recommendations of primer manufacturer, the substrate manufacturer and the manufacturer of the component requiring a primer.
  - 1. Substrate is to be clean, dry, and free of dust, grease, and other contaminants. Shake container well before application. Apply to surfaces using manufacturer recommended equipment and coverage requirement.
  - 2. Comply with both primer manufacturer's time requirements, after primer application, for subsequent application of component material over primed substrate.
- C. Sheathing Board: Install and attach sheathing board at roof locations and as indicated on Drawings.
  - 1. Lay boards with staggered end joints.
    - a. For metal decks, lay boards with long side at right angle to flutes and deck support at ends of boards.
  - 2. Cut sheathing cleanly and accurately at roof breaks and protrusions to provide smooth surface.
  - 3. Seal joints continuous with joint tape.
- D. Fill and Tapered Insulation:
  - 1. Comply with the requirements of this Section, the Drawings, and the instructions of the manufacturers of the insulation materials and roofing membrane.
  - 2. Apply only as much insulation materials as can be covered watertight by the roofing membrane on the same day.

3. On steel decks, apply board materials with long dimension of units across deck ribs. Ends of board materials must be bearing on upper flute surface of steel deck for continuous end support.
  4. On concrete decks, prime concrete decks prior to attachment with a uniform coating of primer per manufacturer's standard application rates.
  5. Insulation materials to be in full sheets, carefully fitted and pushed together for tight joints. Gaps exceeding 1/4 inch are not acceptable.
  6. Insulation materials that must be cut to fit are to be saw-cut or knife-cut in a straight line, not broken. Chalk lines to be used to cut insulation. Uneven or broken edges are not acceptable. Insulation shall be field trimmed to fit tightly to roof obstructions and terminations. Remove dust and debris from roof area that develops during cutting operations.
  7. Stagger joints of each additional layer of board materials by 12 inches each way to ensure that joints do not coincide with joints of preceding layers.
  8. All joints to be fully taped and sealed with minimum 6 inches wide, high temperature and self-adhering type, glass fiber reinforced type, compatible with roofing materials, and as recommended by insulation manufacturer.
  9. Crickets, saddles, and tapered edge strips shall be installed before the cover board material.
  10. At roof edges, install insulation system, nailers and other roof construction in a manner as to produce a flush and smooth transition for roof membrane and flashing.
  11. Install insulation, tapered insulation and tapered edge strips as required to accommodate roof and flashing conditions, prevent water dams and ponding water. Ponding water at scuppers and cricket valleys is not acceptable.
  12. Provide necessary modifications to prevent standing water which is defined as 1/4 inch of water or more, in an area that is 4 sf or larger, at 24 hours or more after precipitation.
  13. Tapered Insulation:
    - a. Install tapered insulation system to achieve elevations, thicknesses and slopes indicated on Drawings and to provide positive slope for complete roof drainage.
    - b. Crickets shall be sized as shown in the Drawings. Modifications shall be provided to ensure positive slope and prevent standing water along cricket valleys and at drain sumps.
      - 1) Minimum length to width ratio shall be 2:1. Fabricate partial crickets with dimensions which would result in a minimum length to width ratio of 2:1 if they were extended to full size.
      - 2) Unless otherwise noted, fabricate all crickets from tapered stock as required to provide the specified minimum slope. For example, when roof slope is indicated as 1/4 inch per foot minimum, fabricate crickets with slope of 1/2 inch per foot minimum.
      - 3) Construct crickets on up slope side of all curbs to ensure positive drainage.
      - 4) Install tapered edge strips at cricket edges and drain sumps to provide a smooth transition to cricket valley or roof drain construction.
    - c. Insulation boards may require mechanical fasteners and stress plates at slope transitions to minimize bridging.
- E. Roof Drainage:
1. Drainage sumps shall be installed as indicated on Drawings.
  2. Carefully lay out and install tapered insulation, sumps, drain bowls and scuppers to ensure the finished roof provides complete drainage with no standing water.
  3. Fabricate sumps to provide smooth transitions between the insulation system and the drains/scuppers.
  4. Sumps shall ensure complete roof drainage and prevent water dams.

5. Adjust insulation, drains and scuppers to ensure complete roof drainage and satisfactory substrates for membrane and flashings.
  6. Drain sump components shall be fastened to the deck using specified insulation fasteners or adhesives.
  7. Circular sumps and sumps that do not provide smooth transition or that create standing water at the drains shall be rejected and shall require removal and replacement.
- F. Mechanical Attachment:
1. Mechanical fasteners and materials being fastened shall be installed in accordance with manufacturer's recommendations and in locations, quantities, and spacing as required to withstand Wind Design requirements indicated in this Section in PERFORMANCE REQUIREMENTS article.
  2. Fasteners shall be installed using manufacturer's recommended equipment and in accordance with the manufacturer's requirements.
  3. Fasteners and stress plates shall be set secure and tight against the insulation surface and shall not be over-driven.
  4. Fasteners shall engage the top flange of steel deck.
  5. Coordinate to avoid damage to other construction components below decking (e.g., electrical conduits, box, etc.).
- G. Adhesive Attachment:
1. Adhesive and materials being adhered shall be installed in accordance with manufacturer's recommendations as required to withstand Wind Design requirements indicated in this Section in PERFORMANCE REQUIREMENTS article.
  2. Component to be adhered is to be placed in full contact with adhesive and weighted into place.
  3. Ensure full adhesion of materials and provide appropriate equipment and methods necessary to achieve full adhesion, including, but not limited to, temporary ballasting until adhesive sets.

### 3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed work from damage and moisture.

**END OF SECTION**

**SECTION 07 27 00****AIR BARRIERS****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Air Barriers.
- B. Related Requirements:
  - 1. Division 07 - Thermal and Moisture Protection: Exterior cladding systems.
  - 2. Section 07 21 19 - Foamed-In-Place Insulation.
  - 3. Section 07 62 00 - Sheet Metal Flashing and Trim: Metal flashings installed in conjunction with air barriers.
  - 4. Section 09 21 16 - Gypsum Board Assemblies: Exterior gypsum board sheathing.

**1.2 REFERENCES**

- A. ASTM International (ASTM):
  - 1. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2021.
  - 2. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
  - 3. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission of Materials; 2022a, Editorial Revisions 2023.
  - 4. ASTM E2178 - Standard Test Method for Determining Air Leakage Rate and Calculation of Air Permeance of Building Materials; 2021a.
- B. National Fire Protection Association (NFPA):
  - 1. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components; 2023.

**1.3 COORDINATION**

- A. Section 01 30 00 - Administrative Requirements: Coordination, scheduling, and sequencing.
- B. Coordinate the work of this Section with other adjacent and interfacing work.
- C. Coordinate compatibility of materials provided for the work of this Section with insulation and other materials provided under other Sections of work.
- D. Sequence the work to permit installation of materials in conjunction with related materials and seals.

**1.4 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures.
- B. Product Data: Submit data on material characteristics, performance criteria, and limitations.
- C. Compatibility Certification: Include manufacturer's certification that the materials provided are compatible with the insulation materials with which the manufacturer's materials contact.



- D. Manufacturer's Installation Instructions: Submit preparation, installation requirements and techniques, product storage and handling criteria.
- E. Manufacturer's qualification statement.
- F. Installer's qualification statement.

### **1.5 QUALITY ASSURANCE**

- A. Air Barrier Association of America (ABAA) Evaluated Air Barrier Assemblies: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacturing, and use secondary materials approved in writing by primary material manufacturer.
- B. Manufacturer Qualifications: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacturing, and use secondary materials approved in writing by primary material manufacturer.
- C. Installer Qualifications: Company specializing in performing Work of this section with minimum three (3) years documented experience.

### **1.6 MOCK-UPS**

- A. Section 01 40 00 - Quality Requirements: Mock-up requirements.
  - 1. Install and incorporate requirements of this Section into mock-ups required for construction for the project.

### **1.7 ENVIRONMENTAL REQUIREMENTS**

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after installation of Work.
- B. Maintain temperature and humidity recommended by materials manufacturers before, during and after installation.

## **PART 2 PRODUCTS**

### **2.1 PERFORMANCE REQUIREMENTS**

- A. Air Barrier System: Continuous network of materials and joints providing air tightness, with adequate strength and stiffness to not deflect excessively under air pressure differences, to which it will be subjected in service. It can be comprised of single material or combination of materials to achieve performance requirements.
- B. Provide continuity of air barrier materials and assemblies in conjunction with other barrier materials described in Division 07 - Thermal and Moisture Protection.
- C. Static Test: Resist air leakage caused by static air pressure across exterior wall assemblies and other interruptions to integrity of building enclosure systems; to maximum air leakage rate of 0.004 cfm/sq ft when subjected to pressure differential of 1.57 lbs/sq ft when tested in accordance with ASTM E2178.

### **2.2 AIR BARRIER MATERIALS**

- A. Air Impermeable and Water Vapor Impermeable:
  - 1. Self-adhered sheet of rubberized asphalt bonded to thermoplastic sheet complying with ASTM D1970/D1970M.
  - 2. Thickness: 40 mils (0.040 inch), minimum.



3. Sheet Width: 6 inches, 12 inches, 18 inches, 24 inches, and 36 inches; coordinate width with application area.
4. Air Permeance: 0.004 cfm/sq ft (0.02 L/s/sq m), maximum; ASTM E2178 with pressure differential of 1.57 lb./sq ft.
5. Water Vapor Permeance: 0.10 perm, maximum; ASTM E96/E96M using Procedure A (desiccant method) at 73.4 degrees F.
6. Water Penetration Resistance Around Nails: Pass; ASTM D1970/D1970M (modified).
7. Ultraviolet and Weathering Resistance: Approved in writing by manufacturer for minimum of 50 days weather exposure.
8. Comply with NFPA 285 requirements for wall assembly.
9. Seam and Perimeter Tape: As recommended by sheet manufacturer.
10. Manufacturers:
  - a. Carlisle Coatings and Waterproofing, Inc.
  - b. Henry Company.
  - c. W.R. Meadows, Inc.
  - d. Substitutions: See Section 01 60 00 - Product Requirements.
11. Basis of Design:
  - a. Henry Company - Blueskin SA.

### 2.3 ACCESSORIES

- A. Substrate Cleaner: Non-corrosive; type recommended by barrier product manufacturer; compatible with adjacent materials.
- B. Primers and Adhesive: As recommended by barrier product manufacturer for substrate material.
- C. Sealant: Moisture cure type as recommended by barrier product manufacture for construction joints subject to dynamic joint movement.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that surfaces and conditions are ready to accept the work of this section. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section. Prepare materials to be installed and equipment used during installation.
- B. Remove loose or foreign matter that may otherwise impair adhesion of materials.
- C. Clean and prime substrate surfaces to receive barrier materials if recommended by barrier material manufacturer.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install the Work in accordance with manufacturer's recommendations and as indicated on Drawings.

- C. Air Barriers: Install continuous airtight barrier over solid surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.
- D. Apply sealants and adhesives at locations recommended by barrier manufacturer. Apply within temperature range as recommended by manufacturer.
- E. Self-Adhered Sheets:
  - 1. Prepare substrate in manner recommended by sheet manufacturer. 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 all material and laps are firmly adhered to substrate with no gaps or fish mouths.
  - 4. Use same material, or other material approved by sheet manufacturer for the purpose, to seal to adjacent construction and as flashing.
  - 5. At wide joints, provide extra flexible membrane allowing joint movement.
- F. Openings, Junctions, and Penetrations in Air Barriers:
  - 1. Sheet Seal at Wall/Roof Junction: Lap sheet seal onto roof air barrier material and seal. Caulk to ensure complete air seal. Position lap seal over firm bearing.
  - 2. Install sheet seal between window and door frames and adjacent wall seal materials with air barrier material. Apply sealant to ensure complete seal. Position lap seal over firm bearing.
  - 3. Install sheet seal to maintain continuity across different substrates and interface with other construction and building assemblies.
  - 4. Provide 2 inches minimum overlap of spray foam insulation over sheet seal membrane edges.
  - 5. Provide 2 inches minimum overlap at sheet seal joint and apply in manner as to shed water.
  - 6. Construct all end dams at sill installations to provide continuous air barrier with window openings.

### **3.4 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Do not leave materials exposed to weather longer than recommended by manufacturer.
- C. Do not permit adjacent work to damage work of this section.

**END OF SECTION**

**SECTION 07 41 13**  
**METAL ROOF PANELS**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Metal roofing system.
  - 2. Roof insulation.
  - 3. Underlayment sheet.
  - 4. Roofing system accessories.
  - 5. Metal flashings and trim.
- B. Related Sections:
  - 1. Section 06 10 53 - Miscellaneous Rough Carpentry.
  - 2. Section 07 42 13 - Metal Wall Panels.
  - 3. Section 07 62 00 - Sheet Metal Flashing and Trim.
  - 4. Section 07 71 23 - Manufactured Gutters and Downspouts.
  - 5. Section 07 90 00 - Joint Protection.

**1.2 REFERENCES**

- A. American Architectural Manufacturers Association (AAMA):
  - 1. AAMA 2604 - Voluntary specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
  - 2. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
- B. American Society of Civil Engineers (ASCE):
  - 1. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- C. ASTM International (ASTM):
  - 1. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2023.
  - 2. ASTM C209 - Standard Test Methods for Cellulosic Fiber Insulating Board; 2020.
  - 3. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2017.
  - 4. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2023a.
  - 5. ASTM C1306/C1306M - Standard Test Method for Hydrostatic Pressure Resistance of a Liquid-Applied Waterproofing Membrane; 2016, Reapproval 2023.
  - 6. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2021.
  - 7. ASTM D2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates; 2023.
  - 8. ASTM D4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films; 2023.
  - 9. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.

10. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2023.
  11. ASTM E108 - Standard Test Methods for Fire Tests of Roof Coverings; 2020a.
  12. ASTM E1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference; 2005, Reapproval 2017.
  13. ASTM E1646 - Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference; 1995, Reapproval 2018.
  14. ASTM E1680 - Standard Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems; 2016, Reapproval 2022.
- D. National Roofing Contractors Association (NRCA):
1. NRCA ML104 - The NRCA Roofing and Waterproofing Manual; Fifth Edition, With Interim Updates.
- E. National Standard of Canada (CAN) / ULC Standards (ULC):
1. CAN/ULC-S770 - Standard Test Method For Determination Of Long-Term Thermal Resistance Of Closed-Cell Thermal Insulating Foams; Reaffirmed 2020.
- F. Sheet Metal and Air Conditioning Contractors (SMACNA):
1. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.
- G. Underwriters Laboratories Inc. (UL):
1. UL 580 - Standard for Safety Tests for Uplift Resistance of Roof Assemblies; Current Edition, Including all Updates.
  2. UL 790 - Standard Test Methods for Fire Tests of Roof Coverings; Current Edition, Including all Updates.

### 1.3 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

### 1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data:
  1. Submit data on roofing system, components, and accessories. Include data regarding metal types, finishes, and characteristics.
- C. Shop Drawings:
  1. Indicate metal roofing panel and trim profiles, jointing patterns, jointing details, fastening methods, flashings, terminations, snow guards and installation details.
  2. Engineered Design Data: Submit structural design calculations for metal roofing signed and sealed by professional engineer.
- D. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of finishes and colors available for products with factory-applied finishes; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples on same product material type indicated for final Work; each sample 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Manufacturer's Installation Instructions: Submit instructions including special procedures for roofing penetrations, flashings, and perimeter conditions requiring special attention.

- G. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

## 1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with SMACNA (ASMM), and NRCA ML104, and the manufacturer's instructions.
- B. Field Quality Control:
  - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect metal roof panel installation, including accessories. Report results in writing. Representative is to not be in the employment of the roofing Installer.
  - 2. Remove and replace applications of metal roof panels where inspections indicate that they do not comply with specified requirements.
  - 3. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

## 1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three (3) years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum five (5) years documented experience and approved by manufacturer.
- C. Engineered Design: Design sheet metal roofing system under direct supervision of Professional Engineer experienced in design of this Work and licensed in the State in which the Work is constructed.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Provide strippable plastic protection on prefinished roofing panels for removal after installation.
- C. Store roofing panels on project site as recommended by manufacturer. Provide proper ventilation and prevent twisting, bending, abrasion, and other damage to panels.
- D. Prevent contact with materials causing discoloration or staining.

## 1.8 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Requirements for warranties.
- B. Provide two (2) year General Contractor's material and labor warranty to cover failure to prevent penetration of water.
- C. Special Warranties:
  - 1. Special Watertightness Warranty: Manufacturer's warranty in which manufacturer agrees to repair or replace standing-seam metal roof panel assemblies that fail to remain watertight, including leaks, within specified warranty period.
    - a. Warranty Form:
      - 1) No Dollar Limit Form.
    - b. Warranty Period: Duration from date of Substantial Completion.
      - 1) Twenty (20) Years.
    - c. The addition of solar panels mounted with mounting clamps to roof panel standing seams shall not void the warranty.

- d. Shop drawings must be provided (or reviewed) by the panel manufacturer and approved by the panel manufacturer prior to the installation of the panel system.
  - e. A minimum of two inspections by the technical representative of the panel system manufacturer are required. The first inspection is to be performed when the underlayment and flashing are in place and the second inspection is to be performed when the roof is complete.
2. Special Installer Warranty: Furnish a written warranty signed by the roofing panel installer, guaranteeing materials and workmanship for watertightness of the roofing system, flashings, penetrations, and against all leaks within specified warranty period.
    - a. Warranty Period: Two (2) years from date of Substantial Completion.
  3. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
    - a. Warranty Period: twenty (20) years from date of Substantial Completion.
    - b. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
      - 1) Color fading more than 5 Hunter units when tested according to ASTM D2244.
      - 2) Chalking more than a No. 8 rating when tested according to ASTM D4214.
      - 3) Cracking, chipping, peeling, or failure of paint to adhere to bare metal.

## **PART 2 PRODUCTS**

### **2.1 PERFORMANCE REQUIREMENTS**

- A. Design and provide complete roofing system, including roof panels, clips, fasteners, connectors, insulation, flashings, and accessories, tested for compliance with the following minimum standards.
- B. Overall: Complete weathertight system tested and approved in accordance with ASTM E1592.
- C. Wind Loads: Design and size components to withstand positive and negative wind loads, including increased loads at building corners.
  1. Design Wind Load: As calculated in accordance with ASCE 7 with 100 mph basic wind speed, exposure C.
- D. Wind Uplift Resistance: Class 90 wind uplift resistance of UL 580.
- E. Air Infiltration: Limit air leakage through roof assembly to 0.025 cfm/sq ft of roof area, measured at reference differential pressure across assembly of 6.24 psf as measured in accordance with ASTM E1680.
- F. Water Leakage: None, when measured in accordance with ASTM E1646 with test pressure of 6.24 psf. Perform test immediately following air infiltration test.
- G. Roof Covering Fire Test Classification: UL 790 (ASTM E108), Class A, minimum.
- H. Exterior Components: Accommodate the following without damage to system, components, or deterioration of seals.
  1. Movement within system.
  2. Movement between system and perimeter framing components.
  3. Dynamic loading and release of loads.
  4. Deflection of structural support framing.

5. Expansion and contraction from temperature range of 170 degrees F over 12 hour period.

## 2.2 MANUFACTURED SHEET METAL ROOFING

- A. Manufacturers:
  1. ATAS International, Inc.
  2. Berridge Manufacturing Company.
  3. Centria Architectural Systems.
  4. Construction Metal Products (CMP).
  5. Dimensional Metals, Inc. (DMI).
  6. Fabral Metal Wall and Roof Systems.
  7. Innovative Metals Company, Inc. (IMETCO).
  8. MCBI Metal Wall and Roof Systems.
  9. McElroy Metal, Inc.
  10. Metal Roofing Systems, Inc.
  11. Metal Sales Manufacturing, LLC.
  12. Petersen Aluminum Corporation (PAC-CLAD).
  13. Substitutions: Section 01 60 00 - Product Requirements.
- B. Structural Metal Roof Panels: Provide complete engineered system designed and constructed to complying with specified requirements, remain weathertight, withstand anticipated movement of substrate and thermally induced movement of roofing system.
- C. Metal Panels and Components: Factory-formed metal panels and components with factory-applied finish.
  1. Base Sheet Metal:
    - a. Steel Panels:
      - 1) SS (structural steel), Grade 50 sheet.
      - 2) Galvalume Coating: Aluminum-zinc alloy-coated complying with ASTM A792/A792M; minimum AZ50 (AZM150) coating.
      - 3) Steel Thickness: Minimum 24 gauge, 0.024 inch (0.61 mm), unless indicated otherwise on Drawings.
    2. /Roof Panel Type: Single skin, uninsulated.
    3. Roof Panel Profile: Standing seam, with 2.0 inch (51 mm) seam height; concealed fastener system for field seaming.
      - a. Seam Type: 180 degrees double locked, field machine formed seams.
    4. Roof Panel Texture:
      - a. Smooth, and striated for added stiffness.
    5. Roof Panel Length:
      - a. As indicated on Drawings.
    6. Roof Panel Width: Nominal 16 inches, unless indicated otherwise on Drawings.
  - D. Metal Finish: Factory applied.
    1. Exposed Finish:
      - a. Polyvinylidene fluoride (PVDF) multi-coat organic coatings system including at least 70 percent PVDF resin and having a minimum total dry film thickness (TDFT) of 1.2 mil (0.0012 inch) (0.030 mm) when measured in accordance with ASTM D1790.
      - b. AAMA Coating System Compliance Required:
        - 1) AAMA 2605 - Superior performing organic coating system.
        - 2) Coating Manufacturers:
          - a) Arkema, Inc.: Kynar 500.
          - b) PPG Metal Coatings: Duranar.
          - c) Sherwin-Williams Company: Fluorpon.



2. Unexposed Finish: Manufacturer's standard coating, minimum 0.5 mil total dry film thickness.
3. Color and Gloss:
  - a. As selected by Architect from panel manufacturer's full range.

### 2.3 INSULATION MATERIALS

- A. Polyisocyanurate (ISO) Insulation Board: Rigid closed-cell foam panels, complying with ASTM C1289.
  1. Basis of Design: Johns Manville - Energy 3.
  2. Type II:
    - a. Class 1 - Faced with glass fiber reinforced cellulosic felt facers on both major surfaces of core foam.
      - 1) Compressive Strength:
        - a) Grade 2: 20 psi (138 kPa), minimum.
      - 2) : : Long Term Thermal Resistance at 1.5 Inch Thick: 8.4 (1.48) LTTR, minimum when tested at 75 degrees F (24 degrees C) in accordance with ASTM C1306/C1306M or CAN/ULC-S770.
  3. Flame Spread Index (FSI): Class B - 26 to 75; per ASTM E84.
  4. Smoke Developed Index (SDI): 450 or less; per ASTM E84.
  5. Tensile Strength: 500 psf, minimum per ASTM C209.
  6. Water Absorption: 1 percent, maximum by volume per ASTM C209.
  7. Water Vapor Permeance: 1 perm, maximum per ASTM E96.
  8. Board Size: Largest size applicable, but not less than 48 x 96 inches.
  9. Board Thickness: As indicated on Drawings.
  10. Number of Layers: As indicated on Drawings.
  11. Board Edges: Square.
- B. Underlayment Sheet: Self-adhering with reinforcing scrim, high temperature sheet, consisting of slip-resisting top surface laminated to SBS-modified asphalt adhesive, with release-paper backing; cold applied.
  1. Thickness: 50 mils (0.05 inch), minimum.
  2. Roll Width: 36 inches.
  3. Thermal Stability: Stable after testing at 250 deg F; ASTM D1970/D1970M.
  4. Low-Temperature Flexibility: Passes after testing at minus 20 deg F; ASTM D1970/D1970M.
  5. Seams shall be lapped in accordance with manufacturer's recommendations.
  6. Underlayment shall be approved for 90 days (minimum) of exposure to UV and weather penetrations.
- C. Slip Sheet: Rosin building paper.

### 2.4 ACCESSORIES

- A. Miscellaneous Sheet Metal Items: Unless indicated otherwise on Drawings, provide metal roofing related flashings, trim, moldings, closure strips, preformed crickets, caps, equipment curb flashings, and similar sheet metal items of the same material, thickness, and finish as used for the roofing panels. Items completely concealed after installation may optionally be stainless steel material.
  1. Coordinate work requirements with requirements in the following Sections:
    - a. Section 07 62 00 - Sheet Metal Flashing and Trim.
    - b. Section 07 71 23 - Manufactured Gutters and Downspouts.
- B. Rib and Ridge Closures: Provide prefabricated, close-fitting, and weathertight components of same metal, thickness, and finish as roof panels.



- C. Fasteners: Stainless steel.
- D. Insulation Board Joint Tape: Minimum 6 inches wide, high temperature and self-adhering type, glass fiber reinforced type, compatible with roofing materials, and as recommended by insulation manufacturer.
- E. Sound Absorbing Insulation Strips: Application is to provide sound absorbing material within acoustic flutes of all acoustic metal roof decking. Sound absorbing insulation strips are to be pre-formed, continuous length and full depth of each flute, and to be as recommended by the metal decking manufacturer.
- F. Sealant:
  - 1. Seam Sealant: Factory applied continuous non-curing butyl sealant.
  - 2. Exposed Sealant: Silicone type approved by component manufacturer.
- G. Dissimilar Materials Separation: Separate dissimilar materials to prevent galvanic or other corrosive action by applying a permanent separator material. Separator material to be type that will remain in the concealed area of application without running, staining, or migrating onto visible finish surfaces. Separator material must be acceptable to building component manufacturer and may include material such as a zinc molybdate alkyd coating, or a bituminous coating, or self-adhering rubberized asphalt sheet, or other permanent applied material as recommended by component manufacturer.
- H. Snow Guards: Prefabricated, noncorrosive units designed to be installed without penetrating metal roof panels, and complete with predrilled holes, clamps, or hooks for anchoring. Snow guards shall be illustrated within the panel manufacturer's shop drawings and shall be designed to resist the sliding force of snow in accordance with the requirements of ASCE-7. Confirming calculations to be provided by the roofing panel manufacturer as part of the shop drawings submittal.
  - 1. Seam-Mounted, Bar-Type Snow Guards: Extruded Aluminum rods or bars held in place by aluminum clamps attached to vertical ribs of standing-seam metal roof panels.
  - 2. Color:
    - a. Match roof panels in finish type and color.

## 2.5 FABRICATION

- A. Verify field measurements prior to fabrication.
- B. Form sections accurate in size, square, and free from distortion or defects.
  - 1. Form roofing panels to width indicated.
  - 2. Finished standing seam height to be 2 inches after on-site machine forming of 180 degrees Double-Lock seam.
    - a. Seam Sealant: Factory applied continuous non-curing butyl sealant.
  - 3. Length of roofing panels to be continuous from eaves to ridges.
- C. Fabricate fascia, trim, flashing, and other metal components from same material as metal roof panels.
  - 1. Provide exposed metal surfaces with same finish as exposed face of metal roof panels.
- D. Fabricate cleats of same material as sheet, to interlock with sheet.
- E. Fabricate starter strips of same material as sheet, continuous, to interlock with sheet.
- F. Form pieces in longest practical lengths, but not less than specified lengths where indicated.
- G. Hem exposed edges on underside 1/2 inch; miter and seam corners.
- H. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.

- I. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.
- J. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Metal Deck:
  - 1. Inspect roof deck to verify deck is clean and smooth, free of depressions, waves, or projections, and properly sloped to eaves.
  - 2. Verify deck is dry and free of snow and ice. Verify substrate joints are solidly supported and fastened.
  - 3. Verify wood nailers are installed and correctly located.
- C. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, reglets are in place, and nailing strips located.
- D. Verify roofing termination and base flashings are in place, sealed, and secure.

### **3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Verify that manufacturer applied factory applied continuous sealant in roofing panel seams and as may be required for other roofing system components.
- D. Metal Decks with Acoustic Flutes:
  - 1. Install preformed sound absorbing insulation strips at full depth and continuous in flutes, and in accordance with manufacturer's instructions.
- E. Dissimilar Materials Separation: Separate dissimilar materials to prevent galvanic or other corrosive action with permanent applied material as indicated in ACCESSORIES article in this Section. Where using applied coating, coat to minimum dry film thickness of 15 mil.

### **3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Overall:
  - 1. Install roofing system in accordance with the Contract Documents, Engineer's design, and panel manufacturer's instructions and recommendations. Anchor all components of roofing system securely in place while allowing for thermal and structural movement.
  - 2. Install roofing system with concealed clips and fasteners, except as otherwise recommended by manufacturer for specific circumstances.
  - 3. Minimize field cutting of panels. Where field cutting is absolutely required, use methods that will not distort panel profiles. Use of torches for field cutting is absolutely prohibited.
  - 4. Install all components and accessories required for a complete roofing assembly, including, but not limited to, flashings, gutters, downspouts, trim, moldings, closure

- strips, preformed crickets, caps, equipment curbs, rib closures, ridge closures, and similar roof accessory items.
- a. Coordinate work requirements with other related Section of work such as sheet metal flashing and trim, roofing specialties, roof hatches, gutters, downspouts, roof deck substrates, etc.
- C. Insulation:
1. Apply no more insulation than can be covered with roofing and made weathertight in same day.
  2. Place boards perpendicular to deck flutes with edges over flute surface for bearing support.
  3. Lay boards with edges in contact, but without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.
  4. Mechanically fasten insulation to deck.
  5. Stagger joints for each additional layer of board materials by 12 inches each way to ensure that joints do not coincide with joints of preceding layers.
  6. Fully tape all joints of each insulation layer with minimum 6 inches wide, high temperature and self-adhering type, glass fiber reinforced type, compatible with roofing materials, and as recommended by insulation manufacturer.
  7. Total insulation thickness shall be as indicated on Drawings.
  8. Place fasteners in accordance with wind uplift requirements, but not less than one fastener for every two square feet of insulation board area.
- D. Underlayment Sheet:
1. Self-Adhering Sheet Underlayment: Apply primer if required by manufacturer and as indicated herein. Comply with temperature restrictions of underlayment manufacturer for installation and with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps with roller. Cover underlayment within 90 days.
  2. Apply underlayment over entire roof surface, wrinkle free, in shingle fashion to shed water.
  3. Lower edge terminations and roof edge terminations to be as indicated on Drawings.
  4. Install underlayment laid perpendicular to slope.
  5. Weather lap side edges not less than 3-1/2 inches.
  6. Weather lap end laps not less than 6 inches and staggered 24 inches between courses.
  7. Turn up 4 inches onto roof penetrations and other vertical obstructions.
- E. Metal Roofing Panels:
1. Install slip sheet over underlayment prior to installing roofing panels.
  2. Install roofing panels with long dimension perpendicular to eaves.
  3. Install roofing panels beginning at eaves. Panel to extend from eaves to ridges without traverse joints.
  4. Install clips to secure roof panels without deforming roof panels.
    - a. Where indicated on Drawings, install clips spaced 24 inches o.c. maximum to receive future solar panels. The addition of solar panels using solar panel hardware clamps shall not void the roofing warranty.
  5. Machine form standing seam, forming a 180 degrees Double Lock seam, between adjacent roofing panels. Hand form joints where machine forming is not possible.
  6. Terminate roofing panels with sheet metal trim and flashing for watertight installation. Close and conceal openings between roofing panels, panel seams, and roof substrate.
  7. Seal metal joints watertight.
  8. Install snow guards in locations indicated on Drawings and in accordance with roofing panel manufacturer's written recommendations.
- F. Flashing and Trim:

1. Place eave edge and rake edge metal flashings tight to fascia. Weather lap joints 2 inches and seal with plastic cement. Secure flange to substrate.
2. Form valleys with sheet metal not exceeding 10 feet in length. Lap joints 6 inches in direction of drainage. Extend valley sheet minimum 6 inches under roofing sheets.
3. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted.
4. Secure flashing exposed edges with continuous cleats.
5. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
6. Seal metal joints watertight.

### **3.4 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work and comply with manufacturer's recommendations.

### **3.5 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Do not permit traffic over unprotected roof surface.

**END OF SECTION**

**SECTION 07 42 13**  
**METAL WALL PANELS**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Manufactured preformed metal wall panels and framing support system.
- B. Related Sections:
  - 1. Section 07 41 13 - Metal Roof Panels.
  - 2. Section 07 42 13.23 - Metal Composite Material Wall Panels.
  - 3. Section 07 43 13 - Metal Soffit Panels.
  - 4. Section 07 62 00 - Sheet Metal Flashing and Trim.
  - 5. Section 07 90 00 - Joint Protection.

**1.2 REFERENCES**

- A. American Architectural Manufacturers Association (AAMA):
  - 1. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
- B. American Society of Civil Engineers (ASCE):
  - 1. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Current Edition Cited by Referring Code or Reference Standard.
- C. ASTM International (ASTM):
  - 1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
  - 2. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2023.
  - 3. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
  - 4. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2018.
  - 5. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.
  - 6. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000, Reapproval 2023.

**1.3 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on panels and hanging system; include metal types, finishes, and characteristics.
- C. Design Data: Submit design calculations.
- D. Shop Drawings: Indicate dimensions, layout, joints, expansion joints, construction details, panel profiles, methods of anchorage, and interface with adjacent materials.

- E. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of finishes and colors available for products with factory-applied color finishes; submit for Architect's initial selections.
- F. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples on same product material type indicated for final Work; each sample 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- G. Manufacturer's Installation Instructions: Submit special procedures.

#### 1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five (5) years of documented experience.
- B. Installer Qualifications: Company specializing in installing the products specified in this section with minimum five (5) years of documented experience.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.
- C. Store prefinished material off ground and protected from weather. Prevent twisting, bending, or abrasion, and provide ventilation to stored materials. Slope metal sheets to ensure drainage.
- D. Prevent contact with materials that may cause discoloration or staining of products.

#### 1.6 WARRANTY

- A. Section 01 77 00 - Closeout Procedures.
- B. Furnish twenty (20) year manufacturer warranty to cover degradation of panel finish, including color fading caused by exposure to weather.
- C. Furnish five (5) year installer warranty to cover defects in water tightness and integrity of seals.

### PART 2 PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Design and size system components and support system to support wall panel system dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to wall plane.
  - 1. Wind Design Pressure:
    - a. As indicated on Drawings, in accordance with ASCE 7, and in accordance with the State Building Code for the State in which the project is located.
  - 2. Maximum Allowable Deflection of Panel: 1/180 of span.
- B. Air Leakage: 0.01 cfm/sf, maximum with static pressure differentials of 6.24 psf, in accordance with ASTM E283/E283M.
- C. Water Penetration: None with static pressure differentials of 12.00 psf, with water spray of 5 gal/hr/sf, for 15 minutes, in accordance with ASTM E331.

- D. Thermal Movement: Allow for thermal movement from variations in both ambient and internal temperatures. Accommodate movement of support structure caused by thermal expansion and contraction.

## 2.2 METAL WALL PANELS

- A. Manufacturers:
  - 1. AEP-Span.
  - 2. ATAS International, Inc.
  - 3. Berridge Manufacturing Company.
  - 4. Centria.
  - 5. Dimensional Metal, Inc. (DMI).
  - 6. Fabral.
  - 7. McElroy Metal, Inc.
  - 8. Metal Roofing Systems, Inc.
  - 9. Petersen Aluminum Corporation (PAC-CLAD).
- B. Basis of Design:
  - a. Petersen Aluminum Corporation (PAC). Precision Series - Box Rib 1, 2 and 3 Profiles.

## 2.3 COMPONENTS

- A. Precoated Metal Sheet:
  - 1. Precoated Aluminum Sheet:
    - a. Comply with the following:
      - 1) ASTM B209/B209M, aluminum alloy and temper to be as required for structural performance requirements.
    - b. Thickness:
      - 1) 18 gauge (0.040 inch) (1.02 mm) thick minimum.
    - c. Continuous coil-coated on exposed surfaces with specified finish coating and on concealed surfaces with specified concealed surfaces coating.
  - 2. Strippable Film: Apply to the exposed surface of finished coil to protect the finish during fabrication, shipping, and field handling. Strippable film to be removed as recommended by manufacturer.
- B. Exterior Metal Panels: Factory formed.
  - 1. Installation Direction:
    - a. As indicated on Drawings.
  - 2. Panel Width:
    - a. 12 inches, unless indicated otherwise on Drawings.
  - 3. Profiles:
    - a. Boxed Ribbed. See drawings for repeating pattern.
  - 4. Panel Depth:
    - a. 1-1/2 inch depth.
  - 5. Panel Edges: Concealed fastened and continuous interlocking edge.
    - a. Sealed with continuous sealant bead.
  - 6. Color: As selected by Architect from manufacturer's full range of colors.
- C. Movement and Expansion Joints: Same material, thickness and finish as metal panel and concealed fasteners. Accommodate movement within system without damage to components or deterioration of seals, movement within system; movement between system and perimeter components when subject to seasonal temperature cycling; dynamic loading and release of loads; and deflection of structural support framing.
- D. Provide continuity of air barrier and vapor retarder seal at building enclosure elements.



- E. Drainage: Provide positive drainage to exterior for moisture entering or condensation occurring within panel system.
- F. Internal and External Corners: Same material, thickness, and finish as metal panels; profile to suit system; shop cut and factory mitered to required angles; profile as indicated on Drawings, but not less than 3 inch returns.
- G. Trim, Closures, Caps, Flashings, Facias and Infills: Same material, thickness, and finish as metal panels; brake formed to required profiles.
- H. Fasteners to be concealed; self-tapping screws and other acceptable fasteners recommended by panel manufacturer; non-corrosion type compatible with materials being fastened and substrate. Where exposed fasteners are required for special trim conditions, fastener heads to be factory finished to match the finish of the adjacent material finish.
- I. Metal Framing Support System: Cold-formed metallic-coated steel sheet, ASTM A653/A653M, G90 (Z180).
  - 1. Metal thickness as indicated on Drawings, but not less than 0.06 inch/16 ga.
  - 2. Anchorage to be concealed, non-corrosive type and as required to comply with structural performance requirements, including specified deflection limitations; hat channel profile; appropriate to anchor panel system to building structure.

## 2.4 FABRICATION

- A. Form sections to shape indicated on Drawings, accurate in size, square, and free from distortion or defects.
- B. Form pieces in longest practicable lengths.

## 2.5 FACTORY APPLIED FINISH

- A. Exposed Surface Finish:
  - 1. AAMA 2605: 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, and 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 full range.
- B. Concealed Surface Finish: Manufacturer's standard coating, minimum 0.5 mil dry film thickness; compatible with finish system, as recommended by finish system manufacturer.

## 2.6 ACCESSORIES

- A. Underlayment Sheet: As indicated on Drawings; compatible with panel system manufacturer's panels and requirements; designed for exterior application.
- B. Gaskets: Manufacturer's standard type suitable for use with system, permanently resilient; ultraviolet and ozone resistant.
- C. Sealants to be as required by manufacturers of materials being sealed and may include:
  - 1. Exposed Sealant: Elastomeric; silicone, polyurethane, or silyl-terminated polyether/polyurethane as required by manufacturers of materials being sealed.
  - 2. Concealed Sealant: Non-curing butyl sealant or tape sealant.
  - 3. Seam Sealant: Factory-applied, non-skinning, non-drying type.
- D. Field Touch-up Paint: As recommended by panel manufacturer.
- E. Dissimilar Materials Separation: Separate dissimilar materials to prevent galvanic or other corrosive action by applying a permanent separator material. Separator material to be type that will remain in the concealed area of application without running, staining, or migrating



onto visible finish surfaces. Separator material must be acceptable to building component manufacturer and may include material such as a zinc molybdate alkyd coating, or a bituminous coating, or self-adhering rubberized asphalt sheet, or other permanent applied material as recommended by component manufacturer.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that building framing members or structural concrete or masonry walls are ready to receive panels.
- C. Verify that weather and air barriers and thermal insulation has been installed completely and correctly.

### **3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment used during installation.
- C. Install Underlayment:
  - 1. Install underlayment as indicated on Drawings.
  - 2. Weather lap edges 2 inches minimum and ends 6 inches minimum.
  - 3. Stagger vertical joints of each layer.
  - 4. Fasten securely to substrate with stainless steel fasteners.
- D. Install subgirts and support framing system as indicated on Drawings and as required by panel manufacturer for conditions and direction of panels. Securely fasten with stainless steel fasteners to substrate and framing members and shimmed and leveled to uniform plane. Space support framing at intervals indicated and not less than that required to achieve design for performance requirements.
- E. Dissimilar Materials Separation: Separate dissimilar materials to prevent galvanic or other corrosive action with permanent applied material as indicated in ACCESSORIES article in this Section. Where using applied coating, coat to minimum dry film thickness of 15 mil.

### **3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install metal panels and support system in accordance with Performance / Design Criteria and manufacturer's instructions.
- C. Protect surfaces in contact with cementitious materials and dissimilar metals with concealed bituminous paint. Allow to cure prior to installation.
- D. Fasten metal panels to structural supports; aligned, level, and plumb. Space fasteners maximum 24 inches on center either horizontally or vertically to suit application.
- E. Provide expansion joints where indicated.
- F. Use concealed fasteners unless otherwise approved by Architect.
- G. Seal and place gaskets to prevent weather penetration. Maintain neat appearance.

**3.4 ERECTION TOLERANCES**

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Offset from True Alignment Between Adjacent Members Butting or In Line:  
1/16 inch.
- C. Maximum Variation from Plane or Location Indicated on Drawings: 1/8 inch.

**3.5 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Remove site cuttings from finish surfaces.
- C. Clean surfaces of installed work in accordance with manufacturer's recommendations.

**3.6 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed work from damage.

**END OF SECTION**

**SECTION 07 42 13.23****METAL COMPOSITE MATERIAL WALL PANELS****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Exterior cladding system consisting of metal composite material (MCM) wall panels, secondary supports, and anchors to structure.
  - 2. Matching flashing and trim.
- B. Related Requirements:
  - 1. Section 05 40 00 - Cold-Formed Metal Framing: Stud wall framing system.
  - 2. Section 07 42 13 - Metal Wall Panels.
  - 3. Section 07 62 00 - Sheet Metal Flashing and Trim: Flashing and trim not within metal siding system.

**1.2 REFERENCES**

- A. American Architectural Manufacturers Association (AAMA):
  - 1. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
- B. American Society of Civil Engineers (ASCE):
  - 1. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- C. ASTM International (ASTM):
  - 1. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes; 2024.
  - 2. ASTM A480/A480M - Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip; 2023b.
  - 3. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
  - 4. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.
  - 5. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2023.
  - 6. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
  - 7. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
  - 8. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.
  - 9. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
  - 10. ASTM D523 - Standard Test Method for Specular Gloss; 2014, Reapproval 2018.
  - 11. ASTM D1781 - Standard Test Method for Climbing Drum Peel for Adhesives; 1998, Reapproval 2021.
  - 12. ASTM D1929 - Standard Test Method for Determining Ignition Temperature of Plastics; 2023.

13. ASTM D2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates; 2023.
  14. ASTM D4145 - Standard Test Method for Coating Flexibility of Prepainted Sheet; 2010, Reapproval 2022.
  15. ASTM D4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films; 2023.
  16. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
  17. 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.
  18. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000, Reapproval 2023.
- D. National Fire Protection Association (NFPA):
1. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components; 2023.

### 1.3 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate Work with placement of anchors.

### 1.4 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing 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 subcontractors.
  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.

### 1.5 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data:
  1. Submit data on each product to be used, including profile characteristics and dimensions, structural properties, thickness, physical characteristics, and finish.
  2. Submit data on panel system to be installed including structural capabilities and sealants.
- C. Shop Drawings:
  1. Shop drawings to be signed and sealed by professional engineer.
    - a. Design Data: Submit structural calculations stamped by design engineer; submit for project information and record.
  2. Indicate elevations and layout, panel profiles and thicknesses, spans, connections, details and location of joints, sealants and gaskets, fasteners and anchorage, supports,

- reinforcement, trim, flashings, accessories, expansion joints, construction details, drainage path to exterior, sequence of installation, color pattern and interface with adjacent materials.
3. Indicate substrates and adjacent work with which the wall system must be coordinated.
  4. Indicate panel numbering system.
  5. Differentiate between shop and field fabrication.
  6. Include large-scale details of anchorages and connecting elements.
  7. Include large-scale details or schematic, exploded or isometric diagrams to fully explain flashing, drainage system and interface with other building components.
  8. Include engineer's design for attachments and anchors.
- D. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of finishes and colors available for products with factory-applied finishes; include sealants; submit for Architect's initial selections.
1. Additionally, provide sample two feet by two feet in the actual style, color, composite material, and specified finish fabricated into four equal adjacent panels with actual mounting system showing typical mounting members, anchorage, expansion provisions, extrusion profiles, intersections, and panel accessories.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples on same product material type indicated for final Work; each sample 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Manufacturer's Installation Instructions: Submit special handling criteria, installation sequence, and cleaning procedures.
- G. Warranty sample(s).
- H. Certifications and Qualifications:
1. Manufacturer's Certificate: Certify that the work results of this Section meet or exceed specified requirements.
  2. Design Engineer's Qualification Statement.
  3. System Manufacturer's Qualification Statement.
  4. Installer's Qualification Statement.
  5. Testing Agency Qualification Statement.

## 1.6 QUALITY ASSURANCE

- A. Field Measurements: Verify actual dimensions by field measurement before fabrication; show recorded measurements on shop drawings.

## 1.7 QUALIFICATIONS

- A. Design Engineer's Qualifications: Design wall panel system, structural supports, and anchorages 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. System Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three (3) years documented experience and approved by Metal Composite Material (MCM) sheet manufacturer.
- C. Installer Qualifications: Company specializing in performing Work of this section with minimum three (3) years documented experience approved by system manufacturer.

## 1.8 MOCKUP

- A. Section 01 40 00 - Quality Requirements: Requirements for mockup.
- B. Construct mockup as specified and as indicated on Drawings including, but not limited to, panel system, attachments to building frame, sealants and seals, related flashings and accessory components, and sealed joints.
- C. Size: 10 ft long by 10 ft wide.
- D. Mockup location to be as directed by Architect.
- E. Incorporate mockup as part of Work if mockup is accepted by Architect.

## 1.9 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.
- C. 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.
- D. Prevent contact with materials capable of causing discoloration or staining.

## 1.10 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Wall System Warranty:
  - 1. Provide five (5) year joint written warranty by manufacturer and installer, agreeing to correct defects in manufacturing or installation.
- C. MCM Sheet Manufacturer's Finish Warranty: Provide manufacturer's written warranty for duration and performance indicated:
  - 1. Duration of Coverage:
    - a. Twenty (20) years minimum.
  - 2. Performance Coverage:
    - a. Chalking: No more than that represented by a No. 8 rating based on ASTM D4214.
    - b. Color Retention: No fading or color change greater than 5 Hunter color difference units, calculated in accordance with ASTM D2244.
    - c. Gloss Retention: Minimum of 30 percent gloss retention, when tested in accordance with ASTM D523.
    - d. No cracking, checking, peeling, or failure of paint to adhere to bare metal.

## PART 2 PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Wall Panel System: Metal panels, fasteners, supports, and anchors designed for installation of panel system project substrate construction and capable of maintaining specified performance without defects, damage, or failure.
- B. Provide structural design by or under direct supervision of a Structural Engineer licensed in the State in which the Project is located.
- C. Structural Performance: Design system and size system components and anchorage to safely withstand Live Loads, Dead Loads and Wind Loads as indicated on Drawings for the

Structural Design and in accordance with ASCE 7 and in compliance with the State Building Code for the State in which the project is located.

1. Design Pressure:
    - a. Minimum 35 lb/sq ft positive and 45 lb/sq ft negative.
  2. Maximum deflection of perimeter framing member of L/175 normal to plane of the wall; maximum deflection of individual panels of L/60.
  3. Maximum anchor deflection in any direction of 1/16 inch (1.6 mm) at connection points of framing members to anchors.
- D. Air Leakage: 0.06 cfm/sf, maximum with static pressure differentials of 1.57 psf, in accordance with ASTM E283/283M.
- E. Water Penetration: None with static pressure differentials of 15.00 psf, with water spray of 5 gal/hr/sf, for 15 minutes, in accordance with ASTM E331.
- F. 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.
- G. Movement: Accommodate movement within system without damage to system, components, or deterioration of seals; movement between system and perimeter components when subject to seasonal temperature cycling; dynamic loading and release of loads; deflection of structural support framing.
- H. Drainage: Provide positive drainage to exterior for moisture entering or condensation occurring within panel system.
- I. Tolerances: Accommodate tolerances of building structural framing.

## 2.2 MANUFACTURERS

- A. Manufacturers:
1. 3A Composites USA - Alucobond.
  2. ALPOLIC Metal Composite Materials by Mitsubishi.
  3. Alucoil North America, LLC - Alucoil.
  4. Arconic Architectural Products, LLC. - Reynobond.
  5. Citadel Architectural Products.
  6. Petersen Aluminum Corporation.
  7. Substitutions: Section 01 60 00 - Product Requirements.

## 2.3 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. Provide structural design by or under direct supervision of a Structural Engineer licensed in the State in which the Project is located.
  2. Manufacturer and installer to provide an engineered pressure relief system including, but not limited to, fabricated panels, jointing and weatherseal, extruded perimeter frames, drainage gutter, extrusions, clips, fasteners, anchors, spacers, trim, flashings, gaskets, sealant, and other system components.
  3. Provide concealed attachment of panels to supporting structure.
- B. Formed Wall Panel System: Rout and return edge panels. Panel pans formed of MCM sheet by routing back edges of sheet, removing corners, and folding edges. Reinforce corners with riveted aluminum angles.



1. Wet System Joints: Sealant-sealed system.
  - a. Basis of Design:
    - 1) Peterson Aluminum Corp, PAC-CLAD PAC-3000 RS

## 2.4 WALL PANELS

- A. Metal composite material (MCM) sheet.
  1. 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.
  2. Reinforce long panels as needed with metal angle braces 24 inches (610 mm) on center in short direction.
  3. For metallic finished panels, maintain consistent grain of MCM sheet; specifically, do not rotate sheet purely to avoid waste.
  4. Fabricate panels under controlled shop conditions.
  5. Fabricate forms, configurations, and sizes as indicated on Drawings and as recommended by MCM sheet manufacturer.
  6. Make panel lines, breaks, curves, and angles sharp and true.
  7. Keep plane surfaces free from warp or buckle.
  8. 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 to inside of panel system.

## 2.5 MATERIALS

- A. Metal Composite Material (MCM) Sheet: Two sheets of aluminum sandwiching a core of extruded thermoplastic material; no foamed insulation material content.
  1. Aluminum Sheet: 3003 alloy and temper.
  2. Core Material: Extruded thermoplastic.
  3. Overall Sheet Thickness:
    - a. 0.157 inch (4 mm), minimum.
  4. Face Sheet Thickness:
    - a. 0.024 inch (0.61 mm), minimum.
  5. Bond and Peel Strength: No adhesion 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.
  6. Surface Burning Characteristics: When tested in accordance with ASTM E84.
    - a. Flame Spread Index: Class A, index of 25, maximum.
    - b. Smoke Developed Index: Index of 450, maximum.
  7. Flammability: Self-ignition temperature of 650 degrees F 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 the applied loads applied and in compliance with applicable building code.
  2. Sheet Steel Components: ASTM A653/A653M galvanized to G90/Z275 or zinc-iron alloy-coated to A60/ZF180; or ASTM A792/A792M aluminum-zinc coated to AZ60/AZM180.
  3. Stainless Steel Sheet Components: ASTM A480/A480M.
  4. Aluminum Components: ASTM B209/B209M; or ASTM B221 (ASTM B221M).
  5. Refer to Section 05 40 00 for additional requirements on panel support framing.



## 2.6 FACTORY FINISH

- A. Factory Finish: To be as required to comply with the warranty requirements, approved by the coating manufacturer for the length of warranty specified for the project, and applied by manufacturing facility specializing in finish system indicated.
  - 1. Coating Flexibility: Pass ASTM D4145 minimum 1T Bend at time of manufacturing.
  - 2. Long-Term Performance: Not less than that specified for warranty requirements.
- B. Factory Coated Finish:
  - 1. 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 aluminum surfaces having minimum total dry film thickness (DFT) as follows:
    - a. DFT: 1.2 mils, 0.0012 inch (0.0305 mm).
- C. Color and Gloss: As selected by Architect from manufacturer's full range of colors and gloss.
  - 1. Full range of colors and gloss to include metallic finishes. Three different colors in total.
- D. Strippable Film: Apply to the top side of the painted coil to protect the finish during fabrication, shipping, and field handling. Strippable film to be removed as recommended by manufacturer.

## 2.7 ACCESSORIES

- A. Flashing: Sheet aluminum; factory finished to match MCM panel finish.
  - 1. Thickness: As indicated on Drawings, but not less than 0.040 inch (1.02 mm).
- B. Anchors, Clips and Accessories: Stainless steel complying with ASTM A276/A276M, ASTM A480/A480M, or ASTM A666.
- C. Fasteners:
  - 1. Exposed Fasteners: Stainless steel; finished to match fastened material.
    - a. Exposed fasteners permitted only where absolutely unavoidable and requires Architect's prior approval.
  - 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. Fasteners for Flashing and Trim: Blind fasteners of high-strength aluminum or stainless steel.
- D. Joint Sealant: Silicone type complying with ASTM C920 and as recommended by MCM sheet manufacturer and approved by system manufacturer and installer. Colors as selected by Architect for submitted samples.
- E. Bituminous Coating: Cold-applied asphalt mastic, noncorrosive compound free of asbestos, sulfur, and other deleterious impurities; 15 mil (0.4 mm) dry film thickness per coat.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify building framing members, substrates and components are acceptable and ready to receive panel system.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install panel system in accordance with manufacturer's instructions.
- C. Permanently fasten panel system to structural supports; aligned, level, and plumb, within specified tolerances.
- D. Attachment system is to allow for the free vertical and horizontal thermal movement due to expansion and contraction for a material temperature range of -20 degrees F (-29 degrees C) to +180 degrees F (+82 degrees C). Buckling of panels, opening of joints, undue stress on fasteners, failure of sealants or any other detrimental effects due to thermal movement are not permitted. Fabrication, assembly, and erection procedure are to account for the ambient temperature at the time of the respective operation.
- E. Anchor panels securely in accordance with manufacturer's recommendations and engineer's design.
- F. Drainage: Provide positive drainage to exterior for moisture entering or condensation occurring within panel system.
- G. Conform to panel manufacturer's instructions for installation of concealed fasteners.
- H. Do not install component parts that are observed to be defective, including warped, bowed, dented, scraped and broken members.
- I. Do not cut, trim, weld, or scrape component parts during erection in a manner that would damage the finish, decrease strength, or result in a visual imperfection or a failure in performance. Return component parts that require alteration to shop for refabrication, or for replacement with new component parts.
- J. For metallic finished panels, maintain consistent grain of MCM sheet; specifically, do not rotate sheet purely to avoid waste.
- K. Separate dissimilar metals. Use appropriate gaskets and fasteners to minimize corrosive or electrolytic action between metals.
- L. Seal joints to prevent weather penetration.

### 3.4 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Offset from Indicated Alignment Between Adjacent Members Abutting or In Line: 1/16 inch.
- C. Maximum Variation from Plane or Location Indicated on Drawings: 1/8 inch.
- D. Maximum Variation of Joint Width: 1/8 inch.

### 3.5 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Remove debris from finish surfaces and work area.

- C. Ensure weep holes and drainage channels are unobstructed and free of dirt and sealants.
- D. Remove temporary coverings and protection of adjacent work areas.
- E. Remove remaining protective film and masking materials after installation of joint sealers, after cleaning of adjacent materials, and immediately prior to completion of work.
- F. Clean installed products in accordance with manufacturer's instructions.
- G. Replace panels that have become damaged. Repair to minor damaged panels is subject to Architect's approval.

### **3.6 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed construction from damage.

**END OF SECTION**



**SECTION 07 42 93.13**  
**METAL SOFFIT PANELS**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Manufactured preformed metal soffit panels and suspension system.
- B. Related Requirements:
  - 1. Section 07 41 13 - Metal Roof Panels.
  - 2. Section 07 42 13 - Metal Wall Panels.
  - 3. Section 07 42 13.26 - Metal Composite Material Wall Panels.
  - 4. Section 07 62 00 - Sheet Metal Flashing and Trim.
  - 5. Section 07 90 00 - Joint Protection.

**1.2 REFERENCES**

- A. American Architectural Manufacturers Association (AAMA):
  - 1. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
- B. American Society of Civil Engineers (ASCE):
  - 1. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- C. ASTM International (ASTM):
  - 1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
  - 2. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2023.
  - 3. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
  - 4. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2018.

**1.3 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on panels and hanging system; include metal types, finishes, and characteristics.
- C. Design Data: Submit design calculations.
- D. Shop Drawings: Indicate dimensions, layout, joints, expansion joints, construction details, panel profiles, methods of anchorage, and interface with adjacent materials.
- E. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of finishes and colors available for products with factory-applied color finishes; submit for Architect's initial selections.
- F. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples on same product material type indicated

for final Work; each sample 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.

- G. Manufacturer's Installation Instructions: Submit special procedures.

#### 1.4 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum five (5) years documented experience.
- B. Installer: Company specializing in performing Work of this Section with minimum five (5) years documented experience and approved by manufacturer.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.
- C. Store prefinished material off ground and protected from weather. Prevent twisting, bending, or abrasion, and provide ventilation to stored materials. Slope metal sheets to ensure drainage.
- D. Prevent contact with materials that may cause discoloration or staining of products.

#### 1.6 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Furnish twenty (20) year manufacturer warranty to cover degradation of panel finish, including color fading caused by exposure to weather.
- C. Furnish five (5) year installer warranty to cover defects in water tightness and integrity of seals.

### PART 2 PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Design and size system components and support system to support wall panel system dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to soffit plane.
1. Wind Design Pressure:
    - a. As indicated on Drawings, in accordance with ASCE 7, and in accordance with the State Building Code for the State in which the project is located.
  2. Maximum Allowable Deflection of Panel: 1/180 of span.
- B. Thermal Movement: Allow for thermal movement from variations in both ambient and internal temperatures. Accommodate movement of support structure caused by thermal expansion and contraction.

#### 2.2 METAL SOFFIT PANELS

- A. Manufacturers:
1. AEP-Span.
  2. ATAS International, Inc.
  3. Berridge Manufacturing Company.

4. Dimensional Metal, Inc. (DMI).
  5. Fabral.
  6. McElroy Metal, Inc.
  7. Metal Roofing Systems, Inc.
  8. Petersen Aluminum Corporation (PAC).
- B. Basis of Design:
1. Petersen Aluminum Corporation (PAC).

## 2.3 COMPONENTS

- A. Precoated Metal Sheet:
1. Precoated Aluminum Sheet:
    - a. Comply with the following:
      - 1) ASTM B209/B209M, aluminum alloy and temper to be as required for structural performance requirements.
    - b. Thickness:
      - 1) 18 gauge (0.040 inch) (1.02 mm) thick minimum.
    - c. Continuous coil-coated on exposed surfaces with specified finish coating and on concealed surfaces with specified concealed surfaces coating.
  2. Strippable Film: Apply to the exposed surface of finished coil to protect the finish during fabrication, shipping, and field handling. Strippable film to be removed as recommended by manufacturer.
- B. Exterior Metal Panels: Factory formed.
1. Installation Direction:
    - a. As indicated on Drawings.
  2. Panel Width:
    - a. 12 inches, unless indicated otherwise on Drawings.
  3. Panel Depth:
    - a. 1 inch depth.
  4. Profiles:
    - a. Flush.
      - 1) Panel widths greater than 8 inches to have single V groove for stiffening.
  5. Panel Edges: Concealed fastened and continuous interlocking edge.
  6. Panel Venting Type:
    - a. Full-Vented type panels.
      - 1) All locations unless otherwise indicated on Drawings.
  7. Color: As selected by Architect from manufacturer's full range of colors.
- C. Trim, Closures, Caps, Flashings, Facias and Infills: Same material, thickness, and finish as metal panels; brake formed to required profiles.
- D. Fasteners to be concealed; self-tapping screws and other acceptable fasteners recommended by panel manufacturer; non-corrosion type compatible with materials being fastened and substrate. Where exposed fasteners are required for special trim conditions, fastener heads to be factory finished to match the finish of the adjacent material finish.
- E. Suspension System:
1. Steel main runners, hanger wires and hat channels; galvanized finish. Thickness and profile as required to support specified loads within specified Performance Requirements.
    - a. Minimum Requirements:
      - 1) Main Runners: Cold rolled channels, galvanized finish; 16 gauge, 1-1/2 inches deep.
      - 2) Hanger Wire: 12 gauge, galvanized, soft annealed steel wire.

- 3) Hat Channels: ASTM C645; 25 gauge, galvanized.

## 2.4 FABRICATION

- A. Form sections to shapes indicated on Drawings, accurate in size, square, and free from distortion or defects.
- B. Form pieces in longest practicable lengths.

## 2.5 FACTORY APPLIED FINISH

- A. Exposed Surface Finish:
  - 1. AAMA 2605: 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, and 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 full range.
- B. Concealed Surface Finish: Manufacturer's standard coating, minimum 0.5 mil dry film thickness; compatible with finish system, as recommended by finish system manufacturer.

## 2.6 ACCESSORIES

- A. Sealants: Silicone type as specified in Section 07 90 00 - Joint Protection.
- B. Field Touch-up Paint: As recommended by material manufacturer.
- C. Separator for Dissimilar Materials: Separate dissimilar materials to prevent galvanic, chemical, and other corrosive action by applying a permanent separator material.
  - 1. Separator Material Requirements:
    - a. Permanent type that will remain concealed in the applied location without running, staining, or migrating onto visible finish surfaces.
    - b. Material approved by manufacturers of materials being separated.
  - 2. Separator material may include the following if it complies with the indicated separator material requirements.
    - a. Zinc molybdate alkyd coating, minimum dry film thickness of 15 mil.
    - b. Bituminous coating, minimum dry film thickness of 15 mil.
    - c. Self-adhering rubberized asphalt sheet.
    - d. Other permanent separator material complying with indicated requirements.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify building framing members are ready to receive soffit panel system.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Dissimilar Materials: Provide permanent separation of dissimilar materials. Refer to ACCESSORIES article in this Section.



**3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install metal panels and support system in accordance with Performance / Design Criteria and manufacturer's instructions.
- C. Protect surfaces in contact with cementitious materials and dissimilar metals with concealed bituminous paint. Allow to cure prior to installation.
- D. Main Runners: Suspend from building structure; parallel to soffit panels installation; spaced not greater than 48 inches o.c.
- E. Hat Channels: Secure perpendicular to main runners as required for attachment of metal panels and spaced not greater than 24 inches o.c.
- F. Add struts as required to resist upward pressure.
- G. Fasten metal panels to suspension system; aligned and level.
- H. Use concealed fasteners unless otherwise approved by Architect.
- I. Seal to prevent weather penetration. Maintain neat appearance.

**3.4 ERECTION TOLERANCES**

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Offset from Indicated Alignment Between Adjacent Members Butting or In Line: 1/16 inch.
- C. Maximum Variation from Plane or Location Indicated on Drawings: 1/8 inch.

**3.5 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Remove site cuttings from finish surfaces.
- C. Clean and wash prefinished surfaces with mild soap and water. Rinse with clean water.
- D. Upon completion of installation, thoroughly clean prefinished surfaces in accordance with manufacturer's recommendations.

**3.6 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
  - 1. Protect installed Work from damage.

**END OF SECTION**



**SECTION 07 54 23****THERMOPLASTIC-POLYOLEFIN ROOFING (ADHERED)****PART 1 GENERAL****1.1 SUMMARY**

- A. Work Includes:
  - 1. Install a fully adhered, thermoplastic-polyolefin (TPO) membrane and flashings to provide a permanently watertight roofing system.
- B. Related Requirements:
  - 1. Section 06 10 53 - Miscellaneous Rough Carpentry.
  - 2. Section 07 22 16.10 - Roof Insulation For Membrane Roofing.
  - 3. Section 07 62 00 - Sheet Metal Flashing and Trim.
  - 4. Section 07 72 00 - Roof Accessories.
  - 5. Section 07 72 33 - Roof Hatches.
  - 6. Division 23 - Mechanical (HVAC) for Section related to roof mounted equipment.

**1.2 REFERENCES**

- A. American Society of Civil Engineers (ASCE):
  - 1. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures, Most Recent Edition Cited by Referring Code or Reference Standard.
- B. ASTM International (ASTM):
  - 1. ASTM C1549 - Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer; 2016, Reapproval 2022.
  - 2. ASTM D751 - Standard Test Methods for Coated Fabrics; 2019.
  - 3. ASTM D6754/D6754M - Standard Specification for Ketone Ethylene Ester Based Sheet Roofing; 2023.
  - 4. ASTM D6878/D6878M - Standard Specification for Thermoplastic Polyolefin Based Sheet Roofing; 2021.
  - 5. ASTM D7635/D7635M - Standard Test Method for Measurement of Thickness of Coatings Over Fabric Reinforcement; 2018.
- C. Cool Roofs Rating Council (CRRC):
  - 1. CRRC (DIR) - Cool Roofs Rating Council Directory; Current Edition.
  - 2. CRRC-1 - Roof Product Rating Program Manual; 2024.
- D. Factory Mutual (FM):
  - 1. FM (AG) - FM Approval Guide; Current Edition.
  - 2. FM DS 1-28 - Wind Design; 2015, with Editorial Revisions 2024.
- E. International Code Council, Inc. (ICC); International Building Code (IBC):
  - 1. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. Underwriters Laboratories Inc. (UL):
  - 1. UL (DIR) - Online Certifications Directory; Current Edition.
  - 2. UL (FRD) - Fire Resistance Directory; Current Edition.

**1.3 PRE-INSTALLATION MEETINGS**

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.

- B. Convene one week before starting work of this Section. Review preparation and installation procedures and coordinating and scheduling required with related work.
- C. Meeting is to include coordination of requirements for roofing insulation and roofing membrane as a complete roofing system.
- D. Meeting Agenda: Agenda is to include organizational structure for personnel Installer, subcontractors, materials suppliers, and the Project Manager; channels and procedures for communication; construction schedule, including sequence of critical work; Contract Documents, including distribution of required copies of Contract Documents and revisions; processing of submittals; rules and regulations governing performance of the Work and procedures for safety, first aid, security, quality control, housekeeping and related matters.

#### 1.4 SUBMITTALS

- A. Refer to Section 01 33 00 - Submittal Procedures for Submittals.
- B. Submittals for roofing insulation, overlay, and barrier components of the roofing system are to coincide with the submittal of the roofing membrane as a complete roofing system.
- C. Product Data: Submit complete data sheets, including characteristics on membrane materials, adhesives, seaming materials, flashing materials, and insulation components.
- D. Shop Drawings: Submit complete set of shop drawings indicating all installation details required for the roofing system installation. Note all additional required materials, including joint and termination detail conditions, cants, and conditions of interface with other materials. Indicate membrane layout and seam locations. Shop drawings must be sealed, signed, and dated by an engineer registered in the State in which the project is located.
- E. Submit documentation of approved, tested roof system indicating compliance with requirements indicated in PERFORMANCE REQUIREMENTS article in this Section.
- F. Manufacturer's qualification statement.
- G. Installer's qualification statement.
- H. Manufacturer's Certificate: Certify products meet or exceed specified requirements.
- I. Installer's Certificate: Certify products meet or exceed specified requirements.
- J. Manufacturer's Installation Instructions:
  - 1. Include special precautions required for seaming membrane.
  - 2. If color application is required, include installation instructions.
- K. Warranty sample(s).

#### 1.5 QUALITY ASSURANCE

- A. Single-Source Responsibility: The requirements of this Section are to be coordinated and executed by the same company as the requirements specified in Section 07 22 16.10 - Roofing Insulation for Membrane Roofing as an integral part of the overall roofing system.
- B. Manufacturer Requirements:
  - 1. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section with minimum ten (10) years of documented experience.
  - 2. Manufacturer must have a written Contractor/Installer approval program.
  - 3. The product must have a continuous manufacturing history with the current product formulation of no less than ten (10) years in the United States of America.
  - 4. Membrane Manufacturer's Technical Representative: Monthly interim inspections and reporting; punch list inspection and report; final inspection and report.

Manufacturer's technical representative is to provide a copy of reports to Owner, Architect and Roofing Designer within four (4) days of each inspection.

- C. Manufacturer's Field Services: During construction and until substantial completion, manufacturer's representative shall perform quality assurance site visits every ten working days to ensure materials are being properly installed and as required to obtain the specified warranty.
1. The first site visit shall be performed within the first three (3) days of operations.
  2. Notify the Architect, Roofing Designer and Owner of all site visits. Submit reports of findings to the Architect, Roofing Designer and Owner within one week of inspection. Payment applications will be subject to rejection until applicable reports are received.
  3. Inspections to be performed by an employee of the selected manufacturer that is assigned full time to their technical services department. Sales personnel will not be acceptable for this function.
  4. Notify the Architect, Roofing Designer and Owner of the Manufacturer's final inspections. A minimum of seven (7) days written notice is required. If required notification is not provided and the Architect, Roofing Designer or Owner wish to attend, the Architect, Roofing Designer and Owner may require reinspections by the Manufacturer's inspector at no additional cost to the Owner.
- D. Installer Requirements:
1. Installer Qualifications: Company specializing in performing work of this section with at least five (5) years of documented experience and approved by manufacturer.
  2. This roofing system shall be installed only by an Installer authorized by the membrane manufacturer prior to bid.
  3. Application of the roofing system shall be accomplished by a primary roofing Installer, Installer's roofing foreperson, and sufficient Installer technicians trained and approved by the manufacturer of the roofing membrane. Installer is to submit evidence of qualification from the manufacturer.
  4. Installer of the work of this Section is to be the same as the Installer of the work of Roofing Insulation, and Sheet Metal and Trim as specified in Division 07 - Thermal and Moisture Protection.
- E. Upon completion of the installation an inspection shall be made by a representative of the membrane manufacturer to review the installed roof system and list all deficiencies.
- F. There are to be no deviations made from the Contract Documents without prior written approval by the Architect or Owner and the membrane manufacturer.
- G. All work shall be completed by personnel trained and authorized by the membrane manufacturer.
- H. Provide manufacturer written verification indicating all seams have been probed and are watertight.

## 1.6 DELIVERY, STORAGE AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. All products delivered to the job site shall be in the original unopened containers or wrappings bearing all seals and approvals.
- C. Handle all materials to prevent damage. Place all materials on pallets and fully protect from moisture.
- D. Follow manufacturer's requirements for storing membrane rolls. Membrane rolls shall be stored lying down on pallets and fully protected from the weather with clean canvas

tarpaulins. Unvented polyethylene tarpaulins are not accepted due to the accumulation of moisture beneath the tarpaulin in certain weather conditions that may affect the ease of membrane weldability.

- E. All adhesives shall be stored at temperatures required by the manufacturer.
- F. All flammable materials shall be stored in a cool, dry area away from sparks and open flames. Follow precautions outlined on containers or supplied by material manufacturer/supplier.
- G. All materials which are determined to be damaged by the Architect, Roofing Designer, Owner, or membrane manufacturer are to be removed from the job site and replaced at no cost to the Owner.

## 1.7 ENVIRONMENTAL REQUIREMENTS

- A. Roofing shall not be applied during precipitation.
- B. Only as much of the new roofing as can be made weathertight each day, including all flashing and detail work, shall be installed. All seams shall be cleaned, and heat welded before leaving the job site that day.
- C. All work shall be scheduled and executed without exposing the interior building areas to the effects of inclement weather.
  - 1. The existing building and its contents shall be protected against all risks.
- D. All surfaces to receive insulation, membrane, or flashings shall be dry. Should surface moisture occur, provide the necessary equipment to dry the surface prior to application of subsequent materials.
- E. All new and temporary construction, including equipment and accessories, shall be secured in such a manner as to preclude wind blow-off and subsequent roof or equipment damage.
- F. Uninterrupted waterstops shall be installed at the end of each day's work and shall be completely removed before proceeding with the next day's work. Waterstops shall not emit dangerous or unsafe fumes and shall not remain in contact with the finished roof as the installation progresses. Contaminated membrane shall be replaced at no cost to the Owner.
- G. Arrange work sequence to avoid use of newly constructed roofing as a walking surface or for equipment movement and storage. Where such access is absolutely required, the Applicator shall provide all necessary protection and barriers to segregate the work area and to prevent damage to adjacent areas. A protection layer of plywood over insulation board shall be provided for all new and existing roof areas that receive rooftop traffic during construction.
- H. Prior to and during application, all dirt, debris, and dust shall be removed from surfaces, either by vacuuming, sweeping, blowing with compressed air, and/or similar methods.
- I. Contaminants, such as grease, fats, oils, and solvents, shall not be allowed to contact the roofing membrane.
- J. The roofing membrane shall not be installed under the following conditions without consulting the membrane manufacturer's technical department for precautionary steps:
  - 1. The roof assembly permits interior air to pressurize the membrane underside.
  - 2. Any exterior wall has 10 percent or more of the surface area comprised of opening doors or windows.
  - 3. The wall/deck intersection permits air entry into the wall flashing area.
- K. Precautions shall be taken when using membrane adhesives at or near rooftop vents or air intakes. Adhesive odors could enter the building. Coordinate the operation of vents and air

intakes in such a manner as to avoid the intake of adhesive odor while ventilating the building. Always maintain lid covering on unused cans.

## 1.8 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Each warranty is to expressly acknowledge that issuance is after warranty provider's final inspection of installed roofing system.
- C. Manufacturer's Warranty: Manufacturer agrees to provide materials and labor to promptly repair or replace components of roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks or breaches in roofing system that allows moisture to enter the substrate below, even if visible leaks are not observed within the facility. Warranty to be non-pro-rated and without monetary limitation or deductibles. Warranty to include insulation, membrane, sheathing board, thermal barrier, roof vapor barrier, overlayment cover board, insulation fasteners, mastics, adhesives, metal copings and edge metal, metal flashings, flashings, sealants, and base flashings. Warranties requiring the Owner's signature will not be acceptable.
  - 1. Warranty Period:
    - a. Thirty (30) years from date of Final Acceptance.
- D. Installer's Warranty: Roof System Warranty to cover workmanship for all work of this Section and roof insulation components including, but not limited to, installation of roofing insulation components such as sheathing boards, vapor retarders, insulation boards, cover boards, roofing membrane, flashings, metal work, roofing accessories and attachment construction.
  - 1. Warranty Period: Five (5) years from date of Final Acceptance.

## PART 2 PRODUCTS

### 2.1 PERFORMANCE AND DESIGN REQUIREMENTS

- A. Roofing system to meet or exceed the following:
  - 1. Roof Covering External Fire Resistance Classification: UL (DIR) certified Class A.
  - 2. Factory Mutual Classification: Class 1 and windstorm resistance of 1-90.
- B. Wind Design:
  - 1. Install roofing system to meet or exceed the requirements of the current adopted version of ASCE-7, and State Building Code in the State in which the project is located. Refer to Structural Drawings for design loads for this project.

### 2.2 ROOFING INSULATION MATERIALS

- A. Insulation system materials are to be manufactured or approved by roof membrane manufacturer as integral part of overall roofing system.
- B. Comply with requirements indicated in Section 07 22 16.10 - Roof Insulation For Membrane Roofing.

### 2.3 ROOFING MEMBRANE MATERIALS

- A. Manufacturers:
  - 1. Carlisle SynTec Systems.
  - 2. Firestone Building Products.
  - 3. GAF Corporation.
  - 4. GenFlex Roofing Systems.

5. Johns Manville.
  6. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Roof Membrane: Thermoplastic-polyolefin (TPO) membrane complying with ASTM D6878/D6878M; polyester reinforcement and factory applied fleece backing.
1. Sheet Total Thickness: Tested in accordance with ASTM D751.
    - a. 80 mil, 0.080 inch (2 mm), minimum.
  2. Sheet Thickness Above Reinforcing Fabric Scrim: Minimum 36 percent of sheet total thickness, measured in accordance with ASTM D7635/D7635M.
  3. Sheet Width: 10 feet (3.048 m).
  4. Sheet Color and Solar Reflectance: Minimum value when tested in accordance with ASTM C1549 and listed by CRRC (DIR). Field applied coating cannot be used to achieve indicated values.
    - a. White: Initial SR value of 0.76. Three-year aged SR value of 0.68.
  5. Basis of Design:
    - a. GAF Corporation - EverGuard Extreme TPO.
- C. Flashing:
1. Reinforced 80 mil thick, TPO membrane for walls and curbs.
  2. Unsupported 80 mil. thick, TPO membrane shall be supplied for field fabricated vent stacks, pipes, drains and corners.
  3. Manufacturer to be same as Roof Membrane manufacturer.
- D. Fully Adhered Low-Profile Expansion Joint: Provide flat, vulcanized waterproofing joint integral with the waterproofing membrane to accommodate movements up to plus or minus 1 inch, and capable of 500 percent elongation at - 40 degrees F across its length and at all vulcanized points. All details and connections to be factory fabricated by means of vulcanization for one-piece installation.

## 2.4 ASSOCIATED MATERIALS

- A. Adhesive: Shall be membrane manufacturer's solvent based reactivating type.
- B. T-joint Patch: Shall be membrane manufacturer's circular patch welded over T-joints formed by overlapping thick membranes.
- C. Corner Flashing: Shall be membrane manufacturer's pre-formed inside and outside flashing corners that are heat-welded to membrane or polymer clad metal base flashings.
- D. Termination Bar: Shall be manufacturer's 1/8 inch by 1 inch, mill finish, extruded aluminum bar with pre-punched slotted holes.
- E. Sealant: Shall be manufacturer's multi-purpose sealant.
- F. Fasteners:
1. Concrete and Masonry Flashing Membrane Termination Anchors:
    - a. 1/4 inch diameter metal based expansion anchor with stainless steel pin of length required to penetrate substrate a minimum of 1-1/2 inches.
    - b. Masonry screws to be approved by membrane manufacturer, 1/4 inch minimum diameter, corrosion resistant, with Phillips flat head. Length required to provide minimum 1.5 inches embedment into substrate.
  2. Solid Concrete Deck Fasteners and Plates: Shall be nail-in, non-threaded fasteners with split bulb tip designed for securement of membrane and insulation to structural concrete roof decks, length required to penetrate deck a minimum of 1 inch with plates as approved by roof membrane manufacturer.



- G. Primary Membrane Cleaner: Shall be a high quality solvent cleaner provided by membrane manufacturer and approved by Architect or Roofing Designer for use as a general membrane cleaner.
- H. Pre-weld Cleaner: Shall be a high quality solvent based seam cleaner with moderate evaporation rate provided by membrane manufacturer.
- I. Walkway Pad: Shall be walkway pad by membrane manufacturer. Color shall differ from the roofing membrane sheet.
- J. Polymer Clad Metal: Refer to Section 07 62 00 - Sheet Metal Flashing and Trim.

## **PART 3 EXECUTION**

### **3.1 SUBSTRATE PREPARATION**

- A. Verify that the substrate is dry, clean, smooth, and free of loose material, oil, grease, or other foreign matter. Sharp ridges and other projections and accumulations of bitumen shall be removed to ensure a smooth surface before roofing.
- B. Any deteriorated substrate shall be repaired.
- C. Beginning installation means acceptance of prepared substrate.
- D. Provide necessary protection from adhesive vapors to prevent interaction with foamed plastic insulation.

### **3.2 MEMBRANE INSTALLATION**

- A. Install specified sheathing, barriers, insulation, and overlay components of roofing system prior to installing roofing membrane component.
  - 1. The installation of the substrate and components is to be inspected prior to installation of the roofing membrane. The substrate is to be clean, dry, free from debris and smooth with no surface roughness or contamination. Broken, delaminated, wet or damaged components are to be removed and replaced prior to installation of the roofing membrane.
- B. Membrane installation to be fully adhered and in compliance with the manufacturer's requirements and as indicated in this Section.
- C. Position membrane over the properly installed and prepared substrate.
- D. Fold membrane back lengthwise so half the underside of the membrane is exposed.
- E. Adhesive shall be applied using solvent-resistant 3/4 inch nap paint rollers. The adhesive shall be applied to the substrate and back side of the membrane at a rate according to the membrane manufacturer's requirements. Apply the adhesive smooth and even coatings with no gaps, globs, puddles, or similar inconsistencies. Allow the adhesive to dry until it is tacky but will string or stick to a dry finger touch.
  - 1. The Applicator is to maintain daily record of adhesive amount used per area per day to verify conformance to the specified adhesive rate.
  - 2. No adhesive shall be applied in seam areas. All membrane shall be applied in the same manner.
- F. Roll the adhesive coated membrane into the coated substrate while avoiding wrinkles. Brush down the bonded section of the membrane immediately after rolling the membrane into the adhesive with a soft bristle broom to achieve maximum contact.
- G. Fold back the unbounded half of the sheet lengthwise and repeat the bonding procedures. This process is repeated throughout the roof area.

- H. Position adjoining sheets to allow a minimum overlap of 2 inches and hot-air weld.
- I. Weld membrane cover strips at all felt-back membrane seams without a factory selvage edge.
- J. Terminate membrane at all walls as indicated on Drawings.
  - 1. Concrete/Masonry Substrate: Membrane shall be turned up wall one inch and mechanically terminated using approved anchors eight inches on center with a termination bar.
- K. Terminate membrane at all penetrations as indicated on Drawings.
  - 1. Membrane shall be terminated six inches on center or a minimum of four fasteners per penetration into the structural deck using fasteners and plates as approved by the membrane manufacturer for the deck substrate.
- L. Membrane shall extend over roof edge a minimum of 2 inches below the perimeter wood blocking. If fleece-back membrane is utilized, trim membrane flush with outside edge of roof and hot-air weld a non-fleece back flashing membrane to extend over the roof edge.

### 3.3 FLASHING INSTALLATION

- A. General:
  - 1. Provide adhesives and flashing materials that are compatible with substrate.
  - 2. Flashings shall be installed concurrently with the roof membrane as the job progresses.
  - 3. No temporary flashings shall be allowed without the prior written approval of the Architect or Roofing Designer, and Manufacturer. Approval shall only be for specific locations on specific dates. If any water is allowed to enter under the newly completed roofing, the affected area shall be removed and replaced at no cost to the Owner.
  - 4. Seams shall not be "taped" as temporary measure but shall be fully completed before the end of each day.
  - 5. Flashing shall be adhered to compatible, dry, smooth, and solvent-resistant surfaces.
  - 6. Do not allow adhesive fumes are not drawn into the building.
- B. Adhesive for Flashing Membrane:
  - 1. Over the properly installed and prepared flashing substrate, flashing adhesive shall be applied according to manufacturer's written instructions. Apply the membrane adhesive in smooth and even coats with no gaps, globs, or similar inconsistencies.
  - 2. Only an area which can be completely covered in the same day's operations shall be flashed. The bonded sheet shall be pressed firmly in place with a hand roller.
  - 3. No adhesive shall be applied in seam areas that are to be welded. All panels of membrane shall be applied in the same manner, overlapping the edges of the panels required by welding techniques.
- C. All flashings shall be mechanically terminated at a minimum of 8 inches above the finished roofing surface using approved fasteners and counterflashing bar unless otherwise indicated on the Drawings. Flashing heights less than 8 inches shall be accepted in writing by the Manufacturer's Technical Department.
- D. All flashing membranes shall be consistently adhered to substrates. All interior and exterior corners and miters shall be cut, and hot-air welded into place. No bitumen shall be in contact with the roof membrane.
- E. All flashings shall be hot-air welded at their joints and at their connections with the (roof) membrane.
- F. All flashings that exceed 30 inches (0.75 m) in height shall receive additional securement. Consult Manufacturer's Technical Department for securement methods.

- G. Corners shall be flashed using the membrane manufacturer's pre-formed corners.
- H. Polymer Clad sheet metal incorporated into the roofing system shall be sealed off with a heat welded stripping ply. The stripping ply shall extend four inches beyond sheet metal onto roof membrane and fit closely to fit closely to edge of sheet metal.
- I. Soil Pipe/Pipe Penetration:
  - 1. Provide field wrapped pipe penetration flashing.
  - 2. Apply aluminum tape to penetration if asphalt contamination is present.
  - 3. Extend existing pipe to obtain a minimum 8 inches finished flashing height.
  - 4. Cut existing pipe to obtain a maximum 12 inches finished flashing height.
  - 5. Horizontal flashing membrane shall be hot-air welded a minimum of four inches onto the membrane.
  - 6. Vertical flashing membrane shall be fully adhered to pipe penetration and extend a minimum of 1.5 inches horizontally at the base of penetration. Hot-air weld vertical flashing membrane to horizontal flashing membrane.
  - 7. Install stainless steel draw band and sealant or hot-air weld flashing cap to terminate top edge of pipe flashing.

### 3.4 HOT-AIR WELDING OF SEAM OVERLAPS

- A. General:
  - 1. All seams shall be hot-air welded. Seam overlaps should be 3 inches (75 mm) wide when automatic machine-welding and 4 inches (100 mm) wide when hand-welding, except for certain details.
  - 2. Welding equipment shall be provided by or approved by the membrane manufacturer. All mechanics intending to use the equipment shall have successfully completed a training course provided by a membrane manufacturer's technical representative prior to welding.
  - 3. All membrane to be welded shall be clean and dry.
- B. Hand-Welding:
  - 1. Hand-welded seams shall be completed in two stages. Hot-air welding equipment shall be allowed to warm up for at least one minute prior to welding.
  - 2. The back edge of the seam shall be welded with a narrow but continuous weld to prevent loss of hot air during the final welding.
  - 3. The nozzle shall be inserted into the seam at a 45 degree angle to the edge of the membrane. Once the proper welding temperature has been reached and the membrane begins to "flow," the hand roller is positioned perpendicular to the nozzle and pressed lightly. For straight seams, the 1-1/2 inches (40 mm) wide nozzle is recommended for use. For corners and compound connections, the 3/4 inch (20 mm) wide nozzle shall be used.
- C. Machine Welding:
  - 1. Machine welded seams are achieved using automatic welding equipment. When using this equipment, instructions from the manufacturer shall be followed and local codes for electric supply, grounding and over current protection observed. Dedicated circuit house power or a dedicated portable generator is recommended. No other equipment shall be operated off the generator.
  - 2. Metal tracks may be used over the deck membrane and under the machine welder to minimize or eliminate wrinkles.
- D. Quality Control of Welded Seams:
  - 1. The Applicator shall check all welded seams for continuity using a rounded screwdriver. Visible evidence that welding is proceeding correctly is smoke during the welding operation, shiny membrane surfaces, and an uninterrupted flow of dark grey

material from the underside of the top membrane. On-site evaluation of welded seams shall be made daily by the Applicator to locations as directed by the Designer or membrane manufacturer's representative. One inch (25 mm) wide cross-section samples of welded seams shall be taken at least three times a day. Correct welds display failure from shearing of the membrane prior to separation of the weld. Each test cut shall be patched by the Applicator at no extra cost to the Owner.

- E. Provide cut edge sealant over all cut edges of reinforced membrane after seam probing has been completed.
- F. Install T-joint patch at all T-seam locations.

### **3.5 WALKWAY PAD INSTALLATION**

- A. Install walkway pads at locations indicated on Drawings and at all roof access ladders, hatches, stairs, and doors with pathways leading to and around all mechanical equipment.
- B. Roofing membrane to receive walkway pad shall be clean and dry.
- C. Place chalk lines on deck sheet to indicate location of Walkway.
- D. Apply a continuous coat of membrane adhesive to the deck sheet and the back of walkway pad in accordance with membrane Manufacturer's technical requirements and press walkway pad into place with a water-filled, foam-covered lawn roller.
- E. Clean the deck membrane in areas to be welded. Hot-air weld the entire perimeter of the walkway to the roofing membrane.
- F. Check all welds with a rounded screwdriver. Re-weld any inconsistencies.
- G. Check all existing membrane seams that are to be covered by walkway with rounded screwdriver and re-weld any inconsistencies before walkway installation.

### **3.6 TEMPORARY CUT-OFF**

- A. All flashings shall be installed concurrently, with the membrane to maintain a watertight condition as the work progresses.
- B. When a break in the day's work occurs in the central area of the project install a temporary watertight seal. An 8 inches strip of flashing membrane shall be welded 4 inches to the new field membrane. The remaining 4 inches of flashing membrane shall be sealed to the deck and/or the substrate so that water will not be allowed to travel under the new or existing membrane. The edge of the membrane shall be sealed in a continuous heavy application of pourable sealer of 6 inches width. When work resumes, the contaminated membrane shall be removed and disposed of. None of these materials shall be reused in the new work.
- C. If inclement weather occurs while a temporary water stop is in place, provide the labor necessary to monitor the situation to maintain a watertight condition.
- D. If any water is allowed to enter under the newly completed system, the affected area shall be removed and replaced at no cost to the Owner.

### **3.7 MANUFACTURER'S FIELD SERVICES**

- A. Section 01 40 00 - Quality Requirements: Manufacturer's field services.
- B. Refer to QUALITY ASSURANCE article in Part 1 of this Section for requirements.

### **3.8 CLEANING AND PROTECTION**

- A. Protect the roof from construction related damages during the Work.

- B. Remove trash and debris from the roof daily.
- C. Metal scraps, nails, screws, and other sharp damaging debris shall be kept off the roof membrane surface during construction.
- D. Remove excess adhesive, sealant, stains, and residue from the membrane and flashing surfaces.
- E. Repair, or remove and replace damaged membrane, flashings, and other roofing components. Repairs shall be in accordance with the membrane manufacturer's repair instruction to comply with the specified warranty.
- F. Remove temporary coverings and masking protection from adjacent work areas upon completion. Remove construction debris from the project site on a planned and regular basis.

**END OF SECTION**



**SECTION 07 62 00**  
**SHEET METAL FLASHING AND TRIM**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
1. Fabrication and installation of sheet metal flashings and trim to provide permanently watertight conditions. Items include:
    - a. Coping Caps.
    - b. Roof Edge.
    - c. Flashings.
    - d. Counterflashings.
    - e. Counterflashing Receivers.
    - f. Fascia.
    - g. Through Wall Scupper with exterior escutcheon.
    - h. Other items as indicated on Drawings.
  2. Sealants for joints within sheet metal fabrications.
- B. Related Requirements:
1. Section 04 20 00 - Unit Masonry: Metal flashings embedded in masonry.
  2. Section 04 72 00 - Cast Stone Masonry.
  3. Section 06 10 53 - Miscellaneous Rough Carpentry.
  4. Division 07 - Thermal and Moisture Protection: Roofing, gutters, downspouts, roof accessories, roof hatches, and joint protection.
  5. Division 08 - Opening: Metal flashings for curbs of skylights and similar openings.

**1.2 REFERENCES**

- A. American Architectural Manufacturers Association (AAMA):
1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2020.
  2. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
  3. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
  4. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
- B. American National Standards Institute (ANSI); Single Ply Roofing Industry (SPRI); Factory Mutual (FM):
1. ANSI/SPRI/FM 4435/ES-1 - Test Standard for Edge Systems Used with Low Slope Roofing Systems; 2022.
- C. ASTM International (ASTM):
1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
  2. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.
  3. ASTM B32 - Standard Specification for Solder Metal; 2020.

4. ASTM B101 - Standard Specification for Lead-Coated Copper Sheet and Strip for Building Construction; 2022.
  5. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
  6. ASTM B370 - Standard Specification for Copper Sheet and Strip for Building Construction; 2022.
  7. ASTM B749 - Standard Specification for Lead and Lead Alloy Strip, Sheet, and Plate Products; 2020.
  8. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
  9. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2017.
  10. ASTM D1005 - Standard Test Method for Measurement of Dry-Film Thickness of Organic Coatings Using Micrometers; 1995, Reapproval 2020.
  11. ASTM D1654 - Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments; 2008, with Editorial Changes 2017.
  12. ASTM D2178/D2178M - Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing; 2015a, Reapproval 2021.
  13. ASTM D2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates; 2023.
  14. ASTM D4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films; 2023.
  15. ASTM D4479/D4479M - Standard Specification for Asphalt Roof Coatings - Asbestos-Free; 2012, Reapproval 2018.
  16. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2012, Reapproval 2018.
  17. ASTM D7091 - Standard Practice for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to Ferrous Metals and Nonmagnetic, Nonconductive Coatings Applied to Non-Ferrous Metals; 2022.
- D. National Roofing Contractors Association (NRCA):
1. NRCA (RM) - The NRCA Roofing Manual; 2024.
- E. Sheet Metal and Air Conditioning Contractors National Association (SMACNA):
1. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

### 1.3 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week before starting work of this Section and in conjunction with roofing pre-installation meeting.

### 1.4 SUBMITTALS

- A. See Section 01 33 00 - Submittal procedures.
- B. Product Data: Submit product data for materials specified certifying compliance with specified requirements.
- C. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.
- D. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of finishes and colors available for products with factory-applied finishes; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples on same product material type indicated



for final Work; each sample 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.

- F. Samples of Fabrications: Fabricate and submit one sample of each of the following illustrating configuration, dimensions, finishes, joinery, bends, corners, fasteners, seals, concealed surfaces finish and include material to be used as separator for contact with dissimilar construction materials.
1. Coping Cap Corner, assembled.
  2. Roof Edge.
  3. Counterflashing and Counterflashing Receiver, assembled.
  4. Fascia.
  5. Exposed Fasteners.
  6. Through Wall Scupper with exterior Escutcheon.

### 1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Company specializing in sheet metal work with ten (10) years of documented experience.
- B. Installer Qualifications: Company specializing in sheet metal work with ten (10) years of documented experience.
1. Installer to be same as installer of the roofing system indicated in Division 07 - Thermal And Moisture Protection.

### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Store material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage. Ensure materials remain dry, covered and not in contact with the ground.
- C. Prevent contact with materials that could cause discoloration or staining. Protect stored materials from damage and contamination with moisture or foreign matter.

### 1.7 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after installation of Work.
- B. Protect the Work from intrusion of weather elements during installation duration.

### 1.8 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.
- C. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.
- D. Coordinate all phases of Work to provide continuity of Work without delays.

### 1.9 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Factory Applied Metal Finishes Warranty:

1. Provide manufacturer's metal finish warranty in which manufacturer agrees to repair finish or replace metal that shows evidence of deterioration of factory applied finish within the indicated warranty period.
2. Deterioration includes, but is not limited to the following:
  - a. Color fading exceeding 5 delta E Hunter color units in accordance with ASTM D2244.
  - b. Peeling, checking, or cracking of coating adhesion to metal.
  - c. Chalking exceeding a No. 8 in accordance with ASTM D4214, Method A.
  - d. Corrosion of substrate exceeding a No. 6 on cut edges and a No. 8 on field surfaces, when measured per ASTM D1654.
3. Warranty Period:
  - a. Twenty (20) years from the project date of Substantial Completion.

## **PART 2 PRODUCTS**

### **2.1 PERFORMANCE REQUIREMENTS**

- A. General: Sheet metal flashing and trim assemblies are to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and is to remain watertight.
- B. Factory Mutual approved for wind uplift protection.
- C. Wind Design Standard: Manufacture and install copings and roof edge flashing systems tested as compliant with ANSI/SPRI/FM 4435/ES-1 requirements and capable of resisting the following design pressure:
  1. Design Pressure: As indicated on Drawings.
- D. Sheet Metal Standard for Flashing and Trim: Comply with NRCA (RM) and SMACNA (ASMM) requirements for dimensions and profiles shown unless more stringent requirements are indicated in the Contract Documents.
  1. Maintain one copy of each document on site.
- E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

### **2.2 MANUFACTURERS**

- A. Manufacturers:
  1. Architectural Products Company.
  2. Hickman Edge Systems, Inc.
  3. Merchant and Evans.
  4. Metal-Era, Inc.
  5. OMG Roofing Products.
  6. PAC-CLAD; Petersen Aluminum Corporation.
  7. Perimeter Systems; a division of SAF.
  8. SAF, Southern Aluminum Finishing Company.
  9. Substitutions: Section 01 60 00 - Product Requirements.

**2.3 METAL SHEET MATERIALS**

- A. Base Metal Thickness Table: Metal thickness minimum to be as indicated in the following table unless indicated otherwise on Drawings. Face dimensions indicated apply to the largest dimensional face of a linear or formed metal fabrication and includes the outward angled drip edge.

Face Dimension	Galvanized Steel	Aluminum	Stainless Steel
Up to 4 in. (to 100 mm)	24 ga. (0.028 in.) (0.7 mm)	0.032 in. (0.82 mm)	26 ga. (0.016 in.) (0.4 mm)
> 4 in. - 8 in. (> 100 - 200 mm)	24 ga. * (0.028 in.) (0.7 mm)	0.040 in. * (1.0 mm)	26 ga. * (0.016 in.) (0.4 mm)
> 8 in. - 10 in. (> 200 - 250 mm)	22 ga. ** (0.034 in.) (0.9 mm)	0.050 in. ** (1.3 mm)	24 ga. ** (0.023 in.) (0.6 mm)
> 10 in.-16 in. (> 250 - 400 mm)	20 ga. (0.040 in.) (1.0 mm)	0.063 in. (1.6 mm)	22ga. (0.029 in.) (0.7 mm)
> 16 in. - 24 in. (> 406 mm - 610 mm)	20 ga. (0.040 in.) (1.0 mm)	0.063 in. (1.6 mm)	22ga. (0.029 in.) (0.7 mm)

Key Notes: Minimum thickness for the following components; thicker depending on face dimension:  
 \* Minimum thickness for Roof Edge, Fascia, and Cleats.  
 \*\* Minimum thickness for Coping Caps.

- B. Pre-Finished Aluminum Sheet: ASTM B209/B209M, 3003 or 3005 alloy, H12 or H14 temper with factory applied pre-finish coating system as follows:
1. Superior Performance Organic Coating System: AAMA 2605, shop applied multiple coats, thermally cured polyvinylidene fluoride (PVDF) resin system.
    - a. Three-Coat Fluoropolymer: AAMA 2605, fluoropolymer finish containing not less than 70 percent PVDF resin by weight in each color coat and clear topcoat. Prepare, pre-treat, and apply coatings.
      - 1) Dry Film Minimum Thickness: ASTM D7091.
        - a) Primer Coat: 0.20 to 0.40 mil.
        - b) Color Coat: 0.70 to 0.90 mil.
        - c) Clear Coat: 0.40 to 0.50 mil.
        - d) Total Thickness: 1.30 to 1.80 mils.
      - b. Surface: Smooth.
      - c. Color: To be selected by Architect for manufacturer's full range.
      - d. Gloss: To be selected by Architect for manufacturer's full range.
      - e. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.
- C. Stainless Steel: ASTM A666, Type 304 alloy, soft temper.
1. Finish:
    - a. No. 4 - Brushed finish.
- D. Protective Film: Factory apply strippable plastic film to material surfaces to protect the finish during fabrication, shipping, handling, and installation.

**2.4 POLYMER CLAD METAL**

- A. Polymer Clad Metal - Metal flashings and trim manufactured with roofing membrane laminated cladding; heat-weldable cladding for watertight seal to roofing membrane; 25 mil thick cladding membrane coating to match the flashing membrane composition laminated on one side. Polymer-clad metal to be manufactured by, and included in the warranty of, the roofing membrane manufacturer. Color to be selected by Architect from manufacturer's full range.

- B. Polymer clad metal type to be that which is indicated for flashing and trim components.
- C. Metal flashings and trim components to be fabricated with polymer clad metal include the following:
  - 1. Items indicated on Drawings.

## 2.5 COPING CAPS

- A. Manufactured system in section lengths not less than 10 feet (12 feet preferred); concealed anchorage; with corner units, end cap units, and concealed splice plates. All exposed components to match in material and finish.
  - 1. Pre-finished aluminum sheet; sloped top at 1/2 inch per foot.
  - 2. Configuration: As indicated on Drawings.
  - 3. Corner and End Cap Units: Factory mitered.
    - a. Fabricate corner and end cap units to form single fabricated units.
      - 1) Minimum length of corner caps to be twice the thickness of wall assembly in each direction.
      - 2) Minimum length of end cap units to be twice the thickness of wall assembly.
    - b. Joints:
      - 1) Continuously welded. Apply specified finish after fabrication.
  - 4. Joint Splice Plates: Material and finish to match coping cap; 6 inches wide minimum; factory applied neoprene sealant strip each edge to maintain waterproof assembly.
  - 5. Face-Leg Cleats: Continuous each side; spring action linear support at mid-span of coping cap sloped top.
  - 6. Surface: Smooth.
  - 7. Color: To be selected by Architect from manufacturer's full range.

## 2.6 ROOF EDGE FASCIA

- A. Manufacture system in section lengths not less than 10 feet (12 feet preferred); concealed anchorage; with corner units, and concealed splice plates. All exposed components are to match in material and finish.
  - 1. Pre-finished aluminum sheet.
  - 2. Configuration: As indicated on Drawings.
  - 3. Corners Units: Factory mitered.
    - a. Fabricate corner units to form single fabricated unit.
    - b. Minimum length to be 24 inches in each direction.
    - c. Joints:
      - 1) Continuously welded. Apply specified finish after fabrication.
  - 4. Joint Splice Plates: 6 inches wide minimum; factory applied neoprene sealant strip each edge to maintain waterproof assembly.
  - 5. Face-Leg Cleats: Continuous.
  - 6. Surface: Smooth.
  - 7. Color: To be selected by Architect from manufacturer's full range.

## 2.7 THROUGH WALL SCUPPERS

- A. Fabricate scuppers of dimensions required with closure flange trim to exterior, 4-inch-wide wall flanges to interior, and base extending 6 inches beyond cant or tapered strip into field of roof. Continuous weld all joints. Fabricate from the following materials:
  - 1. Material: Aluminum; ASTM B209/B209M, 3003 or 3005 alloy, H12 or H14 temper.
  - 2. Fabricate scupper sleeve with polymer clad metal for watertight bond to match roofing membrane and flashing, unless indicated otherwise on Drawings.

3. Exterior Escutcheon: Required where no downspout conductor head is indicated for drainage. Fabricate unit; without seams; profile and configuration as indicated on Drawings; pre-finished aluminum and finish as specified in this Section; metal to be 0.050 inch thick metal with hemmed edges; color to be selected by Architect from manufacturer's full range.

## 2.8 FABRICATION

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Fabricate cleats of same material as fabricated sheet materials. Cleat thickness, width, and profile to be capable of withstanding loads and stresses required to secure and interlock with fabricated sheet materials.
- C. Form pieces in longest possible lengths.
- D. Hem exposed edges on underside 1/2 inch (13 mm); miter and seam corners.
- E. Fabricate vertical faces with bottom edge formed outward 1/2 inch and hemmed to form drip.

## 2.9 ACCESSORIES

- A. General: Provide materials and types of fasteners, protective coatings, sealants, and other accessories as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of materials to which application is made, unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design and wind loads and recommended by manufacturer of components being fastened. Exposed fasteners to be finished with matching finish system of material being fastened.
  1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
    - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM waterproof sealing washers under heads of exposed fasteners bearing on weather side of metal.
    - b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
- C. Fasteners for securing components to treated lumber and/or plywood are to be stainless steel, or specifically manufactured with published approvals for treated lumber applications.
- D. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
- E. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.
- F. Anchors: As required by application condition.
  1. Lead Anchors: Minimum 1/4 inch diameter lead anchor.
  2. Sleeve-Type or Wedge-Type based on application, minimum 5/8 inch diameter, Type 304 or 316 stainless steel, Expansion Anchor Bolt Assembly. Follow fastener manufacturer's published guidelines for substrate type and condition.
- G. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, non-sag, nontoxic, non-staining tape 1/2-inch wide and 1/8 inch thick.
- H. Sealant primers: Primers to be manufactured by or approved by the sealant manufacturer. Primer types required for substrate and sealant as published by sealant manufacturer.

- I. Elastomeric Sealant: For exposed joints ASTM C920, elastomeric silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight. Color to match adjacent material or
- J. Butyl Sealant: For concealed joints ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- K. Plastic Cement: ASTM D4586/D4586M, Type I.
- L. Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D1187/D1187M.
- M. Underlayment Materials:
  - 1. Self-Adhering, High-Temperature Sheet: Minimum 30 mils thick, consisting of a slip-resistant polyethylene- or polypropylene-film top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer according to written recommendations of underlayment manufacturer.
  - 2. Slip Sheet: Rosin-sized building paper, 3 lbs/100 sq. ft. minimum.
- N. Primer:
  - 1. Aluminum and Stainless Steel: Zinc chromate primer.
  - 2. Galvanized Steel: Zinc chromate or galvanized iron primer.
- O. Reglets (Receivers): Type and configuration as indicated on Drawings. Material and finish to match metal flashing component to be secured into reglet. Material thickness to be as required by referenced standards but not less than 0.050 inch.
- P. Solder: ASTM B32; Sn50 (50/50) type.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that substrates, surfaces, and conditions are ready to accept the work of this Section.
- C. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
- D. Verify roofing termination and base flashings are in place, sealed, and secure.
- E. Verify that field measurements are as required.
- F. Examine products to be installed for damage and other conditions detrimental to completion of the Work.
- G. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Install starter and edge strips, and cleats before starting installation.
- D. Install surface mounted reglets true to lines and levels, and seal top of reglets with sealant.

- E. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil (0.4 mm).

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Comply with Drawings and referenced standards.
- C. Installation is to comply with the sheet metal system and component manufacturer's published installation manuals and guidelines and all referenced standards therein.
- D. Installation of sheet metal flashings incorporated into roofing system are to comply with all minimum requirements published by the membrane manufacturer and requirements indicated in the Contract Documents.
- E. Coping and trim sections are to expand and contract freely while mechanically locked in place on anchor cleats.
- F. Coping and trim sections are to be locked to anchor cleats by mechanical pressure from support chairs.
- G. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.
  - 1. Coat concealed side of uncoated-aluminum and stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
  - 2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.
    - a. Install to seal watertight all rough carpentry, parapet walls, curbs, and roof transitions before installing sheet metal flashing.
    - b. The underlayment is to be left in place, not cut, or removed, before installing sheet metal flashing.
    - c. Cover underlayment with slip sheet for separation from metal work to be installed.
- H. Insert flashings into reglets to form tight fit; secure in place with lead or plastic wedges; seal flashings into reglets with sealant.
- I. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted by Architect.
- J. Apply one coat of bituminous paint to concealed aluminum surfaces in contact with cementitious or dissimilar materials.
- K. Apply plastic cement compound between metal flashings and felt flashings.
- L. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- M. Seal metal joints watertight.

### 3.4 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for quality control of work and installation.
- B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.



**3.5 ERECTION TOLERANCES**

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

**3.6 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures.
- B. Clean installed work in accordance with manufacturer's recommendations including cleaning procedures and materials.

**3.7 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed construction from damage.

**END OF SECTION**



**SECTION 07 71 23****MANUFACTURED GUTTERS AND DOWNSPOUTS****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Gutters.
  - 2. Downspouts.
  - 3. Downspout Boots.
  - 4. Conductor Heads (Collection Boxes).
  - 5. Splash Pads.
  - 6. Supports and Accessories.
- B. Related Requirements:
  - 1. Division 07 - Thermal and Moisture Protection: Sections related to roofing construction and joint protection.
  - 2. Division 33 - Utilities: Sections related to stormwater utility construction.
  - 3. Section 07 22 16.10 - Roof Insulation for Membrane Roofing.
  - 4. Section 07 41 13 - Metal Roof Panels.
  - 5. Section 07 54 23 - Thermoplastic-Polyolefin Roofing (Adhered).
  - 6. Section 07 62 00 - Sheet Metal Flashing and Trim.
  - 7. Section 07 90 00 - Joint Protection.

**1.2 REFERENCES**

- A. American Architectural Manufacturers Association (AAMA):
  - 1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2020.
  - 2. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
- B. ASTM International (ASTM):
  - 1. ASTM A48/A48M - Standard Specification for Gray Iron Castings; 20.
  - 2. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar, 2023.
  - 3. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate, 2021a.
- C. National Roofing Contractors Association (NRCA):
  - 1. NRCA (RM) - The NRCA Roofing Manual; 2024.
- D. Sheet Metal and Air Conditioning Contractors National Association (SMACNA):
  - 1. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

**1.3 COORDINATION**

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
  - 1. Coordinate Work with construction related to or interfacing with this Work.
  - 2. Coordinate Work with downspout discharge pipe inlets or connections, if any.

**1.4 PRE-INSTALLATION MEETINGS**

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section and in conjunction with roofing pre-installation meeting.

**1.5 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate locations, configurations, jointing methods, fastening methods, sizing, spacing, slope, calculations, and installation details.
- C. Product Data: Submit data on manufactured components, materials, and finishes.
- D. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of finishes and colors available for products with factory-applied finishes; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples on same product material type indicated for final Work; each sample 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
  - 1. Submit a gutter section and downspout section of minimum size 12 inches long illustrating actual metal, thickness, configuration, profile, color, and texture.

**1.6 QUALITY ASSURANCE**

- A. Perform Work in accordance with these specifications and SMACNA (ASMM) - Architectural Sheet Metal Manual.
- B. Install Work in compliance with the current NRCA (RM).
- C. Install Work in compliance with the sheet metal system and component manufacturers' published installation manuals and guidelines and all referenced standards therein.
- D. Work to be free of leaks in all weather conditions.

**1.7 QUALIFICATIONS**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section with minimum five (5) years documented experience.
- B. Installer Qualifications: Company specializing in installing the Work specified in this Section with minimum five (5) years documented experience.
- C. Installer to be same as installer of the roofing system indicated in Division 07 - Thermal And Moisture Protection.
  - 1. Company specializing in sheet metal work with minimum five (5) years documented experience.

**1.8 DELIVERY, STORAGE, AND HANDLING**

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Deliver materials in the manufacturer's original sealed and labeled containers and in quantities required to allow continuity of application.
- C. Store materials within areas designated or approved by the Owner. Ensure materials remain dry, covered and not in contact with the ground.
- D. Handle material in such manner as to preclude damage and contamination with moisture or foreign matter.

**1.9 WARRANTY**

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Provide the pre-finished sheet metal manufacturer's thirty (30) year finish warranty from the date of substantial completion.

**PART 2 PRODUCTS****2.1 PRE-FINISHED ALUMINUM**

- A. Aluminum: ASTM B209/B209M, alloy 3003, H14 temper.
  - 1. Thickness: 0.040 inch (40-mil), unless indicated otherwise on Drawings or in this Section.
  - 2. Finish: Primed and finished on one side with fluoropolymer coating; multiple coats to minimum 1.0 mil total dry film thickness as specified for sheet metal system, thermally cured, conforming to AAMA 2604. On reverse side, finish with wash coat compatible with finish system as recommended by finish system manufacturer; wash coat to minimum 0.3 to 0.4 mil dry film thickness. A strippable plastic film should protect the finish during fabrication and installation.
    - a. Color and Sheen: To be selected by Architect from manufacturer's full range.

**2.2 COMPONENTS**

- A. Gutters:
  - 1. Pre-Finished Aluminum; 0.050 inch thick; profile as indicated on Drawings.
- B. Downspouts:
  - 1. Pre-Finished Aluminum; 0.040 inch thick; profile as indicated on Drawings.
- C. Downspout Boots: Cast iron; smooth interior without boxed corners or choke points; include integral lug slots, integral cleanout, cleanout cover, and tamper proof fasteners.
  - 1. Basis of Design: J.R. Hoe and Sons.
  - 2. Material: Cast iron; ASTM A48/A48M; casting thickness 3/8 inch (9.5 mm), minimum.
  - 3. Profile:
    - a. As indicated on Drawings. Located at pervious locations only.
  - 4. Finish: Manufacturer's standard factory applied powder coat finish.
    - a. Color:
      - 1) To be selected by Architect from manufacturer's full range.
  - 5. Accessories: Compatible with and appropriate for installation of downspout boots.
    - a. Stainless steel fasteners and building wall anchors.
    - b. Neoprene gaskets and rubber coupling.
- D. Downspout Boots: PVC adapter, unless indicated otherwise on Drawings.
  - 1. Premanufactured extruded PVC; inlet and outlet configuration sized to fit inlet and outlet piping and as indicated on Drawings; smooth interior; provide for flow volume equal to outlet piping without choke points. Located at impervious locations only.
  - 2. Finish: Paint PVC adapter and exposed PVC piping. Refer to Section 09 90 00 - Painting and Coating for paint system for PVC and Architectural Plastic; exterior.
  - 3. Color:
    - a. To be selected by Architect from manufacturer's full range.
    - b. Match downspout metal finish color and sheen.
- E. Conductor Heads (Collection Boxes):
  - 1. Pre-Finished Aluminum; 0.050 inch thick; profile as indicated on Drawings.
  - 2. Pre-manufactured conductor heads to fit scupper drainage outlets and downspouts.
  - 3. Factory weld joints.
  - 4. Factory apply finish after fabrication.
- F. Splash Pads:
  - 1. Size: 3H x 11W x 30L inches unless indicated otherwise on Drawings.
  - 2. Material:
    - a. Precast concrete; minimum 3000 psi (21 MPa) at 28 days, with minimum 5 percent air entrainment.

**2.3 ACCESSORIES**

- A. Anchors and Supports: Profiled to suit gutters and downspouts.
  - 1. Anchoring Devices: In accordance with SMACNA requirements.
  - 2. Gutter Supports:
    - a. Brackets - Configuration, size and metal thickness as indicated on Drawings. Finish to match gutter.
  - 3. Downspout Supports:
    - a. Straps, minimum 0.050 inch thick. Finish to match downspout.
- B. Fasteners: Same material and finish as gutters and downspouts.

**2.4 FABRICATION**

- A. Form components accurately to sizes and profiles indicated on Drawings.
- B. Fabricate with required connection components.
- C. Form component in maximum possible lengths, free of distortion or defects detrimental to appearance or performance. Allow for expansion at joints.
- D. Hem exposed edges of metal.
- E. Seal joints watertight.

**PART 3 EXECUTION****3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Contractor is to coordinate all work for correct sequencing of items which make up the completed building envelope systems.
- C. Verify that surfaces are ready to receive work.

**3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Paint concealed metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to minimum dry film thickness of 15 mil.
- D. Protect components to prevent scratches, dents, and other damages during the work and associated with the work of other trades.
- E. Verify that all exposed fasteners are pre-finished to match surface finish of the component being fastened.

**3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install products in accordance with manufacturer's instructions.
- C. Sheet Metal: Join lengths with seams sealed watertight. Flash and seal gutters to downspouts and accessories.
- D. Slope gutters 1/8 inch per foot minimum to drains.
- E. Connect downspouts to downspout boots at elevations indicated on Drawings; but, in no case is connection to be less than 4 inches above grade. Do not seal connection watertight.

**3.4 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Clean installed work and comply with manufacturer's recommendations.
- C. Clean adjacent soiled surfaces and comply with surface manufacturer's recommendations.

**3.5 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed construction from damage.

**END OF SECTION**



**SECTION 07 72 00**  
**ROOF ACCESSORIES**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Curbs and equipment rails.
  - 2. Piping and conduit pedestals.
- B. Related Requirements:
  - 1. Section 06 10 53 - Miscellaneous Rough Carpentry.
  - 2. Division 07 - Thermal and Moisture Protection: Roofing, roof insulation, flashing, and trim requirements.
  - 3. Division 23 - Mechanical (HVAC) for Section related to roof mounted equipment.

**1.2 REFERENCE STANDARDS**

- A. ASTM International (ASTM):
  - 1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.

**1.3 COORDINATION**

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Provide roof deck structural framing as needed to support and anchor roof accessories.

**1.4 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: 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.
- C. Shop Drawings: Submit detailed drawings indicating construction interface of roof accessories with adjacent work and materials, and layout developed for this project. For equipment supports, indicate the specific equipment being supported. Show configurations, dimensioned locations and number for each type of roof accessory.
  - 1. Equipment Curbs and Rails: Submit shop drawings sealed and signed by a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

**1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Store products in manufacturer's unopened packaging until ready for installation.
- C. Store products under cover and elevated above grade.

## 1.6 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Provide five (5) year warranty to correct defective work.
- C. Provide five (5) year manufacturer's warranty for materials and workmanship.

## PART 2 PRODUCTS

### 2.1 MANUFACTURED UNITS

- A. Manufactured Curbs, Equipment Rails, and Other Roof Mounting Assemblies: Factory-assembled hollow sheet metal construction with fully mitered and welded corners, integral counterflashing, internal reinforcing, and top side and edges formed to shed water.
  - 1. Sheet Metal: Hot-dip zinc coated steel sheet complying with ASTM A653/A653M, SS Grade 33 ksi; G90 (Z275) coating designation; 18 gage (0.048 inch) thick. Use thicker gage as required to support loads of equipment.
  - 2. Manufacture curb bottom and mounting flanges for installation on substrate construction as indicated on Drawings. Curb unit bottom to match slope of substrate and curb unit top to be horizontal for equipment mounting.
  - 3. Provide curbs with layouts and configurations as required by equipment being supported and as indicated on Drawings.
  - 4. Provide for anchorage requirements of the equipment to be supported.
  - 5. Provide unit insulated as indicated on Drawings.
  - 6. Height Above Finished Roof Surface: 9 inches, minimum. Total curb unit height varies based on roofing system thickness and slope of substrate.
- B. Curbs Adjacent to Roof Openings: Provide curb on all sides of opening, with top of curb horizontal for equipment mounting.
  - 1. Provide preservative treated wood nailers along top of curb.
  - 2. Insulate inside of curbs as indicated on Drawings.
  - 3. Height Above Finished Roof Surface: 9 inches, minimum.
- C. mounting.
  - 1. Provide preservative treated wood nailers along top of rails.
  - 2. Height Above Finished Roof Surface: 9 inches, minimum.
- D. Piping and Conduit Pedestals: Support devise sized to fit the diameter of the pipe being supported with stainless steel straps and stainless steel screws to secure strap to support and height adjustable.
  - 1. Manufacturers:
    - a. Olympic Olyflow PipeGuard.
    - b. Erico Caddy Pyramid EZ Series.
    - c. Portable Pipe Hangers.
    - d. Miro Industries.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Do not begin installation until substrate construction is as required.



**3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Clean surfaces thoroughly prior to installation.
- D. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

**3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install in accordance with manufacturer's instructions, in manner that maintains roofing weathertight integrity.

**3.4 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Clean installed work to like-new condition.

**3.5 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed products until completion of project.

**END OF SECTION**



**SECTION 07 72 33****ROOF HATCHES****PART 1 GENERAL****1.1 SUMMARY**

- A. Section includes prefabricated roof hatches, with integral support frames and curbs, operable hardware, counter flashing, and related components.
- B. Related Requirements:
  - 1. Sections related to roof decking and topping construction.
  - 2. Section 06 10 53 - Miscellaneous Rough Carpentry.
  - 3. Division 07 - Thermal and Moisture Protection: Roofing, sheet metal flashing and trim, roof insulation, and accessories.

**1.2 REFERENCES**

- A. ASTM International (ASTM):
  - 1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
  - 2. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.

**1.3 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on unit construction, sizes, configuration, jointing methods, and locations when applicable, and attachment method.
- C. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of finishes and colors available for products with factory-applied finishes; submit for Architect's initial selections.
- D. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples on same product material type indicated for final Work; each sample 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- E. Manufacturer's Installation Instructions: Indicate special installation criteria and interface with adjacent components.

**PART 2 PRODUCTS****2.1 PERFORMANCE REQUIREMENTS**

- A. Installed assemblies to withstand 40 lbf/sq ft external live load with a maximum deflection of 1/150 of the span and negative (uplift) design pressure of 20 lbf/sq ft or greater.

**2.2 ROOF HATCHES**

- A. Manufacturers:
  - 1. Babcock-Davis Hatchways.
  - 2. Bilco.

3. Dur-Red.
  4. J.L. Industries.
  5. Milcor.
  6. O’Keeffe’s Inc.
  7. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design: Bilco - E-50TB.
- C. Description: Factory-assembled and finished; metal curb, frame, and cover, complete with operating hardware and safety components; weather sealed construction and installation.
1. Style: Provide flat metal covers unless otherwise indicated.
  2. Mounting Substrate: Frames and curbs suitable for mounting to roof structure and substrate deck type indicated on Drawings for each hatch location.
  3. Size: Unless indicated otherwise on Drawings, provide the following:
    - a. For Ladder Access:
      - 1) Single leaf; 36 by 42 inches.
    - b. For Ships Ladder Access:
      - 1) Single leaf; 36 by 60 inches.
    - c. For Stair Access: Single leaf; 30 by 96 inches.
    - d. For Equipment Access: Double leaf; 48 by 48 inches.
- D. Frames and Curbs: One-piece curb and frame with integral cap flashing to receive roof flashings; configure extended bottom flange to suit mounting requirements and roof angle.
1. 3 inches thick, metal double wall insulated construction.
  2. Top frame opening rim height to be level and minimum 12 inches above finish roofing surface.
- E. Metal Covers: Perimeter flush with frame and double wall insulated metal construction.
1. 3 inches thick, metal double wall insulated construction.
  2. Gasket: Neoprene, continuous around cover perimeter.
- F. Metal Material:
1. Aluminum: ASTM B209/B209M, alloy 3003, H14 temper, 11 gauge (0.0907 inch) thick, minimum.
- G. Insulation Material: Mineral wool, cavity filled and with no voids.
- H. Factory Finish:
1. Aluminum:
    - a. Factory mill finish.
- I. Hardware: Manufacturer’s standard finish.
1. Compression spring operator and shock absorbers.
  2. Steel manual pull handle for interior operation.
  3. Steel hold open arm with vinyl covered grip handle for easy release.
  4. Padlock hasp.
  5. Hinges: Manufacturer’s recommended type for specific type of roof hatch.
- J. Safety Guard Railing: Fiberglass pipe or tube fabrication, minimum 1-1/2 inches outside diameter posts, top rails, and intermediate rails; 42 inches overall height above roof surface; self-latching hinged gate protecting hatch access side.
1. Guard Openings: Maximum 21 inches.
  2. Mounting Hardware: Corrosion resistant type for secure attachment to hatch frame without penetrating roof membrane and without inhibiting hatch cover operation.
  3. Gate Hardware: Corrosion resistant hinges and latching mechanism.
  4. Fasteners: Stainless steel.
- K. Safety Post: Telescoping type with positive safety lock.

### 2.3 ACCESSORIES

- A. Anchorage Devices: Type recommended by curb manufacturer.
  - 1. Stainless steel materials if exposed to weather.
- B. Blocking and Brackets: Type recommended by curb manufacturer.
  - 1. Stainless steel materials if exposed to weather.
- C. Counterflashings: Same metal type and finish as roof hatch frame.
- D. Protective Coating: Coating to maintain separation between dissimilar metals.
  - 1. Zinc molybdate alkyd.
- E. Sealant: Manufacturer's recommended sealants integral with roof hatch installation, nonhardening, non-skinning, nondrying, nonmigrating butyl based sealants.

### 2.4 FABRICATION

- A. Fabricate components free of visual distortion and free of defects. Weld corners and joints.
- B. Sloped Roofs: Fabricate roof hatch curbs tapered to maintain hatch top level to horizontal.
- C. Provide for condensation occurring within components and within assembly to drain to exterior above roofing.
- D. Fit components for weather tight assembly.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify openings and substrate conditions are ready to receive Work of this section.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Apply protective coating on aluminum surfaces of roof hatches to be in contact with cementitious materials or dissimilar metals.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install insulated curb assembly, fastening securely to roof decking. Flash curb assembly into roof system.
- C. Place and secure roof hatch frame and curb assembly. Install integral setting sealant and counterflashing as required.
- D. Installation to be watertight assembly.
- E. Coordinate with installation of roofing system and related flashings for weather tight installation.
- F. Apply protective coating on surfaces of components in contact with cementitious materials or dissimilar metals.

- G. Adjust operational components for smooth operation.

### **3.4 ADJUSTING**

- A. Section 01 73 00 - Execution: Starting, testing, adjusting, and balancing.
- B. Test for proper operation.

### **3.5 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Remove excess sealant.
- C. Clean surfaces and components in accordance with manufacturer's recommendation.

### **3.6 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.

### **3.7 DEMONSTRATION AND TRAINING**

- A. Section 01 79 00 - Demonstration and Training: Provide demonstration and training to the Owner regarding operation and maintenance of installed Work.

**END OF SECTION**

**SECTION 07 72 36****SMOKE VENTS****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Smoke and Heat Vent System.
  - 2. Roof Curb.
- B. Related Requirements:
  - 1. Sections related to roof decking and topping construction.
  - 2. Division 07 - Thermal and Moisture Protection for Sections related to roofing work.

**1.2 REFERENCES**

- A. Underwriters Laboratories Inc. (UL):
  - 1. UL - Building Materials Directory; Current Edition.

**1.3 COORDINATION**

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate requirements for anchoring the work to the roof structural system.
- C. Coordinate the work with the installation of roofing system for weathertight condition.
- D. Coordinate installation of electrical components for connectivity with security and fire alarm monitoring panel.

**1.4 PRE-INSTALLATION MEETINGS**

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this Section. Review the work requirements, application procedures, quality control, testing and inspection and production schedule.

**1.5 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on unit construction, sizes, configuration, jointing methods, and locations when applicable, and attachment method.
- C. Shop Drawings: Submit shop drawings including profiles, accessories, location, joint fabrication, fusible links, interface with adjacent construction and roofing, and dimensions.
  - 1. Include details of components for monitoring by buildings security and fire alarm system.
  - 2. Include details of components that provide for non-emergency opening, closing and resetting of smoke and heat vent doors.
- D. Manufacturer's Installation Instructions: Indicate special installation criteria and interface with adjacent components.

**1.6 CLOSEOUT SUBMITTALS**

- A. Section 01 77 00 - Closeout Procedures.

- B. Records and reports of testing of completed system in the presence of authorities having jurisdiction.

## 1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this Section with minimum seven (7) years documented experience.
- B. Installer: Company specializing in performing work of this Section and with minimum five (5) years documented experience.

## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Deliver products in manufacturer's original packaging. Store materials in a dry, protected, well-vented area. Inspect product upon receipt and report damaged material immediately to delivering carrier and note such damage on the carrier's freight bill of lading.

## 1.9 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Manufacturer's Warranty: Provide manufacturer's five (5) year warranty for materials and workmanship to be free of defects. Warranty duration to begin with the date of Substantial Completion. Should a part fail to function in normal use within this period, manufacturer shall furnish a new part at no charge.

## 1.10 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
  - 1. For each smoke and heat vent system installed, furnish one (1) extra fusible link and related components needed to reset smoke and heat vent system to fully operational condition.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers:
  - 1. Acudor Products, Inc.
  - 2. Babcock-Davis.
  - 3. Bilco Company.
  - 4. Milcor, Inc.
  - 5. Nystrom, Inc.
  - 6. R&S Roof Products.
  - 7. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design: Bilco Company - Model DSH6072B.

### 2.2 SMOKE AND HEAT VENTS - ROOF MOUNTED

- A. Automatic Smoke and Heat Vents: Factory manufactured vent system conforming to applicable code requirements for smoke and heat vents.
  - 1. Where "smoke" or "smoke/heat" operation is indicated, provide UL listed vent system with automatic opening on melting of replaceable UL (DIR) listed fusible link.



2. Size: as indicated on Drawings, but not less than 5 x 6 feet.
3. Operation: Vent covers shall open simultaneously against a 10 psf snow/wind load when latch is manually released or when heat breaks the UL listed fusible link. Opening shall be in a controlled manner to avoid damage to surrounding construction and roofing system.
4. Latch Operation: When heat parts the UL listed fusible link, the latch is to release instantaneously, allowing vent cover to open. Latch to be designed for easy resetting, after a fire or test, so that the cover cannot be latched closed unless the mechanism has been reset properly. Provide manufacturer's instructions for resetting the latch with each unit. Latch mechanism is to hold the covers in the closed position without overstressing the fusible link.
5. Vent system to be fabricated and installed to support minimum external live loads of 40 psf and a negative (uplift) pressure of 90 psf or greater.
6. Vent system to be fabricated and installed to be weather tight and with fully welded corner joints on cover and frame.

## 2.3 COMPONENTS

- A. Metal Covers:
  1. Exterior Metal:
    - a. Aluminum; 11 gauge (2.3mm) minimum thickness.
  2. Interior Metal Liner:
    - a. Aluminum; 18 gauge (1mm) minimum thickness.
  3. Formed 3 inch beaded flange with formed reinforcing members.
    - a. Double leaf type.
  4. Insulation to be fiberglass of 1 inch (25mm) thickness, fully covered and protected by interior metal liner.
- B. Metal Frame:
  1. Metal:
    - a. Aluminum; 11 gauge (2.3mm) minimum thickness.
  2. Height to be 12 inches (305mm) minimum; formed with not less than 3-1/2 inch (89mm) flange.
  3. Frame to be equipped with integral metal capflashing of the same gauge and material as the frame. Frame flashing components to be designed to engage and hold single-ply roofing membrane securely in place.
  4. Frame to have heavy extruded EPDM rubber gaskets mechanically fastened to the top of the frame to assure a continuous seal when compressed by the covers.
  5. Frame insulation to be rigid high-density fiberboard of minimum 1 inch (25mm) thickness.
- C. Lifting Mechanisms: High performance gas spring operators to open the covers against a snow/wind load. Gas springs shall automatically lock covers in the fully open position. A release mechanism shall be provided to allow covers to be closed. Gas springs shall have integral dampers to assure a controlled rate of cover opening and have a cyclic durability of 50,000 cycles.
- D. Latch Mechanism: Positive hold/release mechanism with a separate latching point for each cover controlled by a single UL listed 165°F (74°C) fusible link. Fusible link shall be frame mounted on a non-hinged end to allow the latching mechanism to be easily reset from the roof level.
- E. Hardware:
  1. Heavy pintle hinges shall be provided.
  2. Gas springs have a powder coated outer tube and chromate plated inner rod.
  3. All Other Hardware:

- a. Zinc plated/chromate sealed or galvanized steel.
4. Cover hardware shall be bolted into heavy gauge metal channel reinforcing welded to the underside of the cover and concealed within the insulation space.
- F. Manual Pull Release Cables: Interior and exterior cables with red vinyl grips to be provided that allow the unit to be opened without disturbing the fusible link.
- G. Factory Finish:
  1. Aluminum; mill finish.
- H. Security and Fire Alarm Connection: Provide electrical detection device and wiring to buildings security and fire alarm panel that provides signal at panel when vent cover latch is released, or vent cover is open.
- I. Manual Winch Operation: Provide manual winch operation to open and close covers remotely. Winch to be wall bracket mounted with adequate cable and pulleys for smooth operation. Closing the covers is to reset the vent system to full intended functionality. Wall mounted winch location as indicated on Drawings.

## 2.4 ROOF CURB FOR SMOKE AND HEAT VENT SYSTEM

- A. Roof Curbs Mounting Assemblies: Factory fabricated hollow sheet metal construction, internally reinforced, and designed to be capable of supporting superimposed live and dead loads and designated equipment load with weathertight joints fully welded.
- B. Applications: Roof curb for mounting smoke and heat vent system units as indicated on Drawings.
- C. Roof Curb Setting Substrate: As indicated on Drawings. Anchor curb to roof structure.
- D. Sheet Metal Material:
  1. Aluminum: 0.080 inch (2.03 mm) minimum thickness, with 3003 alloy, and H14 temper.
    - a. Finish: Mill finish.
- E. Fabricate curb bottom and mounting flanges for setting on substrate and designed to anchor to roof structure. Provide continuous corrosion protection between dissimilar metals.
- F. Provide size, configurations and features indicated on Drawings.

## 2.5 ACCESSORIES

- A. Anchorage Devices: Type recommended by manufacturer.
- B. Counterflashings: Same metal type and finish as vent system frame.
- C. Corrosion Protection Between Dissimilar Metals: Provide protection from corrosion between dissimilar metals by application of self-adhering rubberized asphalt sheet or bituminous coating.

## 2.6 FABRICATION

- A. Verify field measurements prior to fabrication.
- B. Fabricate components free of visual distortion and free of defects.
- C. Fully weld corners and joints that are exposed to weather and as required for structural performance.
- D. Provide for condensation occurring within components and within assembly to drain to exterior above roofing.
- E. Fit components for weather tight assembly.

**PART 3 EXECUTION****3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that field measurements are as required.
- C. Verify that surfaces and conditions are ready to accept the work of this Section.
- D. Examine products to be installed for damage and other conditions detrimental to completion of the Work.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

**3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.

**3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Coordinate installation with installation of roofing system and related flashings for weathertight installation.
- C. Install roof curb assembly as indicated on Drawings; fastening securely to roof structure.
- D. Install with hinges parallel to roof slope.
- E. Adjust hinges for smooth operation.
- F. Flash vent frame assembly to roof system for weathertight seal.
- G. Install electrical devices, wiring and connections to controls and building monitoring systems, if such electrical devices are included in the work of this Section.

**3.4 FIELD QUALITY CONTROL**

- A. Section 01 40 00 - Quality Requirements: Monitor quality of installation, inspection, and testing.
- B. Test smoke and heat vents for proper operation of all components, functions, and safety features in the presence of authorities having jurisdiction. Record and report test results. For failed tests, provide remedial work and retest as needed.

**3.5 ADJUSTING**

- A. Section 01 73 00 - Execution: Starting, testing, adjusting, and balancing.
- B. Adjust opening and reset operations to be smooth and in compliance with code and authorities having jurisdiction requirements.

**3.6 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work in accordance with manufacturer's recommendations including cleaning procedures and materials.
- B. Clean installed work and comply with manufacturer's recommendations.

**3.7 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed construction from damage and unauthorized tampering.

**3.8 DEMONSTRATION AND TRAINING**

- A. Section 01 79 00 - Demonstration and Training: Provide demonstration and training to the Owner regarding operation and maintenance of components of the installed Work.
- B. Include demonstration and training for security and fire alarm detection functionality.

**END OF SECTION**

**SECTION 07 84 00****FIRESTOPPING****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Firestopping through-penetrations of fire rated assemblies.
  - 2. Firestopping joints in fire rated assemblies.
  - 3. Firestopping tops of fire rated walls.
  - 4. Smoke sealing at joints between floor slabs and exterior walls.
  - 5. Smoke sealing penetrations and joints of smoke partitions.
- B. Related Requirements:
  - 1. Section 04 05 03 - Masonry Mortaring and Grouting: Mortar used for firestopping.
  - 2. Section 09 21 16 - Gypsum Board Assemblies: Gypsum board fireproofing.
  - 3. Division 22: Plumbing work requiring firestopping.
  - 4. Division 23: HVAC work requiring firestopping.
  - 5. Division 26: Electrical work requiring firestopping.

**1.2 REFERENCES**

- A. ASTM International (ASTM):
  - 1. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
  - 2. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2022.
  - 3. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestops Systems; 2023a.
  - 4. ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems; 2015, Reapproval 2019.
- B. California Department of Public Health (CDPH):
  - 1. CDPH Standard Method VOC V1.2 - Standard Method For The Testing And Evaluation Of Volatile Organic Chemical Emissions From Indoor Sources Using Environmental Chambers - Version 1.2; 2017.
- C. Intertek Testing Services (ITS):
  - 1. ITS (DIR) - Directory of Listed Products; Current Edition.
- D. Underwriters Laboratories Inc. (UL):
  - 1. UL (FRD) - Fire Resistance Directory; Current Edition.
  - 2. UL 263 - Standard for Fire Tests of Building Construction and Materials; Current Edition, Including all Revisions.
  - 3. UL 1479 - Standard for Fire Tests of Penetration Firestops; Current Edition, Including all Revisions.
  - 4. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems; Current Edition, Including all Revisions.

**1.3 DEFINITIONS**

- A. Firestopping (Through-Penetration Protection System): Sealing or stuffing material or assembly placed in spaces between and penetrations through building materials to arrest movement of fire, smoke, heat, and hot gases through fire rated construction.

#### 1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on product characteristics, performance, and limitation criteria.
- C. Schedule: Submit schedule of opening locations and sizes, penetrating items, and required listed design numbers to seal openings to maintain fire resistance rating of adjacent assembly.
- D. Manufacturer's Installation Instructions: Submit preparation and installation instructions.
- E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.
- F. Engineering Judgements: For conditions not covered by UL (FRD) or ITS (DIR) listed designs, submit judgements by licensed professional engineer suitable for presentation to authority having jurisdiction for acceptance as meeting code fire protection requirements.

#### 1.5 QUALITY ASSURANCE

- A. All firestopping on the project to be performed by the same Company.
- B. Through Penetration Firestopping of Fire Rated Assemblies: UL 1479 or ASTM E814 with 0.10 inch water gauge minimum positive pressure differential to achieve fire F-Ratings and temperature T-Ratings as indicated on Drawings, but not less than 1-hour.
  - 1. Wall Penetrations: Fire F-Ratings as indicated on Drawings, but not less than 1-hour.
  - 2. Floor Penetrations: Fire F-Ratings and temperature T-Ratings as indicated on Drawings, but not less than 1-hour.
    - a. Floor Penetrations Within Wall Cavities: T-Rating is not required.
- C. Through Penetration Firestopping of Non-Fire Rated Floor Assemblies: Materials to resist free passage of flame and products of combustion.
  - 1. Noncombustible Penetrating Items: Noncombustible materials for penetrating items connecting maximum of three stories.
  - 2. Penetrating Items: Materials approved by authorities having jurisdiction for penetrating items connecting maximum of two stories.
- D. Fire Resistant Joints in Fire Rated Floor, Roof, and Wall Assemblies: ASTM E1966 or UL 2079 to achieve fire resistant rating as indicated on Drawings for assembly in which joint is installed.
  - 1. Smoke Barrier Joints Air Leakage: Maximum 5.0 cfm/sq ft of door opening at 0.30 inch water gauge pressure differential.
- E. Fire Resistant Joints Between Floor Slabs and Exterior Walls: ASTM E119 with 0.10 inch water gauge minimum positive pressure differential to achieve fire resistant rating as indicated on Drawings for floor assembly.
- F. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

#### 1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three (3) years documented experience.
- B. Applicator: Company specializing in performing Work of this section with minimum three (3) years documented experience and approved by manufacturer.

## 1.7 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after installation of work.
- B. Do not apply materials when temperature of substrate material and ambient air is below 60 degrees F.
- C. Maintain this minimum temperature before, during, and for minimum three (3) days after installation of materials.
- D. Provide ventilation in areas to receive solvent cured materials.

## PART 2 PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Conform to UL (FRD) or ITS (DIR) for fire resistance ratings and surface burning characteristics.
- B. Provide certificate of compliance from authority having jurisdiction indicating approval of materials used.

### 2.2 FIRESTOPPING

- A. Manufacturers:
  - 1. 3M Fire Protection Products
  - 2. A/D Fire Protection Systems, Inc.
  - 3. Hilti Corp.
  - 4. Nelson Firestop Products
  - 5. Specified Technologies
  - 6. Substitutions: Section 01 60 00 - Product Requirements.
- B. Product Description: Different types of products by multiple manufacturers are acceptable as required to meet specified system description and performance requirements; provide only one type for each similar application.
  - 1. Formulated Firestopping Compound of Incombustible Fibers: Formulated compound mixed with incombustible non-asbestos fibers.
    - a. Maximum volatile organic compound content in accordance with CDPH Standard Method VOC V1.2.
  - 2. Fiber Stuffing and Sealant Firestopping: Composite of mineral fiber stuffing insulation with silicone elastomer for smoke stopping.
    - a. Maximum volatile organic compound content in accordance with CDPH Standard Method VOC V1.2.
  - 3. Mechanical Firestopping Device with Fillers: Mechanical device with incombustible fillers and silicone elastomer, covered with sheet stainless steel jacket, joined with collars, penetration sealed with flanged stops.
  - 4. Intumescent Firestopping: Intumescent putty compound which expands on exposure to surface heat gain.
    - a. Maximum volatile organic compound content in accordance with CDPH Standard Method VOC V1.2.
  - 5. Firestop Pillows: Formed mineral fiber pillows.

### 2.3 ACCESSORIES

- A. Primer: Type recommended by firestopping manufacturer for specific substrate surfaces and suitable for required fire ratings.

1. Maximum volatile organic compound content in accordance with CDPH Standard Method VOC V1.2.
- B. Dam Material: Permanent; mineral fiber matting.
- C. Installation Accessories: Provide clips, collars, fasteners, temporary stops or dams, and other devices required to position and retain materials in place.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify openings are ready to receive firestopping.

### **3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter affecting bond of firestopping material.
- D. Remove incompatible materials affecting bond.
- E. Install damming materials to arrest liquid material leakage.

### **3.3 APPLICATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install material at fire rated construction perimeters and openings containing penetrating sleeves, piping, ductwork, conduit, and other items, requiring firestopping.
- C. Apply primer as recommended by manufacturer for type of firestopping material and substrate involved, and as required for compliance with required fire ratings.
- D. Apply firestopping material in sufficient thickness to achieve required fire and smoke rating, to uniform density and texture.
- E. Compress fibered material to maximum 40 percent of its uncompressed size.
- F. Install fire-rated cable management/firestopping products at locations as indicated on the Drawings or any location where low-voltage cable penetrates a fire rated partition.
- G. Dam material to remain.

### **3.4 FIELD QUALITY CONTROL**

- A. Section 01 40 00 - Quality Requirements: Monitor quality of installation, inspection, and testing.
- B. Inspect installed firestopping for compliance with specifications and submitted schedule.
- C. Install descriptive label at all penetrations including UL assembly and verify noted UL assembly is consistent with installation.



**3.5 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Clean adjacent surfaces of firestopping materials.

**3.6 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect adjacent surfaces from damage by material installation.

**END OF SECTION**



**SECTION 07 90 00**  
**JOINT PROTECTION**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section includes joint sealants and accessories.
- B. Related Sections:
  - 1. Section 07 84 00 - Firestopping: Firestopping sealants.
  - 2. Section 08 80 00 - Glazing: Glazing sealants and accessories.
  - 3. Section 09 21 16 - Gypsum Board Assemblies: Acoustic sealant.
  - 4. Section 09 30 00 - Tiling: Sealant used as tile grout.

**1.2 REFERENCES**

- A. ASTM International (ASTM):
  - 1. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer; 2015, Reapproval 2022.
  - 2. ASTM C719 - Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle); 2022.
  - 3. ASTM C736 - Standard Test Method for Extension-Recovery and Adhesion of Latex Sealants; 2012, Reapproval 2022.
  - 4. ASTM C834 - Standard Specification for Latex Sealants; 2017, Reapproval 2023.
  - 5. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
  - 6. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016, Reapproval 2023.
  - 7. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants; 2022.
  - 8. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants; 2023.
  - 9. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension; 2016, Reapproval 2021.
  - 10. ASTM D2202 - Standard Test Method for Slump of Sealants; 2000, Reapproval 2019.
  - 11. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
  - 12. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2023.
  - 13. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, Editorial Changes 2021.
- B. California Department of Public Health (CDPH):
  - 1. CDPH Standard Method VOC V1.2 - Standard Method For The Testing And Evaluation Of Volatile Organic Chemical Emissions From Indoor Sources Using Environmental Chambers - Version 1.2; 2017.

**1.3 COORDINATION**

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate the Work with other Sections referencing this Section.

**1.4 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

- B. Products Data: Submit data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.
- C. Shop Drawings: Submit schedule of sealant products to be installed and drawings indicating application locations of each sealant product.
- D. Samples for Initial Selection: Submit two (2) sets of samples of manufacturer's full and custom range of colors and finishes for each joint sealant product indicated for Architect's initial selection.
- E. Samples for Verification: Acquire Architect's direction to provide one of the following from Architect's initial selection:
  - 1. Submit two samples, 6 inches long, illustrating profile, dimension, color, and finish.
  - 2. Install Mockup samples of three (3) different shades of each sealant at each variation of construction type to be sealed for Architect to make selection verifications. Mockup locations to be as directed by Architect.
    - a. This Mockup requirement is for sealants that will remain visible and without paint or coating.
- F. Installation Plan: Resubmit shop drawings with added information. Indicate locations of sealant colors and finishes in compliance with Architect's verification of samples decisions.
- G. Manufacturer's qualification statement.
- H. Installer's qualification statement.
- I. Manufacturer's Installation Instructions: Submit special procedures, surface preparation, and perimeter conditions requiring special attention.
- J. Indoor Air Quality Certificates:
  - 1. Certify volatile organic compound content for each interior sealant and related primer.
- K. Warranty Sample: As specified in this Section.

## 1.5 QUALIFICATIONS

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum five (5) years documented experience manufacturing products indicated in this Section.
- B. Installer Qualifications: Company specializing in performing the Work of this Section and with at least three (3) years documented experience installing the Work of this Section.

## 1.6 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements.
- B. Maintain temperature and humidity recommended by sealant manufacturer during and after installation.

## 1.7 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties and product bonds.
- B. Warranty: Provide warranty in which sealant manufacturer agrees to correct installed sealant work that fails. Failures include sealants that do not cure, fail to maintain seal including watertightness, exhibit loss of adhesion or cohesion, or staining of sealed substrate. Warranty period indicated is to begin on the date of Substantial Completion.
  - 1. Warranty Period:
    - a. Five (5) years.

## PART 2 PRODUCTS

### 2.1 JOINT SEALANTS - GENERAL

- A. Fire-Rated Construction Elements and Assemblies: Provide only products that comply with requirements indicated on Drawings and comply with Authorities Having Jurisdiction.
- B. Comply with requirements indicated on Drawings and other specification Sections.
- C. Exterior Joints:
  - 1. Seal open joints except open joints indicated on Drawings as not sealed.
  - 2. Seal the following joints:
    - a. Wall expansion and control joints.
    - b. Joints between doors, windows, and other frames and adjacent construction.
    - c. Joints between different exposed materials.
  - 3. Do not seal intentional weep holes in masonry or opening frames.
- D. Interior Joints:
  - 1. Do not seal interior joints indicated on Drawings as not sealed.
  - 2. Do not seal gaps and openings at junction of suspended ceilings to vertical construction unless indicated to be sealed on Drawings or as fire-rating, smoke, or sound control requirements.
  - 3. Seal open joints except specific open joints indicated on Drawings as not sealed.
  - 4. Seal the following joints:
    - a. Opening Frames: Joints as junction of doors, windows, and access frames to other construction.
    - b. Sound and Smoke Control Wall and Ceiling Assemblies:
      - 1) Gaps at electrical outlets, wiring devices, and piping penetrations.
      - 2) Joints at junction to other construction.
- E. ASTM reference designations for joint sealant Types, Grades, Classes, and Uses:
  - 1. ASTM C920, Type S: Single component.
  - 2. ASTM C920, Type M: Multi-components.
  - 3. ASTM C920, Grade P: Pourable.
  - 4. ASTM C920, Grade NS: Non-sag.
  - 5. ASTM C920, Exposure Use T: Traffic.
  - 6. ASTM C920, Exposure Use NT: Non-traffic.
  - 7. ASTM C920, Substrate Use G: Glass.
  - 8. ASTM C920, Substrate Use M: Mortars.
  - 9. ASTM C920, Substrate Use A: Aluminum.
  - 10. ASTM C920, Substrate Use O: Other.
  - 11. ASTM C920, Class XX: Movement capability, percent (single value used when expansion and contraction are equal).
  - 12. ASTM C920, Class XX/YY: Movement capability, percent (expansion / contraction).
  - 13. ASTM C834, Type OP: Opaque.
  - 14. ASTM C834, Grade: Temperature Rating.

### 2.2 NON-SAG JOINT SEALANTS

- A. Type JSS-1: Silicone Joint Sealant, single-component, non-sag, neutral-curing, ASTM C920, Type S, Grade NS, Class 100/50, Use T, NT, G, M, A, and O.
  - 1. Manufacturers: Products are to comply with requirements.
    - a. Dow Chemical Company.
    - b. Pecora Corporation.
    - c. Tremco Incorporated.
  - 2. Basis of Design: Dow Chemical Company - DOWSIL 790.

3. Joint Movement Capability: Plus 100 and minus 50, ASTM C719.
  4. Hardness: 15, Shore A, ASTM C661.
  5. Staining: None on brick, concrete, granite, and limestone.
  6. VOC Content: 26 g/L maximum.
  7. Color:
    - a. To be selected by Architect from manufacturer's full range.
  8. Applications: Locations where field painting is not required.
    - a. Exterior: Control, expansion, and soft joints in masonry, and between masonry and adjacent work.
    - b. Exterior: Control, expansion, and construction joints in vertical cast-in-place concrete.
    - c. Exterior: Joints between metal frames and non-masonry work.
    - d. Exterior: Joints within framing of aluminum storefront, curtain wall, and window systems.
- B. Type JSS-2: Silicone Joint Sealant, single-component, non-sag, neutral-curing, ASTM C920, Type S, Grade NS, Class 50/50, Use NT, G, A, and O.
1. Manufacturers: Products are to comply with requirements.
    - a. Dow Chemical Company.
    - b. Pecora Corporation.
    - c. Tremco Incorporated.
  2. Basis of Design:
    - a. Dow - DOWSIL 795.
  3. SWRI Validation certified.
  4. Joint Movement Capability: Plus and minus 50, ASTM C719.
  5. Hardness: 30 - 35, Shore A, ASTM C661.
  6. Peel Strength: 30 - 32 lb/in, ASTM C794.
  7. Staining: None on brick, concrete, granite, marble, and limestone.
  8. VOC Content: 32 g/L maximum.
  9. Color:
    - a. To be selected by Architect from manufacturer's full range.
  10. Applications: Locations where field painting is not required.
    - a. Exterior: Lap joints in sheet metal work.
    - b. Exterior: Joints between metal frames and non-masonry work.
    - c. Exterior: Joints within exterior insulation finish systems (EIFS).
    - d. Exterior: Joints for which no other sealant type is indicated.
- C. Type JSS-3: Silicone Joint Sealant, mildew resistant, single-component, non-sag, neutral-curing, ASTM C920, Type S, Grade NS, Class 50/50 or 25/25, Use NT, G, M, and A.
1. Manufacturers: Products are to comply with requirements.
    - a. Dow Chemical Company.
    - b. Pecora Corporation.
    - c. Sika Corporation.
    - d. Tremco Incorporated.
  2. Basis of Design:
    - a. Pecora - 898NST.
  3. Mold and mildew resistant.
  4. Non-corrosive to copper, brass, and zinc allows.
  5. Fungi Resistance: No growth (less than 2 ug), ASTM G21.
  6. Joint Movement Capability: Plus and minus 50 or 25, ASTM C719.
  7. Hardness: 25 - 35, Shore A, ASTM C661.
  8. Peel Strength: Pass for glass, white marble, granite, and fiberglass, ASTM C794.
  9. Staining: None on granite and marble.
  10. VOC Content: 50 g/L maximum.

11. Color:
    - a. To be selected by Architect from manufacturer's full range.
  12. Applications: Locations where field painting is not required.
    - a. Interior: Joints between wet area fixtures and floors, walls, and ceilings.
    - b. Interior: Joints at through wall plumbing penetrations.
- D. Type JSL-1: Siliconized Acrylic Latex Joint Sealant, single-component, non-sag, non-staining, nonbleeding, ASTM C834, Grade OP, Grade -18 Degrees F.
1. Manufacturers: Products are to comply with requirements.
    - a. Pecora Corporation.
    - b. Sika - Master Builders Solutions.
    - c. Tremco Incorporated.
  2. Basis of Design:
    - a. Sika - MasterSeal NP 520.
  3. Overcoat: Paintable.
  4. Elongation at Break: 169 percent, ASTM D412.
  5. Recovery: 91.3 percent, ASTM C736.
  6. Slump: 0 (zero) inch, ASTM D2202.
  7. Tensile Strength: 203 psi, ASTM D412.
  8. Fire Spread / Smoke Development Index: 10/5, ASTM E84.
  9. Sound Transmission Class (STC): 58 db, ASTM E90.
  10. VOC Content: 13 g/L maximum.
  11. Color:
    - a. To be selected by Architect from manufacturer's full range.
  12. Applications: Locations where field painting of substrates is required on both sides of joint unless indicated otherwise on Drawings.
    - a. Interior: Joints of painted wood.
    - b. Interior: Joints of painted gypsum wallboard construction.
    - c. Interior: Acoustic sealant in concealed applications.
    - d. Interior: Joints of painted substrates for which no other sealant is indicated.
- E. Type JSU-1: Polyurethane Elastomeric Joint Sealant, single-component, non-sag, moisture-curing, ASTM C920, Type S, Grade NS, Class 35/35, Use T, NT, M, A, and O.
1. Manufacturers: Products are to comply with requirements.
    - a. Pecora Corporation.
    - b. Sika USA.
    - c. Tremco Incorporated.
  2. Basis of Design: Sika - Sikaflex-1A.
  3. SWRI Validation certified.
  4. Overcoat: Paintable.
  5. Joint Movement Capability: Plus and minus 35, ASTM C719.
  6. Hardness: 25 - 45 Shore A, ASTM C661.
  7. Peel Strength: 20 lb/in, ASTM C794.
  8. Tensile Strength: 175 psi at 21 days, ASTM D412.
  9. Elongation: 550 percent, ASTM D412.
  10. Service Temperature: Minus 40 to 170 degrees F.
  11. VOC Content: 37 g/L maximum, ASTM D3960.
  12. Color:
    - a. To be selected by Architect from manufacturer's full range.
  13. Applications: Locations where field painting of substrates is required on both sides of joint unless indicated otherwise on Drawings.
    - a. Interior: Joints in concrete and concrete panels.
    - b. Interior: Joints on underside of concrete planks and panels.
    - c. Interior: Joints in unit masonry.

- d. Interior: Joints between metal frames and adjacent construction.
- e. Interior: Traffic joints in floors and at junction of floors to walls.

## 2.3 SELF-LEVELING JOINT SEALANTS

- A. Type JSS-3: Self-Leveling Silicone Joint Sealant, single-component, neutral-curing, ASTM C920, Type S, Grade P, Class 100/50, Use T, M, A, and O.
  - 1. Manufacturers: Products are to comply with requirements.
    - a. Dow Chemical Company.
    - b. Pecora Corporation.
    - c. Tremco Incorporated.
  - 2. Basis of Design:
    - a. Pecora - 300 SL (Self-Leveling).
  - 3. Joint Movement Capability: Plus 100 and minus 50, ASTM C719.
  - 4. Hardness: 15, Shore A, ASTM C661.
  - 5. Elongation at Break: 1,400 percent, ASTM D412.
  - 6. Service Temperature: Minus 40 to 180 degrees F.
  - 7. Color:
    - a. To be selected by Architect from manufacturer's full range.
  - 8. Applications: Locations where field painting is not required.
    - a. Exterior: Control, construction, and expansion joints in concrete paving and between concrete and asphalt paving.

## 2.4 ACCESSORIES

- A. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- B. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- C. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specified sealant, and recommended by backing and sealant manufacturers for specific application.
  - 1. Type for Joints Not Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type O - Open Cell Polyurethane.
  - 2. Type for Joints Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type B - Bi-Cellular Polyethylene.
  - 3. Open Cell: 40 to 50 percent larger in diameter than joint width.
  - 4. Closed Cell and Bi-Cellular: 25 to 33 percent larger in diameter than joint width.
- D. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.
- E. Masking Tape: Self-adhesive, nonabsorbent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify substrate surfaces and joint openings are as required and ready to receive work.
- C. Verify that accessories are as required by sealant manufacturer and are compatible with sealant and application surfaces.



**3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of Work of this Section. Prepare materials to be installed and equipment used during installation.
- B. Remove loose materials and foreign matter impairing adhesion of sealant.
- C. Clean and prime joints.
- D. Perform preparation in accordance with ASTM C1193.
- E. Protect elements surrounding Work of this Section from damage or disfiguration.

**3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Perform installation in accordance with ASTM C1193.
- C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- D. Apply masking tape to protect adjacent surfaces and to form uniform sealant edge.
- E. Install bond breaker backing tape where joint backing is not used.
- F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces or other construction.
- G. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- H. Tool sealant surface concave, unless otherwise indicated and remove masking tape at appropriate time to form uniform sealant edge and as to not mar substrate beneath.

**3.4 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Clean adjacent soiled surfaces.

**3.5 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect sealants until cured.

**END OF SECTION**



**SECTION 07 95 13**  
**EXPANSION JOINT COVER ASSEMBLIES**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section includes expansion joint cover assemblies for floor, wall and ceiling surfaces.
- B. Related Requirements:
  - 1. Section 04 20 00 - Unit Masonry: Execution requirements for placement of joint assembly frames specified in this Section in masonry.
  - 2. Section 07 62 00 - Sheet Metal Flashing and Trim: Roof control joints.
  - 3. Section 07 90 00 - Joint Protection: Expansion and control joint finishing utilizing sealant and bond breaker.

**1.2 REFERENCES**

- A. ASTM International (ASTM):
  - 1. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
  - 2. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.
  - 3. ASTM B308/B308M - Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles; 2020.
- B. Intertek Testing Services (ITS):
  - 1. ITS (DIR) - Directory of Listed Products; Current Edition.
- C. Underwriters Laboratories Inc. (UL):
  - 1. UL (Dir) - Online Certifications Directory; Current Edition.
  - 2. UL (FDR) - Fire Resistance Directory; Current Edition.

**1.3 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal requirements.
- B. Product Data: Submit joint assembly profiles, profile dimensions, anchorage devices, and manufacturer's full range and custom range of colors and finishes.
- C. Shop Drawings: Indicate joint and splice locations, miters, layout of work, affected adjacent construction, and anchorage locations.
- D. Samples for Initial Selection: Submit two samples of manufacturer's full range of colors and finishes for Architect's initial selection.
  - 1. For Exterior Wall Applications: Allow for custom color selection by Architect.
- E. Samples for Verification: Submit two samples 6 inches long, illustrating profile, dimension, color, and finish selected from Architect's initial selection.
  - 1. For Exterior Wall Applications: Allow for custom color selection by Architect.
- F. Manufacturer's Installation Instructions: Submit rough-in sizes; provide templates for cast-in or placed frames or anchors; required tolerances for item placement.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Expansion Joint Cover Assemblies:
  - 1. Architectural Art Mfg., Inc.
  - 2. Balco, Inc.
  - 3. Watson Bowman Acme Corporation.
  - 4. Construction Specialties, Inc.
  - 5. MM Systems Corporation.
  - 6. Nystrom, Inc.
- B. Basis of Design: MM System Corporation.

### 2.2 APPLICATIONS

- A. Colors to be as selected by Architect from manufacturer's full range, unless indicated otherwise.
- B. Interior Joints:
  - 1. Floor to Floor Joints: [Flushline System FSS Series](#).
  - 2. Wall to Wall Masonry Joints: [ESS Series](#).
  - 3. Wall to Wall Masonry Corner Joints: [ESS Series](#).
  - 4. Wall to GWB Ceiling Joints: [VSGL Series](#).
  - 5. Wall to Acoustic Ceiling Joints: [VSGL Series](#).
  - 6. Inline Acoustic Ceiling Joints: [VSG Series](#).
- C. Exterior Joints:
  - 1. Wall to Wall Masonry Joints: [ESS Series](#).
  - 2. Wall to Wall Masonry Corner Joints: [ESS Series](#).
- D. Fire Rated Expansion and Seismic Joints: [Pyro-Flex Fire Barrier](#).
  - 1. Provide cover assembly labled to have fire rating equivalent to that required for constructed joint.
    - a. Acceptable Evaluation Agencies: UL, ULC, and Intertek.

### 2.3 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. Joint Dimensions and Configurations: As indicated on Drawings.
  - 2. Joint Cover Sizes: Selected to suit joint width and configuration, based on manufacturer's published recommendations and limitations.
  - 3. Joint Cover Styles: As indicated in the Applications Article of this Section and as indicated on Drawings.
  - 4. Joint Movement Capability: If not indicated, provide minimum plus/minus 50 percent joint movement capability.
  - 5. Lengths: Provide covers in full lengths required; avoid splicing wherever possible.
  - 6. Anchors, Fasteners, and Fittings: Provided by cover manufacturer.
- B. Floor Joint Covers: Coordinate with indicated floor coverings.
  - 1. If floor covering is not indicated, obtain instructions from Architect before proceeding.
  - 2. If style is not indicated, provide extruded aluminum frame both sides, resilient seals, and minimize exposed metal.

- C. Sliding Cover Plate Type Covers: Provide plate with beveled edges and neat fit that does not collect dirt.
- D. Covers In Fire Rated Assemblies: Provide cover assembly labeled to have fire rating equivalent to that required for constructed joint.
  - 1. Acceptable Evaluation Agencies: UL, ULC, and Intertek.

## 2.4 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper; or ASTM B308/B308M, 6061 alloy, T6 temper.
  - 1. Colors: As selected by Architect from manufacturer's full range of finishes.
- B. Anchors and Fasteners:
  - 1. Exterior Applications: Stainless steel as recommended by cover manufacturer.
  - 2. Interior Applications at Cementitious Substrates: Stainless steel as recommended by cover manufacturer.
  - 3. Interior Applications at Non-Cementitious Substrates: As recommended by cover manufacturer.
- C. Backing Paint: Asphaltic type.
- D. Sealant: Silicone, color to match preformed expansion joint color.

## 2.5 FABRICATION

- A. Joint Covers: Aluminum cover plate, designed to permit plus or minus 50 percent joint movement with full recovery, surface mounted.
- B. Back paint components in contact with cementitious materials or dissimilar metals.
- C. Shop assemble components and package with anchors and fittings.
- D. Furnish joint components in single continuous length wherever practical. Minimize site splicing.

## 2.6 FACTORY FINISHING

- A. As selected by Architect from manufacturer's full range of finishes.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Examine substrates for conditions detrimental to installation of the Work. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Verify that joint preparation and dimensions are acceptable and in accordance with manufacturer's requirements.
- D. Verify that joint sealant system has been installed before application of rigid joint cover assembly.
- E. Verify that frames and anchors installed by others are in correct locations and suitable for installation of remainder of assembly.

**3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Provide anchoring devices for installation and embedding.
- D. Provide templates and rough-in measurements.

**3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install components and accessories in accordance with manufacturer's instructions.
- C. Align materials and cover assemblies as indicated on the Drawings.
- D. Align work plumb and level, flush with adjacent surfaces.
- E. Rigidly anchor to substrate to prevent misalignment.
- F. Where indicated, apply field sealant to exterior joint material, both sides of joint.

**3.4 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work and comply with manufacturer's recommendations.
- B. Clean installed work in accordance with manufacturer's recommended materials and procedures.

**3.5 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Do not permit traffic over unprotected floor joint surfaces.

**END OF SECTION**

**SECTION 08 11 13**  
**HOLLOW METAL DOORS AND FRAMES**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
1. Non-fire-rated hollow metal doors and frames.
  2. Fire-rated hollow metal doors and frames.
  3. Hollow metal frames for wood doors and door types other than steel doors.
  4. Hollow metal borrowed lites glazing frames.
- B. Related Requirements:
1. Section 04 20 00 - Unit Masonry: Wall construction type. Masonry grout fill of metal frames and placement of anchors into masonry wall construction.
  2. Section 08 14 16 - Flush Wood Doors: Wood doors for metal frames.
  3. Section 08 71 00 - Door Hardware: Hardware, silencers, and weatherstripping.
  4. Section 08 80 00 - Glazing: Glass for doors and lite frames.
  5. Section 09 21 16 - Gypsum Board Assemblies: Wall construction type.
  6. Section 09 90 00 - Painting and Coating: Field painting.

**1.2 REFERENCES**

- A. Americans With Disabilities Act (ADA):
1. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; Current Edition.
- B. American National Standards Institute (ANSI) and Steel Door Institute (SDI):
1. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2022.
  2. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames; 2020.
  3. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames; 2023.
  4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2020.
- C. ASTM International (ASTM):
1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
  2. ASTM C1363 - Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus; 2019.
  3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023b.
- D. International Code Council (ICC):
1. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- E. Intertek Testing Services (ITS):
1. ITS (DIR) - Directory of Listed Products; Current Edition.
- F. National Fire Protection Association (NFPA):
1. NFPA 80 - Standard for Fire Doors and Other Opening Protectives: 2022.
  2. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

3. NFPA 105 - Standard for Smoke Door Assemblies and other Opening Protectives; 2022.
  4. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2022.
  5. NFPA 257 - Standard On Fire Test For Window And Glass Block Assemblies; 2022.
- G. Steel Door Institute (SDI):
1. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames; 2023.
- H. Underwriters Laboratories Inc. (UL):
1. UL (DIR) - Online Certifications Directory; Current Edition.
  2. UL 9 - Standard for Safety Fire Tests of Window Assemblies; Current Edition, Including All Revisions.
  3. UL 10B - Standard for Safety Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
  4. UL 10C - Standard for Safety Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
  5. UL 1784 - Standard for Safety Air Leakage Tests of Door Assemblies and Other Opening Protectives; Current Edition, Including All Revisions.

### 1.3 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate fire rating of metal frames to fire rating requirements of doors and wall construction for compliance with overall fire rated separation requirements.
- C. Coordinate Work with the requirements of frame and door opening construction, door hardware, and glazing.
- D. Coordinate frames to accommodate various glazing types, door types and hardware requirements as indicated in the Drawings and other specification sections.
- E. Coordinate door frames and anchors with adjacent wall construction which may include, but not be limited to, masonry and framed wall construction with various finish types.
- F. Coordinate fabrication of doors and frames to include factory installed steel plate reinforcing for required hardware devices as indicated in this Section and in Section 08 71 00 for each door and frame. Reinforcing to comply with ANSI/SDI A250.8 and ANSI/SDI A250.6.
- G. Coordinate fabrications and sequence installation to accommodate required door hardware electric wire connections.

### 1.4 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene at project site minimum one week prior to commencing work of this section.
- C. Require attendance of Architect, Owner, Owner's Locksmith and installers of doors, frames, hardware, access control systems, electrical and walls.
- D. Review specification section and cited standards for this Work and Work of related installers; verify submittal approvals and outstanding issues; verify qualifications including qualifications of Contractor's inspectors.

### 1.5 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit manufacturer's product data describing products and components. Include sample of each warranty specified.



- C. Shop Drawings: Indicate materials and details of design and construction; hardware locations; reinforcement type and locations; anchor types, spacing, locations and fastening methods; door and frame elevations and assemblies; glazing; fire rating; smoke and draft control; and finishes.
- D. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.
- E. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.
- F. Manufacturer's Qualification Statement.
- G. Installer's Qualification Statement.

## 1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
- B. Manufacturer Qualifications: Company specializing in manufacturing Products specified in this section with at least five (5) years documented experience.
- C. Installer Qualifications: Company specializing in performing work of the type specified and with at least three (3) years documented experience.
- D. Maintain at project site copies of reference standards relating to installation of products specified.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Accept frames and doors on site in manufacturer's packaging. Inspect for damage.
- C. Comply with manufacturer's recommendation and ANSI/SDI A250.8 in accordance with specified requirements.
- D. Protect with resilient packaging; prevent against humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

## 1.8 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Furnish manufacturer's five (5) year warranty for fire rated and for smoke and draft control assemblies.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Hollow Metal Doors and Frames:
  - 1. Ceco Door - Assa Abloy.
  - 2. Curries - Assa Abloy.
  - 3. Fleming Door Products - Allegion.
  - 4. Pioneer Industries.
  - 5. Republic Doors - Allegion.
  - 6. Steelcraft - Allegion.

7. Substitutions: Section 01 60 00 - Product Requirements.

## 2.2 REGULATORY REQUIREMENTS

- A. Regulatory requirements in this Article are minimum requirements, unless requirements by authorities having jurisdiction are more stringent. Comply with the most stringent requirements.
- B. Fire Rated Assemblies:
  1. Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated.
  2. Fire Rating: As indicated on Drawings, tested in accordance with UL 10C and NFPA 252 (positive pressure fire tests).
  3. Provide units listed and labeled by UL (DIR) or ITS (DIR).
    - a. Attach fire rating label to each fire rated unit.
  4. Temperature-Rise Rating (TRR) Across Framed Door Thickness: In accordance with local building code and authorities having jurisdiction.
- C. Smoke and Draft Control Assemblies:
  1. Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction.
  2. Locations as indicated on Drawings.
  3. Self-closing or automatic closing doors in accordance with NFPA 80 and NFPA 105, with fire-resistance-rated wall construction rated the same or greater than the fire rated doors, and as follows:
    - a. Maximum Air Leakage: 3.0 cfm/sq ft (0.02 cu m/sec/sq m) of door opening at 0.10 inch w.g. (24.9 Pa) pressure, when tested in accordance with UL 1784 at both ambient and elevated temperatures.
    - b. Gasketing: Provide gasketing and edge sealing as necessary to achieve leakage limit.
    - c. Label: Include the "S" label on fire-rating label of door.
- D. Fire Rated, Borrowed-Lite Assemblies:
  1. Complying with NFPA 80 and listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for fire protection ratings.
  2. Fire Rating: As indicated on Drawings, tested in accordance with UL 9 and NFPA 257.
- E. Accessibility: Comply with ICC A117.1 and ADA Standards.

## 2.3 HOLLOW METAL DOORS AND FRAMES

- A. Standard and custom shop fabricated hollow metal doors and frames; fire rated and smoke and draft control assemblies; refer to Drawings and this Section for sizes and configurations.
- B. Finish for doors and frames:
  1. Factory primed and field finished. Refer to 09 90 00 - Coating and Painting for field finish.
- C. Interior Doors: ANSI/SDI A250.8, 1-3/4 inch thick.
  1. Level 3 - Extra Heavy Duty; door face 0.053 inch (16 gauge) thick steel, minimum.
  2. Model 2 (seamless), unless indicated otherwise on Drawings.
  3. Physical Performance: Level A (1,000,000 cycles), in accordance with ANSI/SDI A250.4.
  4. Door Face Sheet: Flush.
  5. Door Core:

- a. Manufacturer's standard core material/construction and in compliance with requirements.
  6. End Closures: Steel channel type; 0.042 inch thick; flush with door faces and edges.
  7. Fire-Rating and Smoke and Draft Control: As indicated on Drawings and in compliance with REGULATORY REQUIREMENTS in this Section.
- D. Interior Frames: ANSI/SDI A250.8.
1. Level 3 - Extra Heavy Duty; 0.053 inch (16 gauge) thick steel, minimum.
  2. Joinery of Frame Members:
    - a. Full profile continuously welded type.
  3. Fire-Rating and Smoke and Draft Control: As indicated on Drawings and in compliance with REGULATORY REQUIREMENTS in this Section.
- E. Exterior Doors: ANSI/SDI A250.8, 1-3/4 inch thick.
1. Level 4 - Maximum Duty; door face 0.067 inch (14 gauge) thick steel, minimum.
    - a. Zinc Coating: A60/ZF180 (galvannealed), ASTM A653/A653M.
  2. Model 2 (seamless), unless indicated otherwise on Drawings.
  3. Physical Performance: Level A (1,000,000 cycles), in accordance with ANSI/SDI A250.4.
  4. Door Face Sheet: Flush.
  5. Door Core:
    - a. Manufacturer's standard core material/construction and in compliance with requirements.
  6. Thermal Resistance Rating: For doors and frames separating conditioned air space and unconditioned air space, provide door and frame assembly with R-value of not less than 2.4 deg F x h x sq. ft./BTU when tested in accordance with ASTM C1363.
  7. End Closures: Steel channel type; 0.042 inch thick; flush with door faces and edges.
    - a. Provide weep hole openings in bottoms to permit moisture to escape to exterior. Seal joints in top edges of doors against water penetration.
  8. Weatherstripping: Refer to Section 08 71 00.
  9. Fire-Rating and Smoke and Draft Control: As indicated on Drawings and in compliance with REGULATORY REQUIREMENTS in this Section.
- F. Exterior Frames: ANSI/SDI A250.8.
1. Level 4 - Maximum Duty; 0.067 inch (14 gauge) thick steel, minimum.
    - a. Zinc Coating: A60/ZF180 (galvannealed), ASTM A653/A653M.
  2. Joinery of Frame Members:
    - a. Full profile continuously welded type.
  3. Weatherstripping: Refer to Section 08 71 00.
  4. Fire-Rating and Smoke and Draft Control: As indicated on Drawings and in compliance with REGULATORY REQUIREMENTS in this Section.
- G. Borrowed Lites Glazing Frames: Construction and face dimensions to match door frames, and as indicated on Drawings. Non-removable stops on non-secured side of frame.

## 2.4 ACCESSORIES

- A. Louvers: Roll formed steel with overlapping frame; steel coating and finish same as door components; factory installed.
1. In Fire-Rated Doors: UL (DIR) or ITS (DIR) listed fusible link louver, same rating as door.
  2. Style: Standard straight slat blade, unless indicated otherwise on Drawings.
  3. Louver Free Area: Comply with air flow requirements.
  4. Fasteners: Concealed fasteners.
- B. Glazing: As specified in Section 08 80 00 - Glazing; factory installed.

- C. Removable Glazing Stops: Rolled steel channel shape, mitered, or butted corners; prepared for countersink type screw holes and screws.
- D. Frame Anchors:
  - 1. Masonry Walls: Masonry strap type; three holes in strap; galvanized.
  - 2. Metal Stud Walls: Steel stud channel type.
  - 3. Base Anchor: Fixed base type.
- E. Astragals for Double Doors: Comply with requirements of door operation and fire rating and smoke and draft control.
- F. Hollow Metal Fixed Panels: If indicated on Drawings, provide panels of same construction, performance, and finish as doors.
- G. Silencers: Specified in Section 08 71 00.
- H. Weatherstripping: Specified in Section 08 71 00.

## 2.5 FABRICATION

- A. Fabricate doors and frames to comply with fire rating and smoke and draft control indicated on Drawings.
- B. Fabricate doors and frames with hardware reinforcement welded in place. Comply with ANSI/SDI A250.8 and ANSI/SDI A250.6. Protect frame hardware preparations with mortar guard boxes.
- C. Fabricate frames to accommodate various glazing types, door types and hardware requirements as indicated in the Drawings and other specification sections.
- D. Fabricate frames and anchors to suit indicated adjacent wall and floor construction which may include, but not be limited to, concrete, masonry, and framed wall construction with indicated finish types.
- E. Fabricate frames to suit masonry wall coursing with head member height as required to fill opening without cutting masonry units.
- F. Reinforce frames wider than 48 inches with roll formed steel channels fitted tightly into frame head, flush with top.
- G. Prepare interior frames for silencers or other seal devices for achieving fire rating and smoke and draft control requirements.
- H. Kerfed Frames: Provide kerfed-style frames where required by door seal hardware such as smoke gasketing, sound gasketing or weatherstripping.
- I. Frame Silencers and Weatherstripping:
  - 1. Interior Frames: Prepare frames for silencers. Provide three single silencers for single doors on strike side. Provide two single silencers on frame head at double doors without mullions.
  - 2. Exterior Frames: Configure exterior frames with profile to receive recessed weatherstripping.
- J. Frame Mullions for Double Doors: Removable type, with profile matching jambs.
- K. Frame Transom Bars for Glazed Lights: Fixed type, integral with adjacent frame construction and with profile matching jamb and head.
- L. Attach fire rating label to each fire rated door and frame.
- M. Attach label to each hollow metal door and frame indicating A-60 Galvannealed.

## 2.6 SHOP FINISHING

- A. Steel Sheet: Galvanized to ASTM A653/A653M, A60.
- B. Primer: Baked. ANSI A250.10 rust inhibitive type.
- C. Bituminous Coating: Fibered asphalt emulsion. Coating inside of frames to be set in masonry walls or otherwise grouted solid with cementitious grout. Apply coating after fabrication and after primer has cured.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify existing conditions before starting work.
- C. Verify opening sizes and tolerances are acceptable.
- D. Verify that finished walls are in plane to ensure proper door alignment.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

### 3.3 INSTALLATION

- A. Install doors and frames in accordance with ANSI/SDI A250.8.
- B. Install fire rated units in accordance with NFPA 80.
- C. Coordinate installation of doors and frames with indicated types of doors, electrical connections, hardware, and glazing panels that are specific to each opening as indicated on the Drawings and in the Specifications.
- D. Install door hardware as specified in Section 08 71 00.
  - 1. Comply with recommended practice for hardware placement of doors and frames in accordance with ANSI/SDI A250.8 and ANSI/SDI A250.6.
- E. Coordinate installation of door frames and anchors with indicated adjacent wall and floor construction which may include, but not be limited to, concrete, masonry, and framed wall construction with indicated finish types.
- F. Grout solid, frames in masonry construction. Prior to grouting, provide bracing sufficient so that pressure of grout will not deform frames.
- G. Install roll formed steel reinforcement channels between two abutting frames. Anchor to structure and floor.
- H. Comply with glass and glazing installation requirements in Section 08 80 00.
- I. Adjust door for smooth and balanced door movement and latching.

### 3.4 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.

- B. Comply with tolerances and clearances indicated in SDI 117.
- C. Maximum Diagonal Distortion: 1/16 inch measured with straight edges, crossed corner to corner.

**3.5 SCHEDULE**

- A. Refer to Door and Frame Schedule on Drawings.

**END OF SECTION**

**SECTION 08 11 16.10**  
**ALUMINUM DOORS WITH FRP FACE PANEL**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Section includes aluminum doors with fiberglass reinforced plastic (FRP) face panels.
- B. Related Requirements:
  - 1. Section 07 90 00 - Joint Protection: Frame perimeter sealants.
  - 2. Section 08 41 13 - Aluminum-Framed Entrances and Storefronts: Frames requiring FRP faced doors.
  - 3. Section 08 44 13 - Glazed Aluminum Curtain Walls: Frames requiring FRP faced doors.
  - 4. Section 08 71 00 - Door Hardware: Hardware items other than specified in this section.
  - 5. Section 08 80 00 - Glazing.

**1.2 REFERENCES**

- A. American Architectural Manufacturers Association (AAMA):
  - 1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2020.
  - 2. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
  - 3. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
- B. ASTM International (ASTM):
  - 1. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
  - 2. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
  - 3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
  - 4. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014, Reapproval 2021.
  - 5. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000, Reapproval 2023.

**1.3 SYSTEM DESCRIPTION**

- A. Aluminum framed entrance system with aluminum doors faced with fiber reinforced polyester faces.

**1.4 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work and expansion and contraction joint location and details.

- C. Product Data: Submit component dimensions; describe components within assembly, anchorage and fasteners, glass and infill, door hardware, and internal drainage details.
- D. Samples for Initial Selection: Two manufacturer's complete set of color samples illustrating the full range of finishes and colors available. Include samples for FRP surfaces, aluminum frame finishes, glass units, infill panels, glazing materials. Submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples to be same product material type indicated for final Work; each sample 8 x 8 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

## 1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five (5) years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum five (5) years documented experience.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Protect finished aluminum surfaces with strippable coating. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.

## 1.7 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Furnish ten (10) year manufacturer's warranty for doors and frames systems.

## PART 2 PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. System Design: Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall, including building corners.
  - 1. To design pressure of 6.24 lb/sq ft, as tested in accordance with ASTM E330/E330M.
- B. System Assembly: Accommodate without damage to components or deterioration of seals, movement within system, movement between system and peripheral construction, dynamic loading and release of loads, deflection of structural support framing.
- C. Water Leakage: None, when measured in accordance with ASTM E331 with test pressure difference of 20 percent of design pressure, with minimum differential of 2.86 lbf/sq ft and maximum of 12.00 lbf/sq ft.

### 2.2 ALUMINUM DOORS WITH FRP FACE PANEL

- A. Manufacturers:
  - 1. Eliason Corporation.
  - 2. Kawneer Co., Inc.



3. Oldcastle Building Envelope.
  4. Special-Lite, Inc.
  5. Substitutions: Section 01 60 00 - Product Requirements.
- B. Flush Aluminum Doors with Fiberglass Reinforced Plastic (FRP) Face Sheets: Aluminum internal framing; no steel components.
1. Size: As indicated on Drawings.
  2. Thickness: 1-3/4 inches (44 mm).
  3. Stiles and Rails:
    - a. Stiles: As indicated on Drawings, but not less than 5-1/2 inches wide, reinforced minimum 3/16 inch thick.
    - b. Top and Bottom Rails: As indicated on Drawings, but not less than 6 inches wide, reinforced minimum 3/16 inch thick.
  4. Facing: Seamless, ultraviolet stabilized laminated FRP sheet.
    - a. Sheet Thickness: 0.12 inch (3 mm), minimum.
    - b. FRP Texture:
      - 1) Pebble grain.
    - c. 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.
    - d. Color: To be selected by Architect from manufacturer's full range.
  5. Core Insulation: Poured-in-place polyurethane foam insulation of not less than 5 lb/cu ft (80 kg/cu m) density.
  6. Hardware Reinforcement: Provide minimum internal 3/16 inch steel reinforcement.
  7. Aluminum Finish and Color:
    - a. Match door frame finish and color.
- C. Hardware:
1. Coordinate with Section 08 71 00 - Door Hardware; provide door hardware for types of doors, applications, and hardware indicated:
    - a. Weatherstripping: Wool pile, continuous and replaceable.
    - b. Hinges: Continuous type, non-removable pin.
      - 1) Specified in Section 08 71 00.
    - c. Threshold: Extruded aluminum, one piece for each door opening, ribbed surface.
      - 1) Specified in Section 08 71 00
    - d. Panic Device: Specified in Section 08 71 00.
    - e. Closer: Specified in Section 08 71 00.
    - f. Lock Cylinders: Specified in Section 08 71 00.
    - g. Finish: Hardware finish to match door aluminum finish.
- D. Glazing Panels: Manufacturer's integral aluminum frame, factory gasket glazed, and allowing for thermal movement. requirements.
1. Interior Doors: 1/4 inch thick tempered glass.
  2. Exterior Doors: 1 inch thick insulated glazing unit; tempered glass.
  3. Refer to Section 08 80 00 - Glazing.
- E. Fasteners and Anchors: Stainless steel.

## 2.3 FABRICATION

- A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- C. Prepare components to receive anchor devices. Fabricate anchors.

- D. Arrange fasteners and attachments to conceal from view.
- E. Prepare components with heavy duty internal reinforcement for door hardware.
- F. Reinforce framing members for imposed loads.

## 2.4 ALUMINUM MATERIALS

- A. Extruded Aluminum: ASTM B221; 6063 alloy, T5 temper typical or 6061 alloy, T6 temper for extruded structural members.
- B. Sheet Aluminum: ASTM B209/B209M, 5005 alloy, H15 or H34 temper.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Examine substrates for conditions detrimental to installation of the Work. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Examine products to be installed for damage and other conditions detrimental to completion of the Work. Proceed with installation only after unsatisfactory conditions have been corrected.
- D. Verify dimensions, tolerances, and method of attachment with other Work.
- E. Verify wall openings are ready to receive Work of this Section.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- 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.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- G. Set thresholds in bed of mastic and secure.
- H. Install hardware using templates provided. Refer to Section 08 71 00 for installation requirements.
- I. Install infill panels using method required to achieve performance criteria.
- J. Coordinate installation of perimeter sealants with Section 07 90 00.

**3.4 ERECTION TOLERANCES**

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

**3.5 ADJUSTING**

- A. Section 01 73 00 - Execution: Adjusting requirements.
- B. Adjust door for smooth and balanced door movement and latching.

**3.6 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures.
- B. Clean installed work and comply with manufacturer's recommendations.

**3.7 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed construction from damage.

**END OF SECTION**



## SECTION 08 14 16

### FLUSH WOOD DOORS

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
  - 1. Flush wood doors.
- B. Related Requirements:
  - 1. Section 08 11 13 - Hollow Metal Doors and Frames: Metal frames for wood doors indicated to be installed in metal frame.
  - 2. Section 08 41 13 - Aluminum-Framed Entrances and Storefronts: Aluminum frames for wood doors indicated to be installed in aluminum frame.
  - 3. Section 08 71 00 - Door Hardware.
  - 4. Section 08 80 00 - Glazing.

##### 1.2 REFERENCES

- A. ASTM International (ASTM):
  - 1. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2023.
  - 2. ASTM E413 - Classification for Rating Sound Insulation; 2022.
- B. Architectural Woodwork Institute (AWI), Architectural Woodwork Manufacturers Association of Canada (AWMAC), Woodwork Institute (WI):
  - 1. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014, Errata 2016.
- C. Architectural Woodwork Institute (AWI):
  - 1. AWI (QCP) - Quality Certification Program; Current Edition.
- D. California Air Resource Board (CARB):
  - 1. CARB (ATCM) - Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products; Current Edition.
- E. National Fire Protection Association (NFPA):
  - 1. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2022.
  - 2. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives; 2022.
- F. Underwriters Laboratories Inc. (UL):
  - 1. UL (Dir) - Online Certifications Directory; Current Edition.
  - 2. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
  - 3. UL 1784 - Standard for Safety Air Leakage Tests of Door Assemblies and Other Opening Protectives; Current Edition, Including All Revisions.

##### 1.3 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Provide the necessary framing, blocking, and backing in walls and ceilings adequate for anchorage the Work.
- C. Coordinate Work with door opening construction, door frame and door hardware.

- D. Coordinate fire rating of metal frames to fire rating requirements of doors and wall construction for compliance with overall fire rated separation requirements.
- E. Coordinate frames with smoke and draft control doors to comply with overall assembly requirements.
- F. Coordinate frames with sound rated doors to comply with overall assembly requirements.

#### 1.4 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this Section. Review the work requirements, project conditions, sequencing, application procedures, quality control, testing and inspection and production schedule.

#### 1.5 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Indicate door core materials and construction; veneer species, type, and characteristics.
- C. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts required, special beveling, special blocking for hardware, factory machining criteria, factory finishing criteria, identify cutouts for glazing.
  - 1. Provide information as required by AWI/AWMAC/WI (AWS).
  - 2. Include AWI (QCP) certification program label and project registration identification.
- D. Samples for Initial Selection: Two sets of manufacturer's samples; each 2 x 4 inches; illustrating the full range of wood grains, stain colors and sheens available for products with factory-applied finishes; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare two samples for each selected finish, color, and sheen; on same product material type indicated for final Work; each 8 x 10 inches. Where finishes involve normal finish, color, sheen, and texture variations, include sample sets showing the full range of variations expected.
- F. Manufacturer's Installation Instructions: Submit special installation instructions.
- G. Manufacturer's Qualifications Statement.
- H. Installer's Qualifications Statement.
- I. Specimen warranty.

#### 1.6 CLOSEOUT SUBMITTALS

- A. Warranties executed in Owner's name.
- B. AWI (QCP) - Quality Certification Program certificates.

#### 1.7 QUALITY ASSURANCE

- A. Maintain one copy of the specified door quality standards on site for review during installation and finishing.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section with not less than five (5) years of documented experience.
  - 1. Accredited participant in AWI (QCP) - Quality Certification Program prior to commencement of fabrication and throughout the duration of the project.

- C. Installer Qualifications: Company specializing in performing work of the type specified in this Section, with not less than five (5) years of documented experience.
- D. Comply with AWI/AWMAC/WI (AWS) standards and grades indicated, unless otherwise specified or indicated.
  - 1. Grades indicated are minimum requirement. Where the Contract Documents indicate elements of the work requirements that exceed the minimum grade indicated, comply with the Contract Documents regarding that element of the work.
- E. Comply with AWI (QCP) - Quality Certification Program requirements.
  - 1. AWI (QCP) quality certification:
    - a. Register project and comply with AWI (QCP) woodwork association quality certification service/program in accordance with requirements for work specified in this Section.
    - b. Provide labels or certificates indicating that installed complies with AWI/AWMAC/WI (AWS) requirements for grade or grades specified.
    - c. Provide designated labels on shop drawings and installed products as required by certification program.
    - d. Submit certifications upon completion of installation that verifies the work complies with specified requirements.
- F. Attach labels from certifying agencies approved by authority having jurisdiction.

## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Package, deliver, and store doors in accordance with AWI/AWMAC/WI (AWS) standards, and door manufacturer requirements.

## 1.9 ENVIRONMENTAL REQUIREMENTS

- A. Environmental Limitations: Comply with AWI/AWMAC/WI (AWS) standards and as follows.
  - 1. Do not deliver or install doors until building space is enclosed and weathertight, wet work is complete and dry, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 25 and 55 percent during remainder of construction period. Allow minimum of 72 hours for delivered materials to acclimate to the climate controlled building space before beginning installation.

## 1.10 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties and product bonds.
- B. Furnish manufacturer's "Life of Installation" warranty for interior doors, including hanging and finishing if door(s) do not comply with warranty tolerance standards.
  - 1. Include coverage for defective materials, delamination, warping, cupping, bowing, and telegraphing of core construction beyond specified installation tolerances.

## 1.11 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
  - 1. One (1) gallon of each type stain and finish coating system used to finish doors.

**PART 2 PRODUCTS****2.1 MANUFACTURERS**

- A. Wood Veneer Faced Doors:
  - 1. Masonite International Architectural.
  - 2. Oshkosh Architectural Door Company.
  - 3. Oregon Door.
  - 4. VT Industries.
  - 5. Substitutions: Section 01 60 00 - Product Requirements.

**2.2 FLUSH WOOD DOORS - INTERIOR**

- A. Grade:
  - 1. Custom.
- B. Performance:
  - 1. Extra Heavy Duty.
- C. Door Size and Configuration:
  - 1. Thickness: 1-3/4 inches thick unless otherwise indicated on Drawings.
  - 2. Size: As indicated on Drawings.
  - 3. Glass Panel: As indicated on Drawings.
- D. Non-Rated and 20-min Rated Doors:
  - 1. Solid Core: Type PC-5, particleboard core, 5-ply.
- E. Fire Rated Doors: Tested to fire ratings indicated on Drawings in accordance with UL 10C-Positive Pressure; UL labeled without any visible seals when door is closed.
  - 1. Solid Core: Type FD-5 rating as scheduled; Category A for positive pressure fire test, 5-ply.
- F. Smoke and Draft Control Doors: Required as indicated on Drawings. In addition to required fire rating, provide door assemblies acceptable tested in accordance with UL 1784 and installed in accordance with NFPA 105 with maximum air leakage of 3.0 cfm per sq ft (0.01524 cu m/s/sq m) of door opening at 0.10 inch wg (24.9 Pa) pressure at both ambient and elevated temperatures; if necessary, provide additional gasketing or edge sealing. UL labeled without any visible seals when door is closed.
- G. Sound-Rated Doors: Tested to STC ratings indicated on Drawings in accordance with ASTM E413, tested in accordance with ASTM E90; STC rating labeled without any visible seals when door is closed.
  - 1. Required as indicated on Drawings; certified and labeled for compliance with STC rating indicated on Drawings.
- H. Wood Veneer Facings:
  - 1. Species:
    - a. Red Oak.
  - 2. Veneer Cut:
    - a. Rift cut.
  - 3. Veneer Adjacent Leaf Matching:
    - a. Slip match.
  - 4. Veneer Panel Leaf Matching:
    - a. Balance match.
  - 5. Doors Matching:
    - a. Pair match.
    - b. Set match doors within 1 foot of each other (doors closed).
  - 6. Doors With Transom Matching:



- a. End match.
7. Finish:
  - a. Shop applied transparent over stain.

### 2.3 FABRICATION

- A. Bonding Adhesive: Type I - Waterproof.
  1. Compliant with CARB (ATCM) for ultra-low emitting formaldehyde (ULEF).
- B. Provide solid core blocking reinforcement for hardware applications and as follows:
  1. Lock blocks.
  2. Top rail block for closer.
  3. Center rail for exit bar.
  4. Bottom rail block for kickplates.
  5. Hardware through bolt blocks.
- C. Edges For Veneered Doors:
  1. Vertical Edges: Minimum 7/16 inch hardwood laminated to 1 inch (25mm) structural composite lumber and bonded to door core. Exposed hardwood edge species and finish to match door face veneer.
  2. Horizontal Edges: Minimum 1-7/16 inch structural composite lumber and bonded to door core.
- D. Factory machine doors for finish hardware in accordance with hardware requirements and dimensions. Do not machine for surface hardware. Furnish solid blocking for surface mounted and through bolted hardware.
  1. Comply with hardware requirements indicated on Drawings and as specified in Division 08 for the specifications.
  2. Include machine work required for securing door perimeter seals.
- E. Door and Frame Fit: Fabricate doors so that door edge clearances of installed doors comply with AWI/AWMAC/WI (AWS) standards.

### 2.4 FINISHES

- A. Shop Applied Finish:
  1. Transparent System - 5, Conversion Varnish.
    - a. Sheen to be as selected by Architect from full range of options.
  2. Stain Color:
    - a. As selected by Architect from full range of colors.
- B. Seal door top edge with color sealer to match door facing.

### 2.5 ACCESSORIES

- A. Hardware: As specified in Section 08 71 00 - Door Hardware.
- B. Door Frames: As indicated on Drawings.
- C. Door Louvers: Size to be as indicated on Drawings.
  1. Metal Louvers:
    - a. Material and Finish: Roll formed steel; pre-painted finish; color as selected by Architect from full range of options.
    - b. Louver Blades:
      - 1) Inverted V shape.
      - 2) Fire rated to match door with fusible link design to UL (DIR) requirements.
- D. Door View Panels: Size to be as indicated on Drawings.

1. Glazing: As indicated on Drawings, but not less than 1/4 inch (6.4 mm) thick, tempered glass, in compliance with requirements of authorities having jurisdiction.
2. Wood Frame:
  - a. Glazing Stops: Solid wood material, of same species and finish as door facing, lip profile; mitered corners; fasteners to be countersunk, fill and finish to match glazing stop finish.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify 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.

### **3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.

### **3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Comply with AWI/AWMAC/WI (AWS) standards and Grade indicated, and manufacturer's requirements, unless otherwise specified or indicated.
  1. Fire Rated Doors: Comply with NFPA 80, and fire ratings as indicated on Drawings.
  2. Smoke and Draft Control Doors: Comply with NFPA 105, and smoke and draft control requirements as indicated on Drawings.
  3. Sound Rated Door: Comply with sound rating requirements indicated on Drawings.
- C. Coordinate installation of doors with installation of frames and hardware.
- D. Install door louvers and vision panels plumb and level.
  1. Wood Glazing Stops: Countersink fasteners, fill and finish to match glazing stop finish.

### **3.4 INSTALLATION TOLERANCES**

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Comply with AWI/AWMAC/WI (AWS) standards and Grade indicated, unless otherwise specified or indicated.
- C. Maximum Vertical or Horizontal Distortion (Bow or Cup): Maximum 1/8 inch measured at center distance from any edge or corner of door.
- D. Comply with AWI/AWMAC/WI (AWS) tolerance requirements and as follows:
  1. Telegraph: Maximum 0.010 inch in any 3 inch span.
  2. Warp: Maximum 0.125 inch per 7 feet of door section.
  3. Squareness: Maximum diagonal variance of 1/8 inch.
  4. Door to Frame Fit and Clearance: 0.125 inch gap.

**3.5 ADJUSTING**

- A. Section 01 73 00 - Execution: Adjusting.
- B. Adjust door for smooth and balanced door movement and latching.

**3.6 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work and comply with manufacturer's recommendations.
- B. Clean installed work in accordance with manufacturer's recommended materials and procedures.

**3.7 SCHEDULE**

- A. Door types and locations to be as indicated on Drawings.

**END OF SECTION**



**SECTION 08 31 13**  
**ACCESS DOORS AND FRAMES**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Section includes fire resistive rated and non-rated access doors and panels with frames.
- B. Related Requirements:
  - 1. Section 04 20 00 - Unit Masonry: Placement of access frame unit anchors in masonry partitions.
  - 2. Section 08 71 00 - Door Hardware: Coordinate with locks and keying requirements.
  - 3. Section 09 21 16 - Gypsum Board Assemblies: Placement of access frame unit anchors in gypsum board partitions.
  - 4. Section 09 90 00 - Painting and Coating: Field paint finish.
  - 5. Divisions of Work such as plumbing, HVAC and electrical construction requiring access doors.

**1.2 REFERENCES**

- A. Intertek Testing Services (ITS):
  - 1. ITS (DIR) - Directory of Listed Products; Current Edition.
- B. National Fire Protection Association (NFPA):
  - 1. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2022.
- C. Underwriters Laboratories Inc. (UL):
  - 1. UL (FDR) - Fire Resistance Directory; Current Edition.

**1.3 COORDINATION**

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate the work of this Section with the work and devices requiring access to controls, valves, traps, dampers, cleanouts, and similar items located behind finished surfaces, but requiring operation and maintenance. Provide access doors and frames for such access.
- C. Coordinate exact locations with various trades and local code requirements to assure proper placement of access doors and panels.
- D. Coordinate locks and keying with requirements indicated in Section 08 71 00 - Door Hardware.

**1.4 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit literature indicating sizes, types, finishes, hardware, scheduled locations, fire resistance listings, and details of adjoining Work.
- C. Shop Drawings: Indicate exact position of each access door units. Indicate sizes that are at variance with sizes indicated and request Architect's approval.
- D. Manufacturer's Installation Instructions: Submit installation requirements and rough-in dimensions.

## 1.5 CLOSEOUT SUBMITTALS

- A. Section 01 77 00 - Closeout Procedures.
- B. Project Record Documents: Provide drawings and schedule indicating locations of installed access units.

## 1.6 QUALITY ASSURANCE

- A. Units in Fire Rated Assemblies: Fire rating as required by applicable code for the fire rated assembly in which access doors and frames are being installed.
  - 1. Provide products listed by ITS (DIR) or UL (FRD) as suitable for the purpose indicated. Attach labels identifying certification.

## PART 2 PRODUCTS

### 2.1 ACCESS DOORS AND PANELS

- A. Manufacturers:
  - 1. Acudor Products, Inc.
  - 2. Cendrex, Inc.
  - 3. JL Industries of Activar Construction Products Group, Inc.
  - 4. Karp Associates, Inc.
  - 5. Nystrom, Inc.
  - 6. Milcor LTD, Partnership.
  - 7. Substitutions: Section 01 60 00 - Product Requirements.
- B. Flush Framed Access Doors (Type 1): Frames and nominal 1 inch wide exposed flanges of 16 gage steel and door panels of 14 gage steel.
- C. Gypsum Board Access Doors (Type 2): Frames and nominal 1 inch wide flanges of 16 gage steel and door panels of 14 gage steel. Design flanges to be concealed by gypsum board joint finishing compound specified in Section 09 21 16.
- D. Fire Rated Access Doors (Type 3): Frames and nominal 1 inch wide exposed flanges of minimum 16 gage steel and door panels of 20 gage steel. Provide self-closing and latching doors with keyed lock to match cylinders specified in Section 08 71 00.
- E. Gypsum Board Fire Rated Access Doors (Type 4): 16 gage steel frames with minimum 22 gage galvanized steel drywall bead flanges and door panels of 20 gage steel. Design flanges to be concealed by gypsum board joint finishing compound specified in Section 09 21 16. Provide self-closing and latching doors with keyed lock to match cylinders specified in Section 08 71 00.

### 2.2 FABRICATION

- A. Factory fabricate units of continuous welded construction; weld, fill, and grind joints to assure flush and square unit.
- B. Wall and Ceiling Access Door and Panel Hardware:
  - 1. Hinges: Standard continuous or concealed spring pin type, 175 degree steel hinges.
  - 2. Latches and Locks:
    - a. Screwdriver Operated Latches:
      - 1) Locations: Non-public secured rooms such as mechanical, electrical, HVAC, and plumbing equipment rooms.
    - b. Keyed Locks: Provide keyed locks. Keyed locks to match cylinders specified in Section 08 71 00.

- 1) Locations: All locations accessible to public and not indicated to be otherwise.

## 2.3 FINISHES

- A. Base Metal Protection: Factory apply baked-on primer coat that is compatible with indicated finish system.
- B. Finish System: Field paint after installation to match adjacent material finish. Refer to Section 09 90 00 - Painting and Coating.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Examine substrates for conditions detrimental to installation of the work. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Verify rough openings for access doors and panels are correctly sized and located.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install units in accordance with manufacturer's instructions.
- C. Install frames plumb and level in openings, and secure units rigidly in place.
- D. Position units to provide convenient access to concealed equipment when necessary.
- E. Set concealed frame type units flush with adjacent finished surfaces.
- F. Install fire rated units in accordance with NFPA 80 and requirements for fire listing.

### 3.4 ADJUSTING

- A. Section 01 73 00 - Execution: Starting, testing, adjusting, and balancing.
- B. Adjust opening/closing and latch operation to smooth operation.

### 3.5 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work and comply with manufacturer's recommendations.
- B. Clean installed work in accordance with manufacturer's recommended materials and procedures.

### 3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protect installed construction.

**END OF SECTION**





## SECTION 08 33 13

### COILING COUNTER DOORS

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Section Includes: Overhead coiling counter doors.
- B. Related Requirements:
  - 1. Section 08 71 00 - Door Hardware: Lock cylinder type.

##### 1.2 REFERENCES

- A. ASTM International (ASTM):
  - 1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
  - 2. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.
  - 3. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
  - 4. ASTM D7091 - Standard Practice for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to Ferrous Metals and Nonmagnetic, Nonconductive Coatings Applied to Non-Ferrous Metals; 2022.
- B. National Association of Architectural Metal Manufacturers (NAAMA):
  - 1. NAAMM AMP 500 - Metal Finishes Manual; 2006.

##### 1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit general construction, component connections and details.
- C. Shop Drawings: Indicate pertinent dimensioning, anchorage methods, hardware locations, and installation details.
- D. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of finishes and colors available for products with factory-applied finishes; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples on same product material type indicated for final Work; each sample 8 inches long. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Manufacturer's Installation Instructions: Indicate installation sequence and procedures, and adjustment and alignment procedures.

##### 1.4 CLOSEOUT SUBMITTALS

- A. Section 01 78 23 - Operation and Maintenance Data.
- B. Operation and Maintenance Data: Submit lubrication requirements and frequency, and periodic adjustments required.

## 1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five (5) years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum three (3) years documented experience and approved by manufacturer.

## 1.6 WARRANTY

- A. Warranty: Manufacturer's warranty that all parts and components, except counterbalance spring and finish, are to be free from defects in materials and workmanship for five (5) years. Counterbalance springs to be warrantied for one (1) year.

## PART 2 PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Design and install overhead coiling door system to withstand the effects of earthquake motions in accordance with ASCE 7 and the local authorities having jurisdiction.
- B. Operation Cycles: Design complete door assembly including operator for usage of up to 20 cycles per day.
- C. Manual Operation: Manual hand crank lift or push up unit with overhead counterbalance device, requiring 25 lbs nominal force to operate.
- D. Source Limitations: Provide overhead coiling doors from one manufacturer for each type of door. Provide operators and other accessories from source acceptable to overhead coiling door manufacturer.

### 2.2 COILING COUNTER DOORS

- A. Manufacturers:
  - 1. C.H.I. Overhead Doors.
  - 2. Cookson Doors.
  - 3. Cornell Doors.
  - 4. Overhead Door Corporation.
  - 5. Raynor Garage Doors.
  - 6. Wayne-Dalton, a Division of Overhead Door Corporation.
  - 7. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design:
  - 1. Cookson Doors - Model ESC10.

### 2.3 COMPONENTS

- A. Curtain:
  - 1. Slat Material:
    - a. Aluminum Slats: Extruded aluminum; ASTM B221, alloy 6063, temper T5.
      - 1) Thickness:
        - a) 16 gauge (0.050 inch) minimum.
  - 2. Slat Profile: Single thickness flat slat.
  - 3. Slat Size: Nominal 1-1/2 or 2 inches wide by required length.
  - 4. Slat Ends: Each slat fitted with end locks to act as wearing surface in guides and to prevent lateral movement.

5. Curtain Bottom: Rectangular tube shape bottom bar fitted with a continuous vinyl bumper to protect finished sill top or countertop; material and finish to match curtain. Provide integral latch and locking devices.
- B. Guides: Continuous channel of profile to retain door in place, stationary or operating.
  1. For Aluminum or Steel Curtains: Guides to be extruded aluminum; ASTM B221, alloy 6063, temper T5; continuous strips of wool pile inserted (removable) into guides to eliminate metal-to-metal contact and to provide dust-seal around curtain. Metal finish to match curtain.
- C. Roller Shaft Counterbalance: Steel pipe and helical 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.
- D. Hood Enclosure and Fascia: Same material and finish as the curtain. Shape and profile to be as indicated on Drawings.
- E. Mounting: Face of wall with hood above opening, unless indicated otherwise on Drawings.
- F. Trim: Material and finish to match curtain.
- G. Operation Type:
  1. Manual Operation:
    - a. Manual push-up; include accessory metal pull-down pole.
- H. Hardware:
  1. Interior Side of Curtain: Center mounted hand turn lock with latch engaging keepers at each curtain guide. Provide 2 lift handles, centered on curtain and 20 inches apart.
- I. Fasteners, Bolts and Anchor Devices: Finish to match adjacent material finish, size suitable for loads and to provide secure anchorage.
  1. Stainless steel.

## 2.4 SHOP APPLIED FINISH

- A. Finishes to be factory applied. Coating thickness indicated is minimum total dry-film thickness (TDFT), in accordance with ASTM D7091.
- B. Color to be selected by Architect from manufacturer's full range.
- C. Aluminum:
  1. Clear Anodized Finish: AAMA 612 Clear anodic coating with non-aqueous electro-deposited organic seal, 0.7 mils TDFT.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify opening sizes, tolerances and conditions are acceptable.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.

**3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install units in accordance with manufacturer's instructions.
- C. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.
- D. Fit and align assembly including hardware; level and plumb, to provide smooth operation.
- E. Coordinate installation of sealants and backing materials at frame perimeter as specified in Section 07 90 00.
- F. Install perimeter trim and closures.

**3.4 ERECTION TOLERANCES**

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maintain dimensional tolerances and alignment with adjacent Work.
- C. Maximum Variation from Plumb: 1/16 inch.
- D. Maximum Variation from Level: 1/16 inch.
- E. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch per 10 ft straight edge.

**3.5 ADJUSTING**

- A. Section 01 73 00 - Execution: Starting, testing, adjusting, and balancing.
- B. Adjust counter door, hardware, and operating assemblies for smooth and noiseless operation.

**3.6 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Remove labels and visible markings.
- C. Clean counter door and components in accordance with manufacturer's recommended materials and instructions.

**END OF SECTION**

## SECTION 08 33 23 OVERHEAD COILING DOORS

### PART 1 GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Exterior coiling doors.
  - 2. Interior coiling doors - non-fire rated.
  - 3. Electric operators and control stations.
  - 4. Electrical wiring for electrical operations, controllers, and monitoring.
- B. Related Requirements:
  - 1. Section 05 50 00 - Metal Fabrications: Support framing.
  - 2. Section 07 90 00 - Joint Protection: Joints between frames and adjacent construction.
  - 3. Section 08 71.00 - Door Hardware: Lock cylinders and keys.
  - 4. Division 08 - Openings: Sections indicating other types of overhead operating doors and closure devices.
  - 5. Division 26 - Electrical: For components requiring electrical work such as wiring, conduits, disconnect switches, connection to power supply and control station wiring.

#### 1.2 REFERENCES

- A. American Architectural Manufacturers Association (AAMA):
  - 1. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
  - 2. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
- B. American Society of Civil Engineers (ASCE):
  - 1. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- C. ASTM International (ASTM):
  - 1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
  - 2. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
  - 3. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
  - 4. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
  - 5. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
  - 6. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009, Reapproval 2016.
  - 7. 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.

8. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014, Reapproval 2021.
- D. Intertek Testing Services (ITS):
  1. ITS (DIR) - Directory of Listed Products; current edition.
- E. National Electrical Manufacturers Association (NEMA):
  1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2020.
  2. NEMA ICS 2 - Industrial Control and Systems Controllers, Contactors and Overload Relays Rated 600 Volts; 2008, Reaffirmation 2020.
  3. NEMA MG 1 - Motors and Generators; 2021.
- F. National Fire Protection Association (NFPA):
  1. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2022.
- G. Underwriters Laboratories Inc. (UL):
  1. UL (DIR) - Online Certifications Directory; Current Edition.
  2. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems; Current Edition, Including All Revisions.
  3. UL 864 - Standard for Safety Control Units and Accessories for Fire Alarm Systems; Current Edition, Including All Revisions.
  4. UL 1784 - UL Standard for Safety Air Leakage Tests of Door Assemblies and Other Opening Protectives; Current Edition, Including All Revisions.

### 1.3 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate keying requirements with Owner.
- C. For Doors Requiring Electrical Connections: Coordinate the work of this Section with Division 26 - Electrical, and Drawings to provide wiring and connectivity as indicated. Such connections may include, but not be limited to the following:
  1. Electrical service for powering components.
  2. Facility Monitoring Systems that may include, but not be limited to, fire alarm system, security alarm system, etc.

### 1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements, for submittal procedures.
- B. Product Data: Submit general construction, color charts, component connections and details, wiring diagram and electrical equipment.
- C. Shop Drawings: Indicate pertinent dimensioning, door panels profile, head/floor/jamb seals, locking hardware, anchorage methods, hardware locations, and installation details. If electrical operation is required, include information for electrical components and interface with electrical work by others.
- D. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of finishes and colors available for products with factory-applied finishes; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples on same product material type indicated for final Work; each sample 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.

- F. Manufacturer's Installation Instructions: Indicate installation sequence and procedures, and adjustment and alignment procedures.
- G. Maintenance Data: Indicate lubrication requirements and frequency. Indicate periodic adjustments required.

### **1.5 CLOSEOUT SUBMITTALS**

- A. Section 01 78 23 - Operation and Maintenance Data.
- B. Operation and Maintenance Data: Submit lubrication requirements and frequency, and periodic adjustments required.

### **1.6 QUALITY ASSURANCE**

- A. Single-Source Responsibility: Provide doors, tracks, motors, components, and accessories from one primary components manufacturer for each type of door. Provide secondary components from source acceptable to manufacturer of primary components.
- B. Products Requiring Electrical Connection: Listed and classified by UL (DIR) as suitable for the purpose specified and indicated.

### **1.7 QUALIFICATIONS**

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five (5) years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum three (3) years documented experience, approved by manufacturer, and having service technicians on staff.

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

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Storage and Protection: Store materials in accordance with manufacturer's recommendations.
- C. Protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.
- D. Prevent physical damage.

### **1.9 PROJECT CONDITIONS**

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after installation of Work.
- B. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

### **1.10 WARRANTY**

- A. Provide manufacturer's warranty of motor, springs, counterbalance, and finish of the system for three (3) years or 20,000 cycles, whichever comes first. Manufacturer's warranty for door to be two (2) years.

**PART 2 PRODUCTS****2.1 EXTERIOR COILING DOORS**

- A. Performance Requirements:
1. Wind Loads: Provide designed coiling door system capable of withstanding the following positive and negative wind loads without damage to door or assembly components:
    - a. Size system components and anchorage to safely withstand Live Loads, Dead Loads and Wind Loads as indicated on Drawings and in compliance with ASCE 7 and the State Building Code for the State in which the project is located. Testing to be in conformance with ASTM E330/E330M.
  2. Operation Cycles: Design door assembly and all operational components to operate for not less than 20,000 cycles.
  3. Seismic Performance:
    - a. Provide manufacturer's seismic calculations confirming ASCE 7-10.
- B. Manufacturers:
1. Cookson Company, a Division of Cornell Enterprises.
  2. Cornell Iron Works, Inc., a Division of Cornell Enterprises.
  3. Overhead Door Corporation.
  4. Raynor Garage Doors.
  5. Wayne-Dalton, a Division of Overhead Door Corporation.
  6. Substitutions: Section 01 60 00 - Product Requirements.
- C. Basis of Design:
1. Cookson Company - Model ESD20 Thermiser.
- D. Metal Curtain Construction:
1. Slat Material:
    - a. Steel Slats: ASTM A653/A653M galvanized steel sheet; G90/Z275 coating minimum.
      - 1) Metal Thickness:
        - a) 20 gage minimum.
  2. Slat Construction:
    - a. Slat Profile: Flat.
    - b. Double-Wall Slat Insulated Construction:
      - 1) Slats 2-5/8 inches wide x 1 inch thick; R-value 7.7 minimum; U-value 0.13 maximum; core of foamed polyurethane insulation to be CFC-free and Ozone Depletion Potential (ODP) rating of zero.
  3. Interlocking Slats:
    - a. Alternate slats fitted with end locks to act as wearing surface in guides and to prevent lateral movement.
  4. Slat Curtain Bottom: Fitted with angles to provide reinforcement and positive contact in closed position.
- E. Air Infiltration: Maximum rate of 1 cfm/sf at 15 and 25 mph when tested according to ASTM E283/E283M or DASMA 105.
- F. Weatherstripping: Moisture and rot proof, resilient type, located at jamb edges, bottom of curtain, and where curtain enters hood enclosure of exterior doors.
- G. Guides and Support Brackets: Provide components and assemblies designed of size, profile, and configuration to retain door in place, and as required to comply with performance requirements and loads imposed on the door system assembly during closed and operating conditions.
1. Galvanized steel.



- H. Hood Enclosure and Trim: Internally reinforced to maintain rigidity and shape.
  - 1. Steel: ASTM A653/A653M galvanized steel sheet; G90/Z275 coating minimum.
    - a. Thickness:
      - 1) 24 gage minimum.
- I. Wall Mounting Condition:
  - 1. As indicated on Drawings.
- J. Operation:
  - 1. Electric motor operated unit with manual override and chain hoist operation in case of power failure or motor failure.
- K. Lock Hardware:
  - 1. Latch Set Lock Cylinders and Keying:
    - a. Specified in Section 08 71 00.
  - 2. For motor operated units, additional lock or latching mechanisms are not required.
  - 3. Latching Mechanism: Interior mounted, adjustable keeper, spring activated latch bar feature to keep in locked or retracted position.
    - a. Include interlock switch for electric operation.
  - 4. Latch Handle: Manufacturer's standard.
- L. Roller Shaft Counterbalance: Steel pipe and helical 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 lbs (10 kg) nominal force to operate.
- M. Finishes: Finishes for all components to match finish selected for each door system.
  - 1. Steel and Aluminum: Factory applied finish coating system to components and assemblies.
    - a. System Type:
      - 1) Powder fluoropolymer coating complying with AAMA 2605.
    - b. System Coats:
      - 1) Three coat system, minimum.
    - c. Colors:
      - 1) To be selected by Architect from manufacturer's full range of options.
      - 2) If the project includes an overhead coiling door system that accesses an auditorium type back-stage area, all components and assemblies on the stage side are to be finished with flat black color.

## 2.2 INTERIOR COILING DOORS - NON-FIRE RATED

- A. Performance Requirements:
  - 1. Operation Cycles: Design door assembly and all operational components to operate for not less than 20,000 cycles.
  - 2. Seismic Performance:
    - a. Provide manufacturer's seismic calculations confirming ASCE 7-10.
- B. Manufacturers:
  - 1. Cookson Company, a Division of Cornell Enterprises.
  - 2. Cornell Iron Works, Inc., a Division of Cornell Enterprises.
  - 3. Overhead Door Corporation.
  - 4. Raynor Garage Doors.
  - 5. Wayne-Dalton, a Division of Overhead Door Corporation.
  - 6. Substitutions: Section 01 60 00 - Product Requirements.
- C. Basis of Design:
  - 1. Cookson Company.

- D. Metal Curtain Construction:
  - 1. Steel Slats: ASTM A653/A653M galvanized steel sheet; G90/Z275 coating minimum.
    - a. Metal Thickness:
      - 1) 22 gage minimum.
  - 2. Slats Construction:
    - a. Profile: Flat.
    - b. Single-wall slat construction.
    - c. Width: 2-5/8 inches wide.
  - 3. Interlocking Slats:
    - a. Alternate slats fitted with end locks to act as wearing surface in guides and to prevent lateral movement.
  - 4. Curtain Bottom for Slat Curtains: Fitted with angles to provide reinforcement and positive contact in closed position.
- E. Hood Enclosure: Internally reinforced to maintain rigidity and shape.
  - 1. Materials and finish to match coiling door.
  - 2. Configuration to be as indicated on Drawings.
- F. Guides and Support Brackets: Structural steel angles; galvanized in accordance with ASTM A653/A653M.
- G. Operation:
  - 1. Electric motor operation.
- H. Mounting:
  - 1. As required to maintain fire rated assembly requirements.
  - 2. As indicated on Drawings.
- I. Locking Devices:
  - 1. Side bolt on inside with lock.
- J. Finishes: Finishes for all components to match finish selected for each door system.
  - 1. Steel and Aluminum: Factory apply finish coating system to components and assemblies.
    - a. System Type:
      - 1) Powder fluoropolymer coating complying with AAMA 2605.
    - b. System Coats:
      - 1) Three coat system, minimum.
    - c. Colors:
      - 1) To be selected by Architect from manufacturer's full range of options.
      - 2) If the project includes an overhead coiling door system that accesses an auditorium type back-stage area, all components and assemblies on the stage side are to be finished with flat black color.

## 2.3 MATERIALS

- A. Steel Sections: ASTM A36/A36M, hot-dip galvanized per ASTM A123/A123M.
- B. Steel Sheets: ASTM A653/A653M galvanized steel sheet; G90/Z275 coating minimum.

## 2.4 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.
  - 2. Provide tamperproof operation cycle counter.

- B. Electric Operators:
  - 1. Mounting:
    - a. Side mounted.
  - 2. Motor Enclosure:
    - a. Exterior Doors: NEMA MG 1, Type 4; open drip proof.
  - 3. Motor Rating:
    - a. 1/2 hp minimum; continuous duty.
  - 4. Motor Voltage:
    - a. 120 volt, single phase, 60 Hz, unless indicated otherwise on Drawings per door locations.
  - 5. Motor Controller: NEMA ICS 2, full voltage, reversing magnetic motor starter.
  - 6. Controller Enclosure: NEMA 250, Type 4X.
  - 7. Opening Speed: 12 inches per second in either direction.
  - 8. Brake: Adjustable friction clutch type, activated by motor controller.
  - 9. Electrical cutout switch to prevent motor operation if locking device is not first disengaged.
  - 10. Manual override in case of power failure.
  - 11. Refer to Division 26 - Electrical specifications and Drawings for electrical connections.
- 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:
  - 1. 24 volt circuit.
  - 2. Control Station Mounting: Recess mounted at interior door jamb.
  - 3. Control Switch Type: For each operator.
    - a. Three button and key (OPEN-STOP-CLOSE) control switch for each operator.
  - 4. Control Switch Activation:
    - a. Continuous-Contact Control Device for each operator complying with UL 325.
      - 1) Secondary Entrapment Protection Devices: Provide sensing devices and safety mechanisms complying with UL 325.
        - a) Provide electric sensing edge with wireless edge kit or non-monitored safety edge as an option along with continuous-constant control device.
- E. Safety Edge: Located at bottom of curtain, wired to stop operator upon striking object, hollow neoprene covered.
  - 1. Provide electro-mechanical sensitized type.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify opening sizes, tolerances and conditions are acceptable.
- C. Examine conditions of substrates, supports, and other conditions under which this work is to be performed.
- D. For Systems Requiring Electrical Connections: Verify that compatible electrical service connectivity is present and that recessed controls boxes and conduits are ready for installation.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install the work in accordance with manufacturer's instructions, the Drawings, and this Section:
  - 1. Install fire-rated assemblies in accordance with NFPA 80.
- C. Use anchor devices to securely fasten assembly to wall construction and building framing without distortion or stress.
- D. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.
- E. Fit and align assembly including hardware; level and plumb, to provide smooth operation.
- F. For Systems Requiring Electrical Connections: Coordinate with this Section, Division 26 - Electrical, and Drawings.
  - 1. Electrical Service: Install wiring from electrical service location to electrical components and include appropriate service disconnect devices.
  - 2. Facility Monitoring Systems: Install wiring connections from door operator mechanism to facility monitoring systems when requirements are indicated. Such monitoring systems may include, but not be limited to, fire alarm system, security alarm system, etc.
- G. Coordinate installation of sealants and backing materials at frame perimeter as specified in Section 07 90 00.
- H. Install perimeter trim and closures.

### 3.4 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maintain dimensional tolerances and alignment with adjacent Work.
- C. Maximum Variation from Plumb: 1/16 inch.
- D. Maximum Variation from Level: 1/16 inch.
- E. Longitudinal or Diagonal Warp: Plus, or minus 1/8 inch per 10 ft straight edge.

### 3.5 ADJUSTING

- A. Section 01 73 00 - Execution: Starting, testing, adjusting, and balancing.
- B. Adjust components, hardware, and operating assemblies for smooth and quiet operation, without binding or distortion.
- C. Test required interface functionality with Facility Monitoring Systems.

### 3.6 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.

- B. Clean installed Work in accordance with manufacturer's recommendations including cleaning procedures and materials.
- C. Remove unneeded labels and visible markings.

**3.7 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protect installed construction.
- B. Protect completed Work from damage.

**3.8 DEMONSTRATION AND TRAINING**

- A. Section 01 79 00 - Demonstration and Training: Provide demonstration and training to the Owner regarding operation and maintenance of components of the installed Work.

**END OF SECTION**



## SECTION 08 33 26

### OVERHEAD COILING GRILLES

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
  - 1. Electric Motorized Operating coiling metal grilles and operating hardware.
- B. Related Requirements:
  - 1. Section 05 50 00 - Metal Fabrications: Support framing.
  - 2. Section 07 90 00 - Joint Protection: Joints between frames and adjacent construction.
  - 3. Section 08 71.00 - Door Hardware: Lock cylinders and keys.
  - 4. Division 08 - Openings: Sections indicating other types of overhead operating doors and closure devices.
  - 5. Division 26 - Electrical: For components requiring electrical work such as wiring, conduits, disconnect switches, connection to power supply and control station wiring.

##### 1.2 REFERENCES

- A. ASTM International (ASTM):
  - 1. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
- B. National Electrical Manufacturers Association (NEMA):
  - 1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2020.
  - 2. NEMA ICS 2 - Industrial Control and Systems Controllers, Contactors, and Overload Relays, Rated 600 Volts; 2008, Reaffirmed 2020.
  - 3. NEMA MG 1 - Motors and Generators; 2017, Revisions 2021.
- C. Underwriters Laboratories Inc. (UL):
  - 1. UL 325 - UL Standard for Safety Door, Drapery, Gate, Louver, and Window Operators and Systems; Current Edition, Including All Revisions.

##### 1.3 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate keying requirements with Owner.
- C. For Grilles Requiring Electrical Connections: Coordinate with this Section, Division 26 - Electrical, and Drawings to provide connectivity as indicated. Such connections may include, but not be limited to the following:
  - 1. Electrical Service for powering components.
  - 2. Facility Monitoring Systems that may include, but not be limited to, fire alarm system, security alarm system, etc.

##### 1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit general construction, component connections, and details.
  - 1. For grilles indicated for electric motorized operation, include control switches and electrical equipment.
- C. Shop Drawings: Indicate pertinent components, dimensioning, anchorage methods, hardware locations, interface with adjacent construction and installation details.

- D. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of finishes and colors available for products with factory-applied finishes; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples on same product material type indicated for final Work; each sample 8 inches long. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Manufacturer's Certification: Certificate stating that materials comply with this specification.
- G. Manufacturer's Installation Instructions: Submit installation sequence and procedures, and adjustment and alignment procedures.

### **1.5 CLOSEOUT SUBMITTALS**

- A. Section 01 77 00 - Closeout Procedures.
- B. Operation and Maintenance Data: Indicate lubrication requirements and frequency, and periodic adjustments required.

### **1.6 QUALITY ASSURANCE**

- A. Products Requiring Electrical Connection: Listed and classified by UL, or another testing firm acceptable to authority having jurisdiction.
- B. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five (5) years documented experience.
- C. Installer: Company specializing in performing Work of this section with minimum three (3) years documented experience and approved by manufacturer.

### **1.7 DELIVERY STORAGE AND HANDLING**

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Follow manufacturer's instructions.

### **1.8 ENVIRONMENTAL REQUIREMENTS**

- A. Maintain temperature, humidity, and ventilation requirements within limits recommended by manufacturer for optimum results. Do not install products under conditions that are not compliant with manufacturer's recommendations.

### **1.9 WARRANTY**

- A. Provide two (2) year manufacturer's warranty covering defects in material and workmanship, starting on the date of substantial completion.
- B. Maintenance Service Agreement Proposal: Submit for Owner's consideration and acceptance of a maintenance service agreement for installed Work.

## **PART 2 PRODUCTS**

### **2.1 OVERHEAD COILING GRILLES**

- A. Manufacturers:
  - 1. Alpine Overhead Doors, Inc.



2. C.H.I. Overhead Doors.
  3. Clopay Building Products.
  4. Cornell/Cookson, Inc.
  5. Overhead Door Corporation.
  6. Raynor Garage Doors.
  7. Wayne-Dalton, a Division of Overhead Door Corporation.
  8. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design:
1. Cornell/Cookson, Inc. - VisionAire ESG10.

## 2.2 COMPONENTS

- A. Grille Curtain: Aluminum conforming to ASTM B221.
1. Grille Pattern:
    - a. Straight pattern.
  2. Horizontal Rods: Solid 5/16 inch diameter, minimum.
    - a. Vertical Spacing:
      - 1) 2 inches o.c.
  3. Vertical Links: 3/4 x 1/8 inch flat aluminum, links spaced at 9 inches o.c.
  4. Bottom Bar: 2 x 3-1/2 inch extruded aluminum tubular section.
    - a. For grilles over 15 feet long, provide bottom bar reinforcing with two 3 x 2 x 3/16 inch aluminum angles.
  5. Mechanical Assist Lift: Provide special lift mechanism for large grilles.
  6. Finish:
    - a. Anodized Aluminum Color:
      - 1) Anodized clear.
- B. Guides: Extruded aluminum conforming to ASTM B221.
1. Continuous channel profile to retain grille in place with snap-on cover trim to conceal fasteners to support. Channel to include continuous integral vertical runner slots for insertion of polypropylene pile runners on both sides of curtain for quiet operation and to prevent curtain-to-guide (metal-to-metal) wear and contact.
  2. Finish: Match grille curtain.
- C. Mounting Angles: Provide metal mounting angles as required for face of wall installation.
1. Extruded Aluminum Angles:
    - a. Finish: Match guides.
- D. Hood Enclosure: Metal type to match grille curtain; internally reinforced to maintain rigidity and shape.
1. Metal Sheet Minimum Thickness: 18 gauge (0.040 inch) thick for aluminum; 24 gauge (0.024 inch) for steel and stainless steel.
  2. Shape:
    - a. Square, unless indicated otherwise on Drawings.
  3. Finish: Match grille curtain.
- E. Roller Shaft Counterbalance: Steel pipe and helical steel spring system, capable of producing torque sufficient to assure smooth operation of grille from any position; with adjustable spring tension.
- F. Hardware:
1. Locks: Furnish locks and keys to allow curtain to be secured.
    - a. Cylinder type dead lock at curtain jamb; key operated on outside and turn latch operated on inside.
      - 1) Prepare curtain with lock mechanism to receive keyed cylinder as specified and furnished in Section 08 71 00. Lock and cylinder to be

- installed as part of Work of this Section. Coordinate keys and cylinders with Owner's individual, master, and grand master key requirements.
2. Latch Handle: Inside center mounted, adjustable keeper, spring activated latch bar with feature to keep locked fully open and closed position; interior and exterior handle.
- G. Electric Motorized Operator:
1. Design grille assembly, including motor operator, to operate for not less than 30,000 cycles.
  2. Electric motor operated unit with manual override in case of power failure.
  3. Description: UL 325, center mounted, totally enclosed nonventilated or fan cooled motor.
  4. Motor Enclosure: NEMA MG 1, Type 1 enclosure.
  5. Motor Rating: 1/2 hp; continuous duty.
  6. Motor Voltage: 115 volt, single phase, 60 Hz.
  7. Motor Controller: NEMA ICS 2, full voltage, reversing magnetic motor starter.
  8. Controller Enclosure: NEMA 250, Type 1.
  9. Grille Speed: 12 inches per second.
  10. Brake: Adjustable friction clutch type, activated by motor controller.
  11. Control Station:
    - a. 24 volt circuit.
    - b. Control Station Mounting: Recess mounted at interior door jamb.
    - c. Control Switch Type: For each operator.
      - 1) Three button and key (OPEN-STOP-CLOSE) control switch for each operator.
    - d. Control Switch Activation:
      - 1) Momentary-Contact Control Device for each operator complying with UL 325.
        - a) Primary Entrapment Protection Devices: Provide sensing devices and safety mechanisms complying with UL 325.
          - (1) Provide electric sensing edge, wireless sensing, NEMA 1 photo eye sensors, or NEMA 4X photo eye sensors as required with momentary-contact control device.
    - e. Safety Edge: Located at bottom of curtain, wired to stop operator upon striking object, hollow neoprene covered.
      - 1) Provide electro-mechanical sensitized type.

## 2.3 ACCESSORIES

- A. Anchors and Bolts: Stainless steel.
- B. Corrosion Protection Between Dissimilar Materials: Provide concealed permanent protection from corrosion between dissimilar materials by application of self-adhering rubberized asphalt sheet or other permanent coating compatible with substrates.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify opening sizes, tolerances and conditions are acceptable.
- C. Examine conditions of substrates, supports, and other conditions under which this work is to be performed.

- D. For Systems Requiring Electrical Connections: Verify that compatible electrical service connectivity is present and that recessed controls boxes and conduits are ready for installation.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install the work in accordance with manufacturer's instructions, the Drawings, and this Section.
- C. Use anchor devices to securely fasten assembly to wall construction and building framing without distortion or stress.
- D. Provide concealed permanent corrosion protection between dissimilar materials to prevent electrolytic corrosion.
- E. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.
- F. Fit and align assembly including hardware; level and plumb, to provide smooth operation.
- G. For Systems Requiring Electrical Connections: Coordinate with this Section, Division 26 - Electrical, and Drawings.
  - 1. Electrical Service: Install wiring from electrical service location to electrical components and include appropriate service disconnect devices.
  - 2. Facility Monitoring Systems: Install wiring connections from door operator mechanism to facility monitoring systems when requirements are indicated. Such monitoring systems may include, but not be limited to, fire alarm system, security alarm system, etc.
- H. Coordinate installation of sealants and backing materials at frame perimeter as specified in Section 07 90 00.
- I. Install perimeter trim and closures.

### 3.4 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maintain dimensional tolerances and alignment with adjacent Work.
- C. Maximum Variation from Plumb: 1/16 inch.
- D. Maximum Variation from Level: 1/16 inch.
- E. Longitudinal or Diagonal Warp: Plus, or minus 1/8 inch per 10 ft straight edge.

### 3.5 ADJUSTING

- A. Section 01 73 00 - Execution: Starting, testing, adjusting, and balancing.
- B. Adjust components, hardware, and operating assemblies for smooth and quiet operation, without binding or distortion.
- C. Test required interface functionality with Facility Monitoring Systems.

### **3.6 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Clean installed Work in accordance with manufacturer's recommendations including cleaning procedures and materials.
- C. Remove unneeded labels and visible markings.

### **3.7 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protect installed construction.
- B. Protect completed Work from damage.

### **3.8 DEMONSTRATION AND TRAINING**

- A. Section 01 79 00 - Demonstration and Training: Provide demonstration and training to the Owner regarding operation and maintenance of components of the installed Work.

**END OF SECTION**

**SECTION 08 41 13****ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Aluminum-framed storefront systems.
  - 2. Glass and glazing panels.
  - 3. Aluminum frame doors and hardware.
  - 4. Structural design requirement.
  - 5. Infill panels.
  
- B. Related Requirements:
  - 1. Section 05 50 00 - Metal Fabrications: Metal fabricated attachment devices.
  - 2. Section 07 90 00 - Joint Protection: Perimeter joint sealers other than those integral to the aluminum-framed entrances and storefronts frames and glazing.
  - 3. Section 08 11 16.10 - Aluminum Doors with FRP Face Panel.
  - 4. Section 08 14 16 - Flush Wood Doors.
  - 5. Section 08 44 13 - Glazed Aluminum Curtain Walls.
  - 6. Section 08 71 00 - Door Hardware: Hardware requirements for reinforcing plates and electrical items to be integrated into the storefront frame of this Section.
  - 7. Section 08 80 00 - Glazing: Glazing for aluminum-framed entrances and storefronts.
  - 8. .
  - 9. Division 26 - Electrical: Electrical requirements to be integrated into the storefront framing of this Section.

**1.2 REFERENCES**

- A. American Architectural Manufacturers Association (AAMA):
  - 1. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems; 2017.
  - 2. AAMA 503 - Voluntary Specification for Field Testing of Newly Installed Storefronts, Curtain Walls, and Sloped Glazing Systems; 2014.
  - 3. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum; 2015.
  - 4. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2020.
  - 5. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.
  - 6. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
  - 7. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
  - 8. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site; 2015.
  - 9. AAMA SFM-1 - Aluminum Store Front and Entrance Manual; 2014.
  
- B. American Society of Civil Engineers (ASCE):
  - 1. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

- C. ASTM International (ASTM):
  - 1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
  - 2. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
  - 3. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
  - 4. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
  - 5. ASTM C794 - Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants; 2018, Reapproval 2022.
  - 6. ASTM E283/E283M - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.
  - 7. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls by Uniform Static Air Pressure Difference; 2014, Reapproval 2021.
  - 8. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000, Reapproval 2023.
  - 9. ASTM E783 - Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors; 2002, Reapproval 2018.
  - 10. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference; 2015, Reapproval 2023.
- D. The Society for Protective Coatings (SSPC):
  - 1. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic, and Type II - Organic); 2019.

### 1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
  - 1. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
  - 2. Coordinate work of this Section with related Door Hardware requirements.
    - a. Provide reinforcement in system framing members to accommodate hardware items indicated in this Section and other related door hardware Sections.
    - b. Prepare system framing members to accommodate electrical hardware devices such as security access readers and automatic operators.
  - 3. Coordinate work of this Section with related Electrical requirements.
    - a. Provide electrical service wiring for electrical hardware devices such as security access readers, automatic operators, and other electrical requirements.
- B. Pre-Installation Meetings:
  - 1. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
  - 2. Convene minimum one week prior to commencing work of this Section.

### 1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit component dimensions; describe components within assembly, anchorage and fasteners, glass and infill panels, door hardware, and internal drainage details.
- C. Shop Drawings: Indicate system dimensions, doors and frames, framed opening requirements and tolerances, anticipated deflection under load, affected related work, weep drainage network, expansion and contraction joint location and details, and field welding required.

1. Details to indicate fasteners and anchoring details to building components and construction.
  2. Details to indicate system interface and maintenance of continuity of building envelope air and weather barrier components by others.
  3. Provide design and calculations sealed by Professional Structural Engineer demonstrating compliance with wind loading per ASCE 7.
  4. Include details of core, stile, and rail construction, trim for lites, and all other components.
  5. Include details of finish hardware mounting.
  6. Include shop applied and field applied sealants by manufacturer; include product name and application locations on drawings. Show sealant joint sizes, including tolerances and maximum/minimum joint sizes required.
- D. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of finishes and colors available for products with factory-applied finishes; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples on same product material type indicated for final Work; each sample 8 x 8 inches. Include samples of glazing, infill panels and glazing materials. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Design Data: Indicate engineered framing members structural and physical characteristics, calculations, dimensional limitations.
- G. Manufacturer's Certificate: Certify products meet or exceed specified requirements.
- H. Installation Data: Special installation requirements.
- I. Field Quality Control Submittals: Submit field inspection and test reports required in FIELD QUALITY CONTROL article in this Section.

## 1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with AAMA SFM-1 - Aluminum Storefront and Entrance Manual.
- B. Designer Qualifications: Design 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.
- C. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section with minimum five (5) years documented experience.
1. Same manufacturer required for the following work:
    - a. Aluminum-Framed Entrances and Storefronts.
    - b. Glazed Aluminum Curtain Walls.
- D. Installer Qualifications: Company specializing in performing Work of this Section with minimum five (5) years documented experience.

## 1.6 DELIVERY, STORAGE, AND PROTECTION

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Handle products of this Section in accordance with AAMA CW-10.
- C. Protect prefinished aluminum surfaces with wrapping. Do not use adhesive papers or spray type coatings which bond when exposed to sunlight or weather. Provide adequate ventilation through wrappings.



## 1.7 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after installation of Work.
- B. Do not install sealants when ambient temperature is less than 40 degrees F during and 48 hours after installation.

## 1.8 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Provide five (5) year warranty to correct defective Work.
- C. Provide five (5) year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting, condensation, or misting. Include provision for replacement of failed units.
- D. Provide manufacturer warranty against excessive degradation of metal finishes. Include provision for replacement of units with excessive fading, chalking, peeling, blistering, or flaking. Warranty period to be as follow:
  - 1. Ten (10) year manufacturer warranty.

## PART 2 PRODUCTS

### 2.1 SYSTEM DESCRIPTION

- A. Aluminum-Framed Storefront System: Includes extruded aluminum framing and doors with supplementary internal support components where required, aluminum and glass entrances, shop fabricated components, factory finished glass, glazing and infill panels, related joint sealers, flashings, anchorage, and attachment devices.
- B. Provide products and system designed to comply with the State Building Code for the State in which the project is located.

### 2.2 PERFORMANCE REQUIREMENTS

- A. Wind Loads: Design and size components and system to withstand dead loads and live loads caused by positive and negative wind loads acting normal to plane of wall, including increased wind loads at building corners.
  - 1. As calculated in accordance with ASCE 7 - Calculation of Wind Loads, as measured in accordance with ASTM E330/E330M.
  - 2. Comply with Design Loads indicated on Drawings and applicable code requirements based on geographical location.
- B. Seismic Loads: Design and size components and system to withstand seismic loads and sway displacement as calculated in accordance with ASCE 7 and applicable code requirements.
- C. Deflection: Limit mullion deflection to flexure limit of glass of span; with full recovery of glazing materials.
- D. System Assembly: Accommodate the following without damage to system, components, or deterioration of seals.
  - 1. Movement within system.
  - 2. Movement between system, system components and perimeter construction.
  - 3. Dynamic loading and release of loads.
  - 4. Deflection of structural support framing.
  - 5. Tolerance of supporting components.



- E. Air Leakage: 0.06 cfm/sq ft maximum leakage through assembly wall area when tested in accordance with ASTM E283/E283M at the following pressure differential.
  - 1. 1.57 psf pressure differential.
- F. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with inside pane of glass and heel bead of glazing compound.
- G. Vapor Seal: Limit vapor seal with interior atmospheric pressure of 1 inch static pressure, 72 degrees F, 40 percent relative humidity without seal failure.
- H. Water Penetration: None, when measured in accordance with ASTM E331 with test pressure differential at 20 percent of design pressure, but not less than 2.86 psf and not to exceed 12.00 psf.
- I. Thermal Transmittance of Assembly (Excluding Entrances): Maximum U-value of 0.45 Btu/(hr sq ft deg F) when measured in accordance with AAMA 1503.
- J. Expansion / Contraction: System to provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over 12 hour period without causing detrimental effect to system components and anchorage.
- K. System Internal Drainage: Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to exterior by weep drainage network.
- L. Not Permitted: Vibration harmonics, wind whistles, noises caused by thermal movement, thermal movement transmitted to other building elements, loosening, weakening, or fracturing of attachments or components of system.

### 2.3 ALUMINUM-FRAMED STOREFRONTS

- A. Interior Storefronts: Application to be where both sides of storefront are exposed to interior conditioned air.
  - 1. Extruded aluminum frame members with internal reinforcement of aluminum or shaped steel structural sections as required to withstand imposed loads, including loads imposed by operating doors and hardware of types and sizes indicated.
  - 2. Frame components not required to be thermally broken.
  - 3. Frame size, configuration, dimensions, and profile: As indicated on Drawings.
    - a. For frames with laminated glass panels, coordinate with glass panel thickness.
  - 4. Provide glazing panels and infill panels as indicated on Drawings, sealed weathertight within frames.
    - a. Panel Position Within Frame:
      - 1) As indicated on Drawings.
  - 5. Manufacturers:
    - a. Kawneer Co., Inc.
    - b. Oldcastle BuildingEnvelope.
    - c. RACO.
    - d. Tubelite, Inc.
    - e. U.S. Aluminum, a C.R. Lurance Company.
    - f. YKK AP America.
    - g. Substitutions: Section 01 60 00 - Product Requirements.
  - 6. Basis of Design:
    - a. Surface Mount Type:
      - 1) Kawneer - Trifab VG 451, 2 inch sightline.

## 2.4 COMPONENTS

- A. Extruded Aluminum: ASTM B221; 6063 alloy, T5 temper typical; 6061 alloy, T6 temper for extruded structural members.
- B. Sheet Aluminum: ASTM B209/B209M, 5005 alloy, H15 or H34 temper, wall thickness as required for system application and use but not less than 0.125 inch.
- C. Sheet Steel: ASTM A653/A653M; galvanized to minimum G90.
- D. Steel Sections: ASTM A36/A36M; shaped to suit aluminum framing and mullion members.
  - 1. For use as concealed structural support reinforcement.
    - a. For exterior framing, steel to be galvanized per ASTM A123/A123M.
    - b. For interior framing, steel to be shop primed.
- E. Structural Supporting Anchors Attached to Structural Steel:
  - 1. Design to suit attachment requirements.
- F. Structural Supporting Anchors Attached to Reinforced Concrete Members:
  - 1. Design to suit attachment requirements.
- G. Fasteners: Provide aluminum, non-magnetic stainless steel, or other non-corrosive metal fasteners, recommended to be compatible by the manufacturer of materials being fastened, including doors, frames, stops, panels, hardware, anchors, and other items receiving fasteners. For exposed fasteners (if any) provide Oval Phillips Head screws with finish matching the item to be fastened. The use of sex bolts will not be accepted.
- H. Framing Members Profiles: Extruded aluminum and as indicated on Drawings.
- I. Trim Components Profiles: Extruded aluminum and as indicated on Drawings.
- J. Glass and Glazing Panels:
  - 1. As indicated on Drawings.
  - 2. As specified in Section 08 80 00 - Glazing.
- K. Doors:
  - 1. Material: As indicated on Drawings.
  - 2. Thickness: As indicated on Drawings.
  - 3. Storefront Framing Members:
    - a. Coordinate frame's door stop and door silencer feature (along the frame stop) with door thickness and door type indicated on Drawings.
    - b. Coordinate reinforcement and shop preparation with door hardware, including closers, hinges, latching and locking components, automatic door operators, and other hardware indicated in other Sections.
    - c. Coordinate storefront frames with the specified doors, types, weight, and hardware and as indicated. Provide aluminum storefront frames with internal and concealed reinforcement and anchorage required to support attachment of the hinges and closers and to withstand the operating and closing loads imposed on the storefront frames by the specified doors and hardware. (e.g. The heavy weight of a solid wood door imposes greater operating loads on door frame members than aluminum and FRP doors.).
    - d. Coordinate with security, safety and other electrical wiring and hardware requirements such as automatic door operators and actuators.
  - 4. Glass and Glazing Panels:
    - a. As indicated on Drawings.
  - 5. Glazing Stops Profile: As indicated on Drawings.
  - 6. Stiles and Rails: Extruded aluminum; profiles as indicated on Drawings.
    - a. Exterior door components to be thermally broken; interior door components not required to be thermally broken.

- b. Coordinate reinforcement and shop preparation with door hardware attachment and operating requirements.
  - c. Unless Indicated Otherwise on Drawings:
    - 1) Stiles to be 6 inches.
    - 2) Top and middle rails to be 6 inches.
      - a) Doors scheduled to receive exit hardware device to be fabricated with middle rail.
    - 3) Bottom rails to be 10 inches.
  - 7. Finish: For aluminum framed doors, finish to match storefront frame in which the door is set. Finish for other door types shall be as indicated on Drawings or in other Sections.
- L. Door Hardware:
- 1. Weatherstripping and Sill Sweep Strips: For aluminum frame doors, manufacturer's standard type to suit application; removable for maintenance replacement.
  - 2. Threshold: Specified in Section 08 71 00. Extruded aluminum, one piece for each door opening, ribbed non-slip surface.
  - 3. Hinges: Specified in Section 08 71 00.
  - 4. Exit Panic Devices: Specified in Section 08 71 00.
  - 5. Closers: Specified in Section 08 71 00.
  - 6. Automatic Door Operators and Actuators: Specified in Section 08 71 00.
  - 7. Lock Cylinders: Specified in Section 08 71 00.
  - 8. Other hardware as may be indicated on Drawings or in Section 08 71 00.
  - 9. Finish: Exposed hardware to match hardware finishes specified in Section 08 71 00.
- M. Flashings:
- 1. Exposed Flashings: Sheet aluminum, finish to match framing members.
    - a. Thickness: 18 gauge, 0.040 inch, minimum.
  - 2. Concealed Flashings: Sheet aluminum.
    - a. Thickness: 22 gauge, 0.025 inch, minimum.
- N. Firestopping: As specified in Section 07 84 00.
- O. Storefront System Sealants: As recommended by storefront system manufacturer; silicone type, with adhesion in compliance with ASTM C794; compatible with glazing panels, infill panels, framing members, flashings, other components, and accessories.
- P. Glazing Gaskets and Accessories: As recommended by storefront and glazing system manufacturers; type to suit application to achieve weather, moisture, and air infiltration requirements.
- Q. Perimeter Sealants and Backing Materials: Provide sealants and backing materials complying with requirements specified in Section 07 90 00.
- R. Sealant for Setting Thresholds: Non-curing butyl type.

## 2.5 FABRICATION

- A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly yet enabling installation and dynamic movement of perimeter seal.
- B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- C. Provide System Internal Drainage: Drain to the exterior by means of a weep drainage networks any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
- D. Prepare system members to receive anchor devices. Fabricate anchors.

- E. Arrange fasteners and attachments to conceal from view.
- F. Prepare system members with internal reinforcement for door hardware.
- G. Prepare system members for installation of door hardware and electrical hardware devices such as security access readers and automatic operators.
- H. Prepare components with internal reinforcement for window treatments.
- I. Reinforce framing members to withstand external imposed loads.
- J. Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.

## 2.6 SHOP FINISHING

- A. Anodized Aluminum Finish:
  - 1. Color Anodized Finish: AAMA 611, AA-M12C22A44 Electrolytically deposited colored anodic coating; Class I, not less than 0.7 mils thick.
- B. Color and Gloss: As selected by Architect from manufacturer's full range of options.
- C. Touch-Up Materials: As recommended by finish manufacturer for field application.
- D. Extent of Finish:
  - 1. Apply factory coating to surfaces exposed at completed assemblies.
  - 2. Apply finish to surfaces cut during fabrication so no natural aluminum is visible in completed assemblies, including joint edges.
  - 3. Apply touch-up materials recommended by coating manufacturer for field application to cut ends and minor damage to factory applied finish.
- E. Concealed Steel Items: Galvanized to ASTM A123/A123M; minimum 2.0 oz/sq ft coating thickness; galvanize after fabrication.
- F. Apply bituminous paint to concealed aluminum and steel surfaces in contact with cementitious or dissimilar metals.
- G. Touch-Up Primer for Galvanized Steel Surfaces: SSPC Paint 20 zinc rich.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify dimensions, tolerances, and method of attachment with other Work.
- C. Verify wall openings are ready to receive Work of this Section.
- D. Verify that construction to which the Work is to be anchored is complete, structurally sound, and adequate to provide the required securement.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.

- B. Install wall system in accordance with engineered design, manufacturer's instructions, and AAMA SFM-1 - Aluminum Storefront and Entrance Manual.
- C. Installation to interface with and maintain continuity of building envelope air and weather barrier components by others.
- D. Coordinate with installers of other products to be installed as integral or surface mounted components to the Work required in this Section.
  - 1. Provide open pathways for electrical wiring and device attachment requirements, to include, but not limited to, the following:
    - a. Electrical hardware devices such as security access readers and automatic operators.
    - b. Electrical life safety and security devices.
- E. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- F. Provide alignment attachments and shims to permanently fasten system to building structure.
- G. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent Work.
- H. Provide thermal isolation where components penetrate or disrupt building insulation.
- I. Install sill flashings. Turn up ends and edges; seal to adjacent Work to form watertight dam.
- J. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- K. Install integral flashings and integral joint sealers.
- L. Set thresholds in bed setting sealant and secure.
- M. Install hardware using hardware manufacturer's templates. Refer to Section 08 71 00 for door hardware requirements other than specified in this Section.
- N. Glazing:
  - 1. Coordinate installation of glass with Section 08 80 00 - Glazing; separate glass from metal surfaces.
- O. Install system weather seal sealants, seals, gaskets and glazing and infill panels to achieve performance criteria.
- P. Install perimeter sealant and backer to achieve performance criteria conforming with installation criteria specified in Section 07 90 00.

### 3.4 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Monitor quality of installation, inspection, and testing.
- B. Manufacturer's Field Services: Provide services of storefront manufacturer's field representative to inspect for proper installation of system and submit report. Representative is to submit inspection report, including list of deficiencies within 5 days of each inspection.
  - 1. Inspections Required:
    - a. 10 percent of completion of the work of this Section.
    - b. 50 percent of completion of the work of this Section.
    - c. 100 percent of completion of the work of this Section.
- C. Water-Spray Test: Provide water spray quality test of installed storefront components in accordance with AAMA 501.2 during construction process and before installation of interior finishes.

1. Perform a minimum of two tests in each area as directed by Architect or Owner.
  2. Conduct tests in each area prior to 10 percent and 50 percent completion of this work.
  3. Tests are to be observed and reported by storefront manufacturer's field representative. Submit test results and observations report within 5 days of each test.
- D. Repair or replace storefront components that have failed designated field testing, and retest to verify performance complies with specified requirements. Submit reports of retest results within 5 days of each retest.

### **3.5 ERECTION TOLERANCES**

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation from Plumb: 1/16 inch every 3 feet non-cumulative or 1/16 inches per 10 feet, whichever is less.
- C. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

### **3.6 ADJUSTING**

- A. Section 01 73 00 - Execution: Testing and adjusting.
- B. Adjust operating hardware for smooth operation and latching.

### **3.7 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Remove protective material from pre-finished aluminum surfaces.
- C. Wash down surfaces with solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- D. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.
- E. Remove excess sealant by method acceptable to sealant manufacturer.

### **3.8 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect finished Work from damage.

### **3.9 DEMONSTRATION AND TRAINING**

- A. Section 01 79 00 - Demonstration and Training: Provide demonstration and training to the Owner regarding operation and maintenance of components of the installed Work.

**END OF SECTION**

**SECTION 08 42 26.10**  
**GLASS DISPLAY CASE DOORS**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Section Includes: Glass display case doors and hardware.
- B. Related Requirements:
  - 1. Section 07 90 00 - Joint Protection: System perimeter sealant and back-up materials.
  - 2. Section 08 71 00 - Door Hardware: Lock cylinders.

**1.2 REFERENCES**

- A. American Architectural Manufacturers Association (AAMA):
  - 1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2020.
- B. ASTM International (ASTM):
  - 1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
  - 2. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
  - 3. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.
  - 4. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
  - 5. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2021.
  - 6. ASTM B455/B455M - Standard Specification for Copper-Zinc-Lead Alloy (Leaded-Brass) Extruded Shapes; 2020.
  - 7. ASTM C1036 - Standard Specification for Flat Glass; 2021.
  - 8. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.

**1.3 COORDINATION**

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate work with adjacent construction to accommodate anchorage of the work of this Section.

**1.4 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit data for system components including glass; door hardware, rails, frames, and finishes.
- C. Shop Drawings: Indicate elevations, framed opening requirements, tolerances; anchorage and fasteners; glass; door hardware requirements and installation details.
- D. Samples for Initial Selection: Two sets, representing manufacturer's full range of available metal materials and finishes.
- E. Samples for Verification: From the Architects initial selection, prepare and submit two samples, minimum size 6 inches representing actual material and finish of exposed metal and of glass.



**1.5 CLOSEOUT SUBMITTALS**

- A. Section 01 77 00 - Closeout Procedures. Requirements for submittals.
- B. Operation and Maintenance Data: Submit for maintaining metal finishes. Include care and cleaning instructions, list of recommended cleaning and polishing materials, and lubrication requirements.

**1.6 QUALIFICATIONS**

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum five (5) years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum three (3) years documented experience and approved by manufacturer.

**1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Accept all-glass entrances on site in manufacturer's protective packaging. Inspect for damage.
- C. Protect finished metal surfaces with wrapping. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.

**1.8 WARRANTY**

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Furnish five (5) year manufacturer's warranty for door closers.

**1.9 SPARE PARTS AND MAINTENANCE PRODUCTS**

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
  - 1. Furnish two (2) sets of special wrenches and tools for door closers.

**PART 2 PRODUCTS****2.1 GLASS DISPLAY CASE DOORS**

- A. Manufacturers:
  - 1. CR Laurence.
  - 2. Dorma Glass.
  - 3. Sugatsune.
  - 4. Virginia Glass Products Corp.
  - 5. Substitutions: Section 01 60 00 - Product Requirements.
- B. Frameless Doors:
  - 1. Door Operation: Swing.
  - 2. Glass Type:
    - a. Laminated glass.
  - 3. Glass Thickness:
    - a. 3/8 inch thick.
  - 4. Door Rails: Extruded aluminum.
    - a. Location: Door top and bottom.
    - b. Rail Shape: Square.



- c. Rail Height:
  - 1) 2.5 inches.
- d. Rail Thickness: As required for door loads and hardware.
- 5. Stops and Locks: Incorporated into rails.
- 6. Header:
  - a. Extruded aluminum.
  - b. As indicated on Drawings.
  - c. Concealment for closer.
- 7. Door Hardware: Stainless steel, unless specified otherwise.
  - a. Pivots:
    - 1) Floor mounted center hung pivot with cover plate.
  - b. Closer:
    - 1) Concealed in header.
  - c. Lock: Bottom rail; cylinder type; keyed outside, thumb turn inside.
  - d. Lock Cylinders: As specified in Section 08 71 00.

## 2.2 COMPONENTS

- A. Steel Sections: ASTM A36/A36M; shapes to suit frame sections.
- B. Aluminum Extrusions: ASTM B221 (ASTM B221M), alloy 6063, temper T5.
- C. Stainless Steel: ASTM A666; Type 304.
- D. Brass Components: Conforming to ASTM B455/B455M.
- E. Fasteners: Stainless steel.
- F. Tempered Glass: Flat glass meeting requirements of ASTM C1036, Type I - Transparent Flat Glass, Quality Q3, and Kind FT, fully tempered, in accordance with ASTM C1048, and as follows:
  - 1. Thickness: 3/8 inch (9.5 mm).
  - 2. Color: Class 1, Clear.
  - 3. Prepare glazing panels for required fittings and hardware before tempering.
  - 4. Polish edges that will be exposed in finished work to bright flat polish.
  - 5. Temper glass materials horizontally; visible tong marks or tong mark distortions are not permitted.

## 2.3 FABRICATION

- A. Verify field measurements prior to fabrication.
- B. Fabricate doors with continuous top and bottom continuous rails. Reinforce rails with steel sections or tie rods where required.
- C. Fabricate sidelights with continuous top and bottom glazing channels.
- D. Fabricate doors and sidelights allowing for minimum clearances and shim spacing around perimeter of assembly.
- E. Rigidly fit and secure joints and corners with internal reinforcement. Make joints and connections flush, hairline, and weatherproof.
- F. Break form cladding to match rail profiles. Fabricate cladding to align flush with adjacent cladding with hairline joints.
- G. Prepare components to receive anchor devices and hardware. Fabricate anchorage items.
- H. Arrange fasteners, attachments, and jointing to ensure concealment from view.
- I. Prepare components with drillings for door hardware.

## 2.4 SHOP FINISHING

- A. Stainless Steel Finishes:
  - 1. Satin Polished Finish: Number 4, satin directional polish parallel with long dimension of finished face.
- B. Galvanizing: ASTM A123/A123M; hot dip galvanized after fabrication.
- C. Aluminum Finish:
  - 1. Clear Anodized Finish: AAMA 611, AA-M12C22A41 Clear anodic coating; Class I, not less than 0.7 mils thick.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that openings are acceptable.
- C. Do not begin installation until substrates and openings have been properly prepared.
- D. If substrate and anchorage locations preparation is not as required for installation of the Work, correct unsatisfactory preparation before proceeding.
- E. Verify wall openings are ready to receive work of this section.
- F. Verify block outs for floor closers are sized and located properly.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Apply one coat of bituminous paint to concealed aluminum and steel surfaces in contact with cementitious or dissimilar materials.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install in accordance with manufacturer's installation instructions.
- C. Use anchorage devices to securely attach glazing channels assembly to structure.
- D. Align assembly plumb and to indicated position, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- E. Install hardware and hang doors.

### 3.4 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Horizontal Components and Sight Lines: Not more than 1/16 inch in 10 feet variation from level, non-cumulative.
- C. Vertical Components and Sight Lines: Not more than 1/16 inch in 10 feet variation from plumb, non-cumulative.
- D. Variation from Plane or Indicated Location: Not more than 1/16 inch (1.6 mm).

- E. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

### **3.5 ADJUSTING**

- A. Section 01 73 00 - Execution: Starting, testing, adjusting, and balancing.
- B. Adjust doors to operate correctly, without binding to frame, sill, or adjacent doors.
- C. Adjust operating hardware for smooth, balanced operation.

### **3.6 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work and comply with manufacturer's recommendations.
- B. Clean installed work in accordance with manufacturer's recommended materials and procedures.
- C. Remove protective material from prefinished surfaces.
- D. Wash down exposed surfaces using solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- E. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

### **3.7 PROTECTION OF FINISHED WORK**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect finish work and glazing from damage.

**END OF SECTION**



**SECTION 08 43 13.13**  
**FIRE-RATED ALUMINUM STOREFRONTS**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Section includes fire-rated aluminum storefront systems.
  - 1. Aluminum framing.
  - 2. Glazing units.
  - 3. Doors and hardware.
- B. Related Requirements:
  - 1. Section 05 50 00 - Metal Fabrications: Metal fabricated attachment devices.
  - 2. Section 07 90 00 - Joint Protection: Perimeter joint sealants for perimeter of aluminum frames.
  - 3. Section 08 71 00 - Door Hardware: Hardware requirements for reinforcing plates and electrical items to be integrated into the storefront frame of this Section.
  - 4. Division 26 - Electrical: Electrical requirements to be integrated into the storefront framing of this Section.

**1.2 REFERENCES**

- A. American Architectural Manufacturers Association (AAMA):
  - 1. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum; 2015.
  - 2. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2024.
  - 3. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
  - 4. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
  - 5. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site; 2015.
- B. Americans with Disabilities Act (ADA):
  - 1. ADA Standards - ADA Standards for Accessible Design; Current Edition.
- C. American Society of Civil Engineers (ASCE):
  - 1. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- D. ASTM International (ASTM):
  - 1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
  - 2. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
  - 3. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
  - 4. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
  - 5. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.
- E. The Society for Protective Coatings (SSPC):

1. SSPC-Paint 20 - Zinc-Rich Primers (Type I - Inorganic, and Type II - Organic); 2019.

### 1.3 ADMINISTRATIVE REQUIREMENTS

- A. Section 01 30 00 - Administrative Requirements.
- B. Coordination: Coordinate work of this Section with related requirements.
  1. Related Door Hardware:
    - a. Provide reinforcement in system framing members to accommodate hardware items indicated in this Section and other related door hardware Sections.
    - b. Prepare system framing members to accommodate electrical hardware devices such as security access readers and automatic operators.
  2. Related Electrical requirements.
    - a. Provide electrical service wiring for electrical hardware devices such as security access readers, automatic operators, and other electrical requirements.
    - b. Coordinate installation of electrical components for connectivity with security and fire alarm monitoring panel.
- C. Pre-Installation Meetings: Convene minimum one week prior to commencing work of this Section. Review the work requirements, application procedures, quality control, testing and inspection and production schedule.

### 1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit component dimensions; describe components within assembly, anchorage and fasteners, glazing units, and infill panels, door hardware.
- C. Shop Drawings: Indicate system fire-rating, dimensions, doors and frames, framed opening requirements and tolerances, anticipated deflection under load, affected related work, expansion and contraction joint location and details, and field welding required. Include details indicating the following:
  1. Fasteners and anchoring details to building components and construction.
  2. System interface and maintenance of continuity of fire-rating of contiguous construction by others.
  3. Provide design and calculations sealed by Professional Structural Engineer demonstrating compliance with wind loading per ASCE 7.
    - a. Indicate engineered framing members structural and physical characteristics, calculations, dimensional limitations.
  4. Construction of cores, stiles, rails, trim for lites, and all other components.
  5. Hardware mounting.
  6. Shop applied and field applied sealants by manufacturer; include product name and application locations on drawings. Show sealant joint sizes, including tolerances and maximum/minimum joint sizes required.
  7. Electrical requirements for electric components including the following:
    - a. Components for monitoring by buildings security and fire alarm system.
- D. Samples for Initial Selection: Two manufacturer's color charts illustrating the range of finishes and colors available for products with factory-applied finishes; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples on same product material type indicated for final Work; each sample 8 x 8 inches. Include samples of glazing, infill panels and glazing materials. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.

- F. Manufacturer's Certificate: Certify products meet or exceed specified requirements.
- G. Manufacturer's Installation Instructions: Indicate special installation criteria and interface with adjacent components.
- H. Engineer's qualifications statement.
- I. Manufacturer's qualifications statement.
- J. Installer's qualifications statement.
- K. Field Quality Control Submittals: Submit field inspection and test reports required in FIELD QUALITY CONTROL article in this Section.

## 1.5 QUALITY ASSURANCE

- A. Engineer Qualifications: Design 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 minimum ten (10) years documented experience.
- C. Installer Qualifications: Company specializing in performing Work of this Section with minimum five (5) years documented experience.
- D. Manufacturer's Field Services: Provide services of storefront manufacturer's field representative to inspect for proper installation as required in FIELD QUALITY CONTROL article in this Section.

## 1.6 DELIVERY, STORAGE, AND PROTECTION

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Handle products of this Section in accordance with AAMA CW-10.
- C. Protect prefinished aluminum surfaces with wrapping. Do not use adhesive papers or spray type coatings which bond when exposed to sunlight or weather. Provide adequate ventilation through wrappings.

## 1.7 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after installation of Work.
- B. Do not install sealants when ambient temperature is less than 40 degrees F during and 48 hours after installation.

## 1.8 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Warranty periods indicated are to begin on the project's date of Substantial Completion.
- C. Provide five (5) year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting, condensation, or misting. Include provision for replacement of failed units.
- D. Provide manufacturer warranty against excessive degradation of metal finishes. Include provision for replacement of units with excessive fading, chalking, peeling, blistering, or flaking. Warranty period to be as follow:
  - 1. Ten (10) year manufacturer warranty.

## 1.9 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
  - 1. One (1) each of each type of hinge installed.
  - 2. One (1) each of each type of panic device installed.
  - 3. One (1) each of each type of closer installed.
  - 4. One (1) each of each type of lock cylinder and latch set installed.
  - 5. One (1) each of each type of smoke seal device for door bottom.
  - 6. One (1) set of perimeter seals for entire perimeter of one door.

## PART 2 PRODUCTS

### 2.1 SYSTEM DESCRIPTION

- A. Fire-Rated Aluminum Storefront System: Includes extruded aluminum framing and doors with supplementary internal support components where required, aluminum and glass entrances, shop fabricated components, factory finished glass, glazing and infill panels, related joint sealers, flashings, anchorage, and attachment devices.
- B. Provide products and system designed to comply with the State Building Code for the State in which the project is located.

### 2.2 INTERIOR FIRE-RATED ALUMINUM STOREFRONT SYSTEMS

- A. Manufacturers:
  - 1. Technical Glass Products.
  - 2. McGroby Glass.
  - 3. Vetrotech North America.
  - 4. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design: Technical Glass Products - Fireframes Aluminum Series.
- C. Provide fire-rated assemblies that are factory fabricated, factory finished, and with components that include framing members, glazing, doors, seals, trim, flashings, anchorage and attachment devices.
  - 1. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
  - 2. Preparation for Window Treatments: Provide reinforced interior horizontal head rail.
- D. Structural Performance: Design to support dead loads and horizontal live loads. Coordinate connection to building's structural members.
  - 1. Design Live Loads: Comply with requirements of ASCE 7, the Drawings, and applicable codes.
  - 2. Seismic Loads: Design and size components and system to withstand seismic loads and sway displacement as calculated in accordance with ASCE 7 and applicable code requirements.
  - 3. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
  - 4. 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.
- E. Fire Performance: Provide hourly fire-resistance-rating as indicated on Drawings and in accordance with fire rating requirements of contiguous construction. Installed assembly,



including glazing, is to comply with ASTM E119 or UL 263 testing and requirements of local authorities having jurisdiction.

1. Acceptable evidence of compliance includes listing by UL (DIR) or testing agency acceptable to authorities having jurisdiction.

## 2.3 COMPONENTS

- A. Framing Members: Formed steel structural members with aluminum cladding and non-combustible thermally resistive material as required for fire rating.
  1. Frame size, configuration, dimensions, trim, and profile: As indicated on Drawings.
  2. Coordinate and provide for hardware requirements:
    - a. Coordinate storefront frames with the specified doors, types, weight, and hardware and as indicated. Provide aluminum storefront frames with internal and concealed reinforcement and anchorage required to support attachment of the hinges and closers and to withstand the operating and closing loads imposed on the storefront frames by the specified doors and hardware.
    - b. Provide reinforcement and shop preparation required for door hardware, including closers, hinges, latching and locking components, automatic door operators, and other hardware indicated in other Sections.
    - c. Coordinate with security, safety and other electrical wiring and hardware requirements such as automatic door operators and actuators.
- B. Glazing Units - **Type FPGL**: Composed of multiple sheets of high visible light transmission glass laminated with an intumescent interlayer.
  1. Basis of Design: Pilkington - Pyrostop.
  2. Fire-Rating: Provide hourly fire-resistance-rating as indicated on Drawings and in accordance with fire-rating requirements of contiguous construction. Installed assembly, including glazing, is to comply with ASTM E119 and UL 263 testing and requirements of local authorities having jurisdiction.
  3. Impact Resistant Safety Glass:
    - a. Comply with ANSI Z97.1 - Class A and 16 CFR 1201 - Category II.
  4. Glazing Material and Application: As required to comply with required fire-rating.
  5. Markings for Fire-Resistance-Rated Glazing Assemblies: Provide permanent markings on fire-resistance-rated glazing in compliance with ICC (IBC), local building code, and authorities having jurisdiction. Marking to include name of product, manufacturer, testing laboratory (UL), fire-rating period in minutes, safety glazing standards, and date manufactured.
- C. Doors: Metal with glazed view panels.
  1. Fire-Rating: Provide hourly fire-resistance-rating as indicated on Drawings and in accordance with fire-rating requirements of contiguous construction. Installed assembly, including glazing, is to comply with ASTM E119 and UL 263 testing and requirements of local authorities having jurisdiction.
  2. Material Type:
    - a. Steel; powder coat finish, AAMA 2604; color to be selected by Architect from manufacturer's full range.
  3. Operation: Comply with ADA Standards.
    - a. Manual swing operation.
  4. Dimensional Requirements: The following requirements are subject to variances as may be required to comply with fire-rating and performance requirements for the overall fire-rated assembly.
    - a. Thickness: 1-3/4 inches (44.5 mm).
    - b. Top Rail: 6 inches (152.4 mm).
    - c. Mid Rail: 6 inches (152.4 mm) or greater to comply with hardware requirements.

- d. Bottom Rail: 10 inches (254 mm).
  - e. Vertical Stiles: 6 inches (152.4 mm).
  - f. Glazing Stops:
    - 1) Square profile.
5. Finish: Same as overall assembly framing.
- D. Door Hardware: Comply with requirements of overall assembly fire-rating and refer to Section 08 71 00 - Door Hardware.

## 2.4 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).
- B. Sheet Aluminum: ASTM B209/B209M.
- C. Sheet and Formed Steel: ASTM A653/A653M; galvanized to minimum G90.
- D. Steel Sections: ASTM A36/A36M; galvanized in accordance with ASTM A123/A123M.
- E. Structural Supporting Anchors Attached to Structural Steel:
  - 1. Designed for bolted attachment.
- F. Structural Supporting Anchors Attached to Reinforced Concrete Members: Design for welded attachment to weld plates embedded in concrete.
- G. Fasteners: Stainless steel. Arrange fasteners and attachments to conceal from view.
- H. Firestopping: Type required for fire rating of fire-rated assembly and finish materials.
- I. Sealants Within Fire-Rated Assembly: Type required for fire rating of fire-rated assembly.
- J. Sealant for Setting Thresholds: Non-curing butyl type.
- K. Perimeter Sealants: Type required for fire rating of fire-rated assembly and finish materials.
- L. Glazing Gaskets: Type required for fire rating of fire-rated assembly.
- M. Shop and Touch-Up Primer for Steel Components: Zinc oxide, alkyd, linseed oil primer appropriate for coating hand cleaned steel.
- N. Touch-Up Primer for Galvanized Steel Surfaces: SSPC-Paint 20, zinc rich.
- O. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint. Coating to be 15 mil minimum dry film thickness.

## 2.5 FABRICATION

- A. Fabricate assemblies in accordance with field dimensions.
- B. Fabricate assemblies with minimum clearances and shim spacing around perimeter of assembly yet enabling installation and dynamic movement of perimeter seal.
- C. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- D. Prepare system members to receive anchor devices. Fabricate anchors.
- E. Arrange fasteners and attachments to conceal from view.
- F. Prepare system members with internal reinforcement for door hardware.
- G. Prepare system members for installation of door hardware and electrical hardware devices such as security access readers and automatic operators.
- H. Prepare components with internal reinforcement for window treatments.
- I. Reinforce framing members to withstand external imposed loads.

- J. Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.

## 2.6 SHOP FINISHING

- A. Anodized Aluminum Finish:
  - 1. Class 1 Natural Anodized Finish: AAMA 611, AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.
  - 2. High Performance Organic Coating: AAMA 2604, thermally cured polyvinylidene fluoride (PVDF) resin-based coating, fluoropolymer finish containing minimum 70 percent PVDF resins.
    - a. Three (3) coat system, 1.2 mil minimum total dry-film thickness.
    - b. Two (2) coat system, 1.2 mil minimum total dry-film thickness.
- B. Color and Gloss: As selected by Architect from manufacturer's full range of options.
- C. Touch-Up Materials: As recommended by finish manufacturer for field application.
- D. Extent of Finish:
  - 1. Apply factory coating to surfaces exposed at completed assemblies.
  - 2. Apply finish to surfaces cut during fabrication so no natural aluminum is visible in completed assemblies, including joint edges.
  - 3. Apply touch-up materials recommended by coating manufacturer for field application to cut ends and minor damage to factory applied finish.
- E. Concealed Steel Items: Galvanized to ASTM A123/A123M; minimum 2.0 oz/sq ft coating thickness; galvanize after fabrication.
- F. Apply bituminous paint to concealed aluminum and steel surfaces in contact with cementitious or dissimilar metals.
- G. Touch-Up Primer for Galvanized Steel Surfaces: SSPC Paint 20 zinc rich.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify dimensions, tolerances, and method of attachment with other Work.
- C. Verify wall openings are ready to receive Work of this Section.
- D. Verify that construction to which the Work is to be anchored is complete, structurally sound, and adequate to provide the required securement.
- E. Verify fire-rating requirements of the Work to be installed and other contiguous construction.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.

- B. Install assemblies in accordance with the Drawings, engineered design, manufacturer's instructions, fire-rated performance requirements, and in compliance with code requirements.
- C. Coordinate with installers of other products to be installed as integral or surface mounted components to the Work required in this Section.
  - 1. Provide open pathways for electrical wiring and device attachment requirements, to include, but not limited to, the following:
    - a. Electrical hardware devices such as security access readers and automatic operators.
    - b. Electrical life safety and security devices.
- D. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- E. Provide alignment attachments and shims to permanently anchor system to building structure.
- F. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent Work.
- G. Install hardware using hardware manufacturer's templates. Refer to Section 08 71 00 for door hardware requirements other than specified in this Section.
- H. Install assembly sealants, seals, gaskets and glazing and infill panels to achieve performance requirements.

### 3.4 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation from Plumb: 1/16 inch every 3 feet non-cumulative or 1/2 inches per 100 feet, whichever is less.
- C. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.
- D. Assembly Perimeter Sealant Space: As required to comply with fire-rating requirements, and no greater than 3/4 inch, and no less than 1/4 inch.

### 3.5 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Monitor quality of installation, inspection, and testing.
- B. Manufacturer's Field Services: Provide services of storefront manufacturer's field representative to inspect for proper installation of system and submit report. Representative is to submit inspection report, including list of deficiencies within 5 days of each inspection.
  - 1. Inspections Required:
    - a. 10 percent of completion of the work of this Section.
    - b. 50 percent of completion of the work of this Section.
    - c. 100 percent of completion of the work of this Section.
- C. Repair or replace storefront components that have failed designated field inspection and reinspect to verify performance complies with specified requirements. Submit reports of retest results within 5 days of each retest.

### 3.6 ADJUSTING

- A. Section 01 73 00 - Execution: Testing and adjusting.
- B. Adjust operating components and hardware for smooth operation and latching.

**3.7 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Remove protective material from pre-finished aluminum surfaces.
- C. Wash down surfaces with solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- D. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.
- E. Remove excess sealant in accordance with recommendations by manufacturers of sealant and surface being cleaned.

**3.8 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect finished Work from damage.

**3.9 DEMONSTRATION AND TRAINING**

- A. Section 01 79 00 - Demonstration and Training: Provide demonstration and training to the Owner regarding operation and maintenance of components of the installed Work.

**END OF SECTION**



## SECTION 08 44 13

### GLAZED ALUMINUM CURTAIN WALLS

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
  - 1. Glazed aluminum curtain wall systems.
  - 2. Glass and glazing panels.
  - 3. Aluminum frame doors and hardware.
  - 4. Structural design requirement.
  - 5. Infill panels.
  - 6. Sun Control and Shade Devices.
  
- B. Related Requirements:
  - 1. Section 05 50 00 - Metal Fabrications: Metal fabricated attachment devices.
  - 2. Section 07 90 00 - Joint Protection: Perimeter joint sealers other than those integral to the curtain wall frames and glazing.
  - 3. Section 08 11 16.10 - Aluminum Doors with FRP Face Panel.
  - 4. Section 08 41 13 - Aluminum-Framed Entrances and Storefronts: Storefront systems including storefront entrance doors, frames, and glazed lites.
  - 5. Section 08 71 00 - Door Hardware: Hardware requirements for reinforcing plates and electrical items to be integrated into the curtain wall framing of this Section.
  - 6. Section 08 80 00 - Glazing: Glazing for glazed aluminum curtain walls.
  - 7. Section 10 71 13 - Exterior Sun Control Devices.
  - 8. Division 26 - Electrical: Electrical requirements to be integrated into the curtain wall framing of this Section.

##### 1.2 REFERENCES

- A. American Architectural Manufacturers Association (AAMA):
  - 1. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems; 2015.
  - 2. AAMA 503 - Voluntary Specification for Field Testing of Newly Installed Storefronts, Curtain Walls, and Sloped Glazing Systems; 2014.
  - 3. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum; 2015.
  - 4. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2020.
  - 5. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.
  - 6. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
  - 7. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
  - 8. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site; 2015.
  - 9. AAMA CWM - Curtain Wall Manual; 2019.
  
- B. American Society of Civil Engineers (ASCE):
  - 1. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

- C. ASTM International (ASTM):
  - 1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
  - 2. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
  - 3. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
  - 4. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
  - 5. ASTM C794 - Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants; 2018, Reapproval 2022.
  - 6. ASTM E283/E283M - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.
  - 7. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls by Uniform Static Air Pressure Difference; 2014, Reapproval 2021.
  - 8. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000, Reapproval 2023.
  - 9. ASTM E783 - Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors; 2002, Reapproval 2018.
  - 10. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference; 2023.
- D. The Society for Protective Coatings (SSPC):
  - 1. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic, and Type II - Organic); 2019.

### 1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
  - 1. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
  - 2. Coordinate work of this Section with related Door Hardware requirements.
    - a. Provide reinforcement in system framing members to accommodate hardware items indicated in this Section and other related door hardware Sections.
    - b. Prepare system framing members to accommodate electrical hardware devices such as security access readers and automatic operators.
  - 3. Coordinate work of this Section with related Electrical requirements.
    - a. Provide for electrical service wiring for electrical hardware devices such as security access readers, automatic operators, and other electrical requirements.
- B. Pre-Installation Meetings:
  - 1. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
  - 2. Convene minimum one week prior to commencing work of this Section.

### 1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit component dimensions, describe components within assembly, anchorage and fasteners, glass and infill panels, door hardware, and internal drainage details.
- C. Shop Drawings: Indicate system dimensions, doors and frames, framed opening requirements and tolerances, anticipated deflection under load, affected related work, weep drainage network, expansion and contraction joint location and details, and field welding required.



1. Details to indicate fasteners and anchoring details to building components and construction.
  2. Details to indicate system interface and maintenance of continuity of building envelope air and weather barrier components by others.
  3. Provide design and calculations sealed by Professional Structural Engineer demonstrating compliance with wind loading per ASCE 7.
  4. Include details of core, stile, and rail construction, trim for lites, and all other components.
  5. Include details of finish hardware mounting.
  6. Include shop applied and field applied sealants by manufacturer; include product name and application locations on drawings. Show sealant joint sizes, including tolerances and maximum/minimum joint sizes required.
- D. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of finishes and colors available for products with factory-applied finishes; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples on same product material type indicated for final Work; each sample 8 x 8 inches. Include samples of glazing, infill panels and glazing materials. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Design Data: Indicate engineered framing members structural and physical characteristics, calculations, dimensional limitations.
- G. Manufacturer's Certificate: Certify products supplied meet or exceed specified requirements.
- H. Installation Data: Special installation requirements.
- I. Field Quality Control Submittals: Submit field inspection and test reports required in FIELD QUALITY CONTROL article in this Section.

## 1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with AAMA CWM - Curtain Wall Manual.
- B. Designer Qualifications: Design 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.
- C. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section with minimum five (5) years documented experience.
1. Same manufacturer required for the following work:
    - a. Aluminum-Framed Entrances and Storefronts.
    - b. Glazed Aluminum Curtain Walls.
- D. Installer Qualifications: Company specializing in performing Work of this Section with minimum five (5) years documented experience.

## 1.6 DELIVERY, STORAGE, AND PROTECTION

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Handle products of this Section in accordance with AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site.

- C. Protect prefinished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather. Provide adequate ventilation through wrappings.

## 1.7 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after installation of Work.
- B. Do not install sealants when ambient temperature is less than 40 degrees F during and 48 hours after installation.

## 1.8 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Provide five (5) year warranty to correct defective Work.
- C. Provide five (5) year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting, condensation, or misting. Include provision for replacement of failed units.
- D. Provide manufacturer warranty against excessive degradation of metal finishes. Include provision for replacement of units with excessive fading, chalking, peeling, blistering, or flaking. Warranty period to be as follow:
  - 1. Ten (10) year manufacturer warranty.

## PART 2 PRODUCTS

### 2.1 SYSTEM DESCRIPTION

- A. Curtain Wall System: Includes extruded aluminum framing and doors with self-supporting framing, supplementary internal support components where required, aluminum and glass entrances, shop fabricated components, factory finished glass, glazing and infill panels; related joint sealers, flashings, anchorage, and attachment devices.
- B. Provide products and system designed to comply with the State Building Code for the State in which the project is located.

### 2.2 PERFORMANCE REQUIREMENTS

- A. Wind Loads: Design and size components and system to withstand dead loads and live loads caused by positive and negative wind loads acting normal to plane of wall, including increased wind loads at building corners.
  - 1. As calculated in accordance with ASCE 7 - Calculation of Wind Loads, as measured in accordance with ASTM E330/E330M.
  - 2. Comply with Design Loads indicated on Drawings and applicable code requirements based on geographical location.
- B. Seismic Loads: Design and size components and system to withstand seismic loads and sway displacement as calculated in accordance with ASCE 7 and applicable code requirements.
- C. Member Deflection:
  - 1. For spans less than 13 feet 6 inches, limit member deflection to flexure limit of glass in any direction, and maximum of 1/175 of span or 3/4 inch, whichever is less and with full recovery of glazing materials.

2. For spans over 13 feet 6 inches and less than 40 feet, limit member deflection to flexure limit of glass in any direction, and maximum of  $1/240$  of span plus  $1/4$  inch, with full recovery of glazing materials.
- D. System Assembly: Accommodate the following without damage to system, components, or deterioration of seals.
1. Movement within system.
  2. Movement between system, system components and perimeter construction.
  3. Dynamic loading and release of loads.
  4. Deflection of structural support framing.
  5. Tolerance of supporting components.
- E. Air Leakage: 0.06 cfm/sq ft maximum leakage through assembly wall area when tested in accordance with ASTM E283/E283M at the following pressure differential.
1. 1.57 psf pressure differential.
- F. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with inside pane of glass and heel bead of glazing compound.
- G. Vapor Seal: Limit vapor seal with interior atmospheric pressure of 1 inch static pressure, 72 degrees F, 40 percent relative humidity without seal failure.
- H. Water Penetration: None, when measured in accordance with ASTM E331 with test pressure differential at 20 percent of design pressure, but not less than 2.86 psf and not to exceed 12.00 psf.
- I. Thermal Transmittance of Assembly (Excluding Entrances): Maximum U-value of 0.45 Btu/(hr sq ft deg F) when measured in accordance with AAMA 1503.
- J. Expansion and Contraction: System to provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over 12 hour period and by 180 degrees F surface temperature without causing detrimental effect to system components and anchorage.
- K. System Internal Drainage: Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to exterior by weep drainage network.
- L. Not Permitted: Vibration harmonics, wind whistles, noises caused by thermal movement, thermal movement transmitted to other building elements, loosening, weakening, or fracturing of attachments or components of system.

### 2.3 GLAZED CURTAIN WALL SYSTEM

- A. Exterior Glazed Curtain Wall: Application to be where one side of curtain wall is exposed to unconditioned air; includes building exterior exposure.
1. Extruded aluminum frame members with internal reinforcement of aluminum or shaped steel structural sections as required to withstand imposed loads, including loads imposed by operating doors and hardware of types and sizes indicated.
  2. Frame components to be thermally broken from exterior exposed surfaces.
  3. Frame size, configuration, dimensions, and profile: As indicated on Drawings.
    - a. For frames with laminated glass panels, coordinate with glass panel thickness.
    - b. Continuous perimeter filler.
  4. Provide glazing panels and infill panels as indicated on Drawings, sealed weathertight within frames.
    - a. Panel Position Within Frame:
      - 1) As indicated on Drawings.
  5. Internal weep drainage system to drain to exterior.

6. Manufacturers:
  - a. Kawneer Co., Inc.
  - b. Oldcastle BuildingEnvelope.
  - c. Tubelite, Inc.
  - d. U.S. Aluminum, a C.R. Lurance Company.
  - e. YKK AP America.
  - f. Substitutions: Section 01 60 00 - Product Requirements.
7. Basis of Design:
  - a. Kawneer Co., Inc.:
    - 1) 1600 Wall System 1; 2-1/2 inch sightline.

## 2.4 COMPONENTS

- A. Extruded Aluminum: ASTM B221; 6063 alloy, T5 temper typical or 6061 alloy, T6 temper for extruded structural members.
- B. Sheet Aluminum: ASTM B209/B209M, 5005 alloy, H15 or H34 temper, wall thickness as required for system application and use but not less than 0.125 inch.
- C. Sheet Steel: ASTM A653/A653M; galvanized to minimum G90.
- D. Steel Sections: ASTM A36/A36M; shaped to suit aluminum framing and mullion members.
  1. For use as concealed structural support reinforcement.
    - a. For exterior framing, steel to be galvanized per ASTM A123/A123M.
    - b. For interior framing, steel to be shop primed.
- E. Structural Supporting Anchors Attached to Structural Steel:
  1. Design to suit attachment requirements.
- F. Structural Supporting Anchors Attached to Reinforced Concrete Members:
  1. Design to suit attachment requirements.
- G. Fasteners: Provide aluminum, non-magnetic stainless steel, or other non-corrosive metal fasteners, recommended to be compatible by the manufacturer of materials being fastened, including doors, frames, stops, panels, hardware, anchors, and other items receiving fasteners. For exposed fasteners (if any) provide Oval Phillips Head screws with finish matching the item to be fastened. The use of sex bolts will not be accepted.
- H. Framing Members Profiles: Extruded aluminum and as indicated on Drawings.
- I. Trim Components Profiles: Extruded aluminum and as indicated on Drawings.
- J. Glass and Glazing Panels:
  1. As indicated on Drawings.
  2. As specified in Section 08 80 00 - Glazing.
- K. Infill Panels:
  1. Insulated Fiber Reinforced Panels (IFRP): Factory manufactured foam wrapped panels with FRP sheet faced both sides, with edges and thickness formed to fit frame and seal condition.
    - a. Locations: Exterior exposure of building envelope.
    - b. Thickness: 1 inch thick.
    - c. Insulating Core: Polyisocyanurate or polyurethane foam; minimum 5.0 R-value per inch thickness; fire resistant.
    - d. FRP Faces: Fiber reinforced panel sheet laminated to substrate.
      - 1) Thickness:
        - a) Minimum 0.120 inch thick.
      - 2) Finish Type:
        - a) Finish pebble grain to match adjacent doors.

- b) As selected by Architect from manufacturer's full range of options.
  - 3) Finish Color:
    - a) As selected by Architect from manufacturer's full range of options.
    - b) Color to match adjacent adjacent doors.
  - e. Basis of Design: Fiber-Tech Clad Foam Core Panels.
- L. Sun Control and Shade Devices: Shop fabricated, shop finished, extruded aluminum outriggers, louvers, and fascia, free of defects impairing strength, durability, or appearance.
- 1. Configurations and Locations: As indicated on Drawings.
  - 2. Blade Profile, Angle and Spacing: As indicated on Drawings.
  - 3. Outrigger Shape: As indicated on Drawings.
  - 4. Design and fabricate to resist the same loads as Curtain Wall system without failure, damage, or permanent deflection.
    - a. Additional design load for sun control and shade devices to include live and snow loads.
    - b. Coordinate concealed structural support reinforcement and anchorage required to support attachment hardware.
  - 5. Sizes: As indicated on drawings.
  - 6. Finish Type: As selected by Architect from manufacturer's full range of options.
  - 7. Finish Color: As selected by Architect from manufacturer's full range of options.
  - 8. Shop fabricate to the greatest extent possible; disassemble as necessary for shipping.
- M. Doors:
- 1. Material: As indicated on Drawings.
  - 2. Thickness: As indicated on Drawings.
  - 3. Curtain Wall Framing Members:
    - a. Coordinate frame's door stop and door silencer feature (along the frame stop) with door thickness and door type indicated on Drawings.
    - b. Coordinate concealed structural support reinforcement and shop preparation with door hardware, including closers, hinges, latching and locking components, automatic door operators, and other hardware indicated in other Sections.
    - c. Coordinate curtain wall frames with the specified doors, types, weight, and hardware and as indicated. Provide aluminum curtain wall frames with internal and concealed structural support reinforcement and anchorage required to support attachment of the hinges and closers and to withstand the operating and closing loads imposed on the curtain wall frames by the specified doors and hardware.
    - d. Coordinate with security, safety and other electrical wiring and hardware requirements such as automatic door operators and actuators.
  - 4. Glass and Glazing Panels:
    - a. As indicated on Drawings.
  - 5. Glazing Stops Profile: As indicated on Drawings.
  - 6. Stiles and Rails: Extruded aluminum; profiles as indicated on Drawings.
    - a. Exterior door components to be thermally broken; interior door components not required to be thermally broken.
    - b. Coordinate reinforcement and shop preparation with door hardware attachment and operating requirements.
    - c. Unless Indicated Otherwise on Drawings:
      - 1) Stiles to be 6 inches.
      - 2) Top and middle rails to be 6 inches.
        - a) Doors scheduled to receive exit hardware device to be fabricated with middle rail.
      - 3) Bottom rails to be 10 inches.

7. Finish: For aluminum framed doors, finish to match curtain wall frame in which the door is set. Finish for other door types shall be as indicated on Drawings or in other Sections.
- N. Door Hardware:
1. Weatherstripping and Sill Sweep Strips: For aluminum frame doors, manufacturer's standard type to suit application; removable for maintenance replacement.
  2. Threshold: Specified in Section 08 71 00. Extruded aluminum, one piece for each door opening, ribbed non-slip surface.
  3. Hinges: Specified in Section 08 71 00.
  4. Exit Panic Devices: Specified in Section 08 71 00.
  5. Closers: Specified in Section 08 71 00.
  6. Automatic Door Operators and Actuators: Specified in Section 08 71 00.
  7. Lock Cylinders: Specified in Section 08 71 00.
  8. Other hardware as may be indicated on Drawings or in Section 08 71 00.
  9. Finish: Exposed hardware to match hardware finishes specified in Section 08 71 00.
- O. Flashings:
1. Exposed Flashings: Sheet aluminum, finish to match framing members.
    - a. Thickness: 18 gauge, 0.040 inch, minimum.
  2. Concealed Flashings: Sheet aluminum.
    - a. Thickness: 22 gauge, 0.025 inch, minimum.
- P. Firestopping: As specified in Section 07 84 00.
- Q. Curtain Wall System Sealants: As recommended by curtain wall system manufacturer; silicone type, with adhesion in compliance with ASTM C794; compatible with glazing panels, infill panels, framing members, flashings, other components, and accessories.
- R. Glazing Gaskets and Accessories: As recommended by curtain wall and glazing system manufacturers; type to suit application to achieve weather, moisture, and air infiltration requirements.
- S. Perimeter Sealants and Backing Materials: Provide sealants and backing materials complying with requirements specified in Section 07 90 00.
- T. Sealant for Setting Thresholds: Non-curing butyl type.

## 2.5 FABRICATION

- A. Fabricate system components with minimum clearances and shim spacing around perimeter of assembly yet enabling installation and dynamic movement of perimeter seal.
- B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- C. Provide System Internal Drainage: Drain to the exterior by means of a weep drainage networks any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
- D. Prepare system members to receive anchor devices. Fabricate anchors.
- E. Arrange fasteners and attachments to conceal from view.
- F. Prepare system members with internal reinforcement for door hardware.
- G. Prepare system members for installation of door hardware and electrical hardware devices such as security access readers and automatic operators.
- H. Prepare components with internal reinforcement for window treatments.
- I. Reinforce framing members to withstand external imposed loads.

- J. Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.

## 2.6 SHOP FINISHING

- A. Anodized Aluminum Finish:
  - 1. Color Anodized Finish: AAMA 611, AA-M12C22A44 Electrolytically deposited colored anodic coating; Class I, not less than 0.7 mils thick.
- B. Color and Gloss: As selected by Architect from manufacturer's full range of options.
- C. Touch-Up Materials: As recommended by finish manufacturer for field application.
- D. Extent of Finish:
  - 1. Apply factory coating to surfaces exposed at completed assemblies.
  - 2. Apply finish to surfaces cut during fabrication so no natural aluminum is visible in completed assemblies, including joint edges.
  - 3. Apply touch-up materials recommended by coating manufacturer for field application to cut ends and minor damage to factory applied finish.
- E. Concealed Steel Items: Galvanized to ASTM A123/A123M; minimum 2.0 oz/sq ft coating thickness; galvanize after fabrication.
- F. Apply bituminous paint to concealed aluminum and steel surfaces in contact with cementitious or dissimilar metals.
- G. Touch-Up Primer for Galvanized Steel Surfaces: SSPC Paint 20 zinc rich.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify dimensions, tolerances, and method of attachment with other work.
- C. Verify wall openings are ready to receive Work of this Section.
- D. Verify that construction to which the Work is to be anchored is complete, structurally sound, and adequate to provide the required securement.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install wall system in accordance with engineered design, manufacturer's instructions, and AAMA CWM - Curtain Wall Manual.
- C. Installation to interface with and maintain continuity of building envelope air and weather barrier components by others.
- D. Coordinate with installers of other products to be installed as integral or surface mounted components to the glazed aluminum curtain wall system.



1. Provide open pathways for electrical wiring and device attachment requirements, to include, but not limited to, the following:
  - a. Electrical hardware devices such as security access readers and automatic operators.
  - b. Electrical life safety and security devices.
- E. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- F. Provide alignment attachments and shims to permanently fasten system to building structure.
- G. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances and align with adjacent Work.
- H. Provide thermal isolation where components penetrate or disrupt building insulation.
- I. Install sill flashings. Turn up ends and edges; seal to adjacent Work to form watertight dam.
- J. Install firestopping at each floor slab edge. Comply with applicable codes and requirements specified in Section 07 84 00.
- K. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- L. Install integral flashings and integral joint sealers.
- M. Set thresholds in bed setting sealant and secure.
- N. Install hardware using hardware manufacturer's templates. Refer to Section 08 71 00 for door hardware requirements other than specified in this Section.
- O. Glazing:
  1. Coordinate installation of glass with Section 08 80 00 - Glazing; separate glass from metal surfaces.
- P. Install system weather seal sealants, seals, gaskets and glazing and infill panels to achieve performance criteria.
- Q. Install perimeter sealant and back to achieve performance criteria conforming with installation criteria specified in Section 07 90 00.

### 3.4 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Monitor quality of installation, inspection, and testing.
- B. Manufacturer's Field Services: Provide services of curtain wall manufacturer's field representative to inspect for proper installation of system and submit report. Representative is to submit inspection report, including list of deficiencies within 5 days of each inspection.
  1. Inspections Required:
    - a. 10 percent of completion of the work of this Section.
    - b. 50 percent of completion of the work of this Section.
    - c. 100 percent of completion of the work of this Section.
- C. Water-Spray Test: Provide water spray quality test of installed curtain wall components in accordance with AAMA 501.2 during construction process and before installation of interior finishes.
  1. Perform a minimum of two tests in each area as directed by Architect or Owner.
  2. Conduct tests in each area prior to 10 percent and 50 percent completion of this work.
  3. Tests are to be observed and reported by curtain wall manufacturer's field representative. Submit test results and observations report within 5 days of each test.



- D. Repair or replace curtain wall components that have failed designated field testing, and retest to verify performance complies with specified requirements. Submit reports of retest results within 5 days of each retest.

### **3.5 ERECTION TOLERANCES**

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation from Plumb: 1/16 inch every 3 feet non-cumulative or 1/2 inch per 100 ft, whichever is less.
- C. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.
- D. Sealant Space Between Curtain Wall Mullions and Adjacent Construction: Maximum of 3/4 inch and minimum of 1/4 inch.

### **3.6 ADJUSTING**

- A. Section 01 73 00 - Execution: Testing and adjusting.
- B. Adjust operating hardware for smooth operation.

### **3.7 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Remove protective material from prefinished aluminum surfaces.
- C. Wash down surfaces with solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- D. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.
- E. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

### **3.8 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect finished Work from damage.

### **3.9 DEMONSTRATION AND TRAINING**

- A. Section 01 79 00 - Demonstration and Training: Provide demonstration and training to the Owner regarding operation and maintenance of components of the installed Work.

**END OF SECTION**



**SECTION 08 71 00**  
**DOOR HARDWARE**

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Mechanical and electrified door hardware
2. Electronic access control system components

B. Section excludes:

1. Windows
2. Cabinets (casework), including locks in cabinets
3. Signage
4. Toilet accessories
5. Overhead doors

C. Related Sections:

1. Division 01 "General Requirements" sections for Allowances, Alternates, Owner Furnished Contractor Installed, Project Management and Coordination.
2. Division 06 Section "Rough Carpentry"
3. Division 06 Section "Finish Carpentry"
4. Division 07 Section "Joint Sealants" for sealant requirements applicable to threshold installation specified in this section.
5. Division 08 Sections:
  - a. "Metal Doors and Frames"
  - b. "Flush Wood Doors"
  - c. "Stile and Rail Wood Doors"
  - d. "Interior Aluminum Doors and Frames"
  - e. "Aluminum-Framed Entrances and Storefronts"
  - f. "Stainless Steel Doors and Frames"
  - g. "Special Function Doors"
  - h. "Entrances"
6. Division 26 "Electrical" sections for connections to electrical power system and for low-voltage wiring.
7. Division 28 "Electronic Safety and Security" sections for coordination with other components of electronic access control system and fire alarm system.

1.02 REFERENCES

A. UL LLC

1. UL 10B - Fire Test of Door Assemblies
2. UL 10C - Positive Pressure Test of Fire Door Assemblies
3. UL 1784 - Air Leakage Tests of Door Assemblies
4. UL 305 - Panic Hardware

B. DHI - Door and Hardware Institute

1. Sequence and Format for the Hardware Schedule

2. Recommended Locations for Builders Hardware
  3. Keying Systems and Nomenclature
  4. Installation Guide for Doors and Hardware
- C. NFPA – National Fire Protection Association
1. NFPA 70 – National Electric Code
  2. NFPA 80 – 2016 Edition – Standard for Fire Doors and Other Opening Protectives
  3. NFPA 101 – Life Safety Code
  4. NFPA 105 – Smoke and Draft Control Door Assemblies
  5. NFPA 252 – Fire Tests of Door Assemblies
- D. ANSI - American National Standards Institute
1. ANSI A117.1 – 2017 Edition – Accessible and Usable Buildings and Facilities
  2. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties
  3. ANSI/BHMA A156.28 - Recommended Practices for Keying Systems
  4. ANSI/WDMA I.S. 1A - Interior Architectural Wood Flush Doors
  5. ANSI/SDI A250.8 - Standard Steel Doors and Frames

### 1.03 SUBMITTALS

#### A. General:

1. Submit in accordance with Conditions of Contract and Division 01 Submittal Procedures.
2. Prior to forwarding submittal:
  - a. Review drawings and Sections from related trades to verify compatibility with specified hardware.
  - b. Highlight, encircle, or otherwise specifically identify on submittals: deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.

#### B. Action Submittals:

1. Product Data: Submit technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:
  - a. Wiring Diagrams: For power, signal, and control wiring and including:
    - 1) Details of interface of electrified door hardware and building safety and security systems.
    - 2) Schematic diagram of systems that interface with electrified door hardware.
    - 3) Point-to-point wiring.
    - 4) Risers.
3. Samples for Verification: If requested by Architect, submit production sample of requested door hardware unit in finish indicated and tagged with full description for coordination with schedule.
  - a. Samples will be returned to supplier. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.
4. Door Hardware Schedule:
  - a. Submit concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work critical in Project construction schedule.

- b. Submit under direct supervision of a Door Hardware Institute (DHI) certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule published by DHI.
  - c. Indicate complete designations of each item required for each opening, include:
    - 1) Door Index: door number, heading number, and Architect's hardware set number.
    - 2) Quantity, type, style, function, size, and finish of each hardware item.
    - 3) Name and manufacturer of each item.
    - 4) Fastenings and other pertinent information.
    - 5) Location of each hardware set cross-referenced to indications on Drawings.
    - 6) Explanation of all abbreviations, symbols, and codes contained in schedule.
    - 7) Mounting locations for hardware.
    - 8) Door and frame sizes and materials.
    - 9) Degree of door swing and handing.
    - 10) Operational Description of openings with electrified hardware covering egress, ingress (access), and fire/smoke alarm connections.
5. Key Schedule:
- a. After Keying Conference, provide keying schedule that includes levels of keying, explanations of key system's function, key symbols used, and door numbers controlled.
  - b. Use ANSI/BHMA A156.28 "Recommended Practices for Keying Systems" as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
  - c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
  - d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
  - e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion. Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.
  - f. Prepare key schedule by or under supervision of supplier, detailing Owner's final keying instructions for locks.
- C. Informational Submittals:
1. Provide Qualification Data for Supplier, Installer and Architectural Hardware Consultant.
  2. Provide Product Data:
    - a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
    - b. Include warranties for specified door hardware.
- D. Closeout Submittals:
1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:
    - a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
    - b. Catalog pages for each product.
    - c. Final approved hardware schedule edited to reflect conditions as installed.
    - d. Final keying schedule
    - e. Copy of warranties including appropriate reference numbers for manufacturers to identify project.
    - f. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.
- E. Inspection and Testing:
1. Submit written reports to the Owner and Authority Having Jurisdiction (AHJ) of the results of functional testing and inspection for:
    - a. Fire door assemblies, in compliance with NFPA 80.

- b. Required egress door assemblies, in compliance with NFPA 101.

#### 1.04 QUALITY ASSURANCE

##### A. Qualifications and Responsibilities:

1. Supplier: Recognized architectural hardware supplier with a minimum of 5 years documented experience supplying both mechanical and electromechanical door hardware similar in quantity, type, and quality to that indicated for this Project. Supplier to be recognized as a factory direct distributor by the manufacturer of the primary materials with a warehousing facility in the Project's vicinity. Supplier to have on staff, a certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.
2. Installer: Qualified tradesperson skilled in the application of commercial grade hardware with experience installing door hardware similar in quantity, type, and quality as indicated for this Project.
3. Architectural Hardware Consultant: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:
  - a. For door hardware: DHI certified AHC or DHC.
  - b. Can provide installation and technical data to Architect and other related subcontractors.
  - c. Can inspect and verify components are in working order upon completion of installation.
  - d. Capable of producing wiring diagram and coordinating installation of electrified hardware with Architect and electrical engineers.
4. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.

##### B. Certifications:

1. Fire-Rated Door Openings:
  - a. Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction.
  - b. Provide only items of door hardware that are listed products tested by UL LLC, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.
2. Smoke and Draft Control Door Assemblies:
  - a. Provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105
  - b. Comply with the maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at tested pressure differential of 0.3-inch wg (75 Pa) of water.
3. Electrified Door Hardware
  - a. Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction.
4. Accessibility Requirements:
  - a. Comply with governing accessibility regulations cited in "REFERENCES" article 087100, 1.02.D3 herein for door hardware on doors in an accessible route. This project must comply with all Federal Americans with Disability Act regulations and all Local Accessibility Regulations.

##### C. Pre-Installation Meetings

1. Keying Conference

- a. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:
  - 1) Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
  - 2) Preliminary key system schematic diagram.
  - 3) Requirements for key control system.
  - 4) Requirements for access control.
  - 5) Address for delivery of keys.
2. Pre-installation Conference
  - a. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
  - b. Inspect and discuss preparatory work performed by other trades.
  - c. Inspect and discuss electrical roughing-in for electrified door hardware.
  - d. Review sequence of operation for each type of electrified door hardware.
  - e. Review required testing, inspecting, and certifying procedures.
  - f. Review questions or concerns related to proper installation and adjustment of door hardware.
3. Electrified Hardware Coordination Conference:
  - a. Prior to ordering electrified hardware, schedule and hold meeting to coordinate door hardware with security, electrical, doors and frames, and other related suppliers.

#### 1.05 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site. Promptly replace products damaged during shipping.
- B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package. Deliver each article of hardware in manufacturer's original packaging.
- C. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.
- D. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.
- E. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.
- F. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

#### 1.06 COORDINATION

- A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.
- B. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.

- D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

#### 1.07 WARRANTY

- A. Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within published warranty period.
  - 1. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.
  - 2. Warranty Period: Beginning from date of Substantial Completion, for durations indicated in manufacturer's published listings.

#### 1.08 MAINTENANCE

- A. Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.
- B. Turn over unused materials to Owner for maintenance purposes.

### PART 2 - PRODUCTS

#### 2.01 MANUFACTURERS

- A. The Owner requires use of certain products for their unique characteristics and project suitability to ensure continuity of existing and future performance and maintenance standards. After investigating available product offerings, the Awarding Authority has elected to prepare proprietary specifications. These products are specified with the notation: "No Substitute."
  - 1. Where "No Substitute" is noted, submittals and substitution requests for other products will not be considered.
- B. Approval of alternate manufacturers and/or products other than those listed as "Scheduled Manufacturer" or "Acceptable Manufacturers" in the individual article for the product category are only to be considered by official substitution request in accordance with section 01 25 00.
- C. Approval of products from manufacturers indicated in "Acceptable Manufacturers" is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer's product.
- D. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

#### 2.02 MATERIALS

- A. Fabrication
  - 1. Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. provide screws according to manufacturer's recognized installation standards for application intended.
  - 2. Finish exposed screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.



3. Provide concealed fasteners wherever possible for hardware units exposed when door is closed. Coordinate with “Metal Doors and Frames”, “Flush Wood Doors”, “Stile and Rail Wood Doors” to ensure proper reinforcements. Advise the Architect where visible fasteners, such as thru bolts, are required.
- B. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.
1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.
- C. Cable and Connectors:
1. Where scheduled in the hardware sets, provide each item of electrified hardware and wire harnesses with number and gage of wires enough to accommodate electric function of specified hardware.
  2. Provide Molex connectors that plug directly into connectors from harnesses, electric locking and power transfer devices.
  3. Provide through-door wire harness for each electrified locking device installed in a door and wire harness for each electrified hinge, electrified continuous hinge, electrified pivot, and electric power transfer for connection to power supplies.

## 2.03 HINGES

- A. Manufacturers and Products:
1. Scheduled Manufacturer and Product:
    - a. Ives 5BB series
  2. Acceptable Manufacturers and Products:
    - a. McKinney TB series
    - b. Best FBB series
- B. Requirements:
1. Provide hinges conforming to ANSI/BHMA A156.1.
  2. Provide five knuckle, ball bearing hinges.
  3. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:
    - a. Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches (114 mm) high
    - b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high
  4. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:
    - a. Exterior: Heavy weight, bronze/stainless steel, 5 inches (127 mm) high
    - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
  5. 2 inches or thicker doors:
    - a. Exterior: Heavy weight, bronze or stainless steel, 5 inches (127 mm) high
    - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
  6. Adjust hinge width for door, frame, and wall conditions to allow proper degree of opening.
  7. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
  8. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
    - a. Steel Hinges: Steel pins
    - b. Non-Ferrous Hinges: Stainless steel pins
    - c. Out-Swinging Exterior Doors: Non-removable pins
    - d. Out-Swinging Interior Lockable Doors: Non-removable pins
    - e. Interior Non-lockable Doors: Non-rising pins

9. Provide hinges with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware. Locate electric hinge at second hinge from bottom or nearest to electrified locking component. Provide mortar guard for each electrified hinge specified.

## 2.04 CONTINUOUS HINGES

### A. Manufacturers:

1. Scheduled Manufacturer:
  - a. Ives
2. Acceptable Manufacturers:
  - a. Select
  - b. ABH

### B. Requirements:

1. Provide aluminum geared continuous hinges conforming to ANSI/BHMA A156.26, Grade 1.
2. Provide aluminum geared continuous hinges, where specified in the hardware sets, fabricated from 6063-T6 aluminum.
3. Provide split nylon bearings at each hinge knuckle for quiet, smooth, self-lubricating operation.
4. Provide hinges capable of supporting door weights up to 450 pounds, and successfully tested for 1,500,000 cycles.
5. On fire-rated doors, provide aluminum geared continuous hinges classified for use on rated doors by testing agency acceptable to authority having jurisdiction.
6. Provide aluminum geared continuous hinges with electrified option scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware.
7. Provide hinges 1 inch (25 mm) shorter in length than nominal height of door, unless otherwise noted or door details require shorter length and with symmetrical hole pattern.

## 2.05 ELECTRIC POWER TRANSFER

### A. Manufacturers:

1. Scheduled Manufacturer and Product:
  - a. Von Duprin EPT-10
2. Acceptable Manufacturers and Products:
  - a. Securitron CEPT-10
  - b. Security Door Controls PTM

### B. Requirements:

1. Provide power transfer with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware.
2. Locate electric power transfer per manufacturer's template and UL requirements, unless interference with operation of door or other hardware items.

## 2.06 FLUSH BOLTS

### A. Manufacturers:

1. Scheduled Manufacturer:
  - a. Ives

2. Acceptable Manufacturers:
  - a. Burns
  - b. Trimco

B. Requirements:

1. Provide automatic, constant latching, and manual flush bolts with forged bronze or stainless-steel face plates, extruded brass levers, and with wrought brass guides and strikes. Provide 12 inch (305 mm) steel or brass rods at doors up to 90 inches (2286 mm) in height. For doors over 90 inches (2286 mm) in height increase top rods by 6 inches (152 mm) for each additional 6 inches (152 mm) of door height. Provide dust-proof strikes at each bottom flush bolt.

## 2.07 COORDINATORS

A. Manufacturers:

1. Scheduled Manufacturer:
  - a. Ives
2. Acceptable Manufacturers:
  - a. Burns
  - b. Trimco

B. Requirements:

1. Where pairs of doors are equipped with automatic flush bolts, an astragal, or other hardware that requires synchronized closing of the doors, provide bar-type coordinating device, surface applied to underside of stop at frame head.
2. Provide filler bar of correct length for unit to span entire width of opening, and appropriate brackets for parallel arm door closers, surface vertical rod exit device strikes, or other stop mounted hardware. Factory-prepared coordinators for vertical rod devices as specified.

## 2.08 MORTISE LOCKS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
  - a. Schlage L9000 series
2. Acceptable Manufacturers and Products:
  - a. Accurate 9000/9100 series
  - b. Sargent 8200 series

B. Requirements:

1. Provide mortise locks conforming to ANSI/BHMA A156.13 Series 1000, Grade 1, and UL Listed for 3-hour fire doors.
2. Indicators: Where specified, provide indicator window measuring a minimum 2-3/5-inch x 3/5 inch with 180-degree visibility. Provide messages color-coded using ANSI Z535 Safety Red with full text and/or symbols, as scheduled, for easy visibility. When applicable allows for lock status indication on both sides of the door.
3. Provide locks manufactured from heavy gauge steel, containing components of steel with a zinc dichromate plating for corrosion resistance.
4. Provide lock case that is multi-function and field reversible for handing without opening case. Cylinders: Refer to "KEYING" article, herein.

5. Provide locks with standard 2-3/4 inches (70 mm) backset with full 3/4 inch (19 mm) throw stainless steel mechanical anti-friction latchbolt. Provide deadbolt with full 1-inch (25 mm) throw, constructed of stainless steel.
6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim. Provide electrified options as scheduled in the hardware sets. Where scheduled, provide switches and sensors integrated into the locks and latches.
7. Provide motor based electrified locksets that comply with the following requirements:
  - a. Universal input voltage – single chassis accepts 12 or 24VDC to allow for changes in the field without changing lock chassis.
  - b. Fail Safe/Fail Secure – changing mode between electrically locked (fail safe) and electrically unlocked (fail secure) is field selectable without opening the lock case.
  - c. Low maximum current draw – maximum 0.4 amps to allow for multiple locks on a single power supply.
  - d. Low holding current – maximum 0.01 amps to produce minimal heat, eliminate “hot levers” in electrically locked applications, and to provide reliable operation in wood doors that provide minimal ventilation and air flow.
  - e. Connections – provide quick-connect Molex system standard.
8. Lever Trim: Solid brass, bronze, or stainless steel, cast or forged in design specified, with wrought roses and external lever spring cages. Provide thru-bolted levers with 2-piece spindles.
  - a. Vandlgard: Provide levers with vandal resistant technology for use at heavy traffic or abusive applications.
  - b. Lever Design: 17.

## 2.09 CYLINDRICAL LOCKS – GRADE 1

### A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
  - a. Schlage ND series
2. Acceptable Manufacturers and Products:
  - a. Sargent 11-Line
  - b. Corbin-Russwin CL3100 series

### B. Requirements:

1. Provide cylindrical locks conforming to ANSI/BHMA A156.2 Series 4000, Grade 1, and UL Listed for 3-hour fire doors.
2. Indicators: Where specified, provide escutcheon with lock status indicator window on top of lockset rose:
  - a. Escutcheon height (including rose) 6.05 inches high by 3.68 inches wide.
  - b. Indicator window measuring a minimum 3.52-inch by .60 inch with 1.92 square-inches of front facing viewing area and 180-degree visibility with a total of .236 square-inches of total viewable area.
  - c. Provide snap-in serviceable window to prevent tampering. Lock must function if indicator is compromised.
  - d. Provide messages color-coded with full text and symbol, as scheduled, for easy visibility.
  - e. Unlocked and Unoccupied message will display on white background, and Locked and Occupied message will display on red background.
3. Cylinders: Refer to "KEYING" article, herein.
4. Provide locks with standard 2-3/4 inches (70 mm) backset, unless noted otherwise, with 1/2-inch latch throw. Provide proper latch throw for UL listing at pairs.
5. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.
6. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
7. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.

8. Provide electrified options as scheduled in the hardware sets.
9. Lever Trim: Solid cast levers without plastic inserts and wrought roses on both sides.
  - a. Vandlgard: Provide levers with vandal resistant technology for use at heavy traffic or abusive applications.
  - b. Lever Design: Sparta.

## 2.10 EXIT DEVICES

### A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
  - a. Von Duprin 99/33A series
2. Acceptable Manufacturers and Products:
  - a. Detex Advantex series
  - b. Precision APEX 2000 series

### B. Requirements:

1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1 and UL listed for Panic Exit or Fire Exit Hardware.
2. Cylinders: Refer to "KEYING" article, herein.
3. Provide grooved touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.
4. Touchpad must extend a minimum of one half of door width. No plastic inserts are allowed in touchpads.
5. Provide exit devices with deadlatching feature for security and for future addition of alarm kits and/or other electrified requirements.
6. Provide exit devices with weather resistant components that can withstand harsh conditions of various climates and corrosive cleaners used in outdoor pool environments.
7. Provide flush end caps for exit devices.
8. Provide exit devices with manufacturer's approved strikes.
9. Provide exit devices cut to door width and height. Install exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.
10. Mount mechanism case flush on face of doors or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
11. Provide cylinder or hex-key dogging as specified at non fire-rated openings.
12. Removable Mullions: 2 inches (51 mm) x 3 inches (76 mm) steel tube. Where scheduled as keyed removable mullion, provide type that can be removed by use of a keyed cylinder, which is self-locking when re-installed.
13. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive areas, and where noted in hardware sets.
14. Provide electrified options as scheduled.
15. Top latch mounting: double- or single-tab mount for steel doors, face mount for aluminum doors eliminating requirement of tabs, and double tab mount for wood doors.
16. Provide exit devices with optional trim designs to match other lever and pull designs used on the project.

## 2.11 ELECTRONIC ACCESS CONTROL LOCKSETS AND EXIT DEVICE TRIM

### A. Manufacturers:

1. Scheduled Manufacturer and Product:
  - a. Schlage AD Series
2. Acceptable Manufacturers and Products:
  - a. No Substitute

## B. Requirements:

1. Provide adaptable electronic access control products that comply with the following requirements:
  - a. Listed, UL 294 - The Standard of Safety for Access Control System Units.
  - b. Compliant with ANSI/BHMA A156.25 Grade 1 Operation and Security.
  - c. Certified to UL10C, FCC Part15, Florida Building Code Standards TAS 201 large missile impact, TAS 202 and TAS 203.
  - d. Compliant with ASTM E330 for door assemblies.
  - e. Compliant with ICC / ANSI A117.1, NFPA 101, NFPA 80, and Industry Canada IC.
2. Functions: Provide functions as scheduled that are field configurable without taking the adaptable electronic product off the door.
3. Emergency Override: Provide mechanical key override; cylinders: Refer to "KEYING" article, herein.
4. Levers:
  - a. Vandal Resistance: Exterior (secure side) lever rotates freely while door remains locked, preventing damage to internal lock components from vandalism by excessive force.
  - b. Provide non-handed lever trim that operates independently of non-locking levers.
  - c. Tactile Warning (Knurling): Where required by authority having jurisdiction. Provide on levers on exterior (secure side) of doors serving rooms considered to be hazardous.
5. Features:
  - a. Audible feedback that can be enabled or disabled.
  - b. Tamper-Resistant Screws: Tamper torx screws on inside escutcheon for increased security.
  - c. Visual tri-colored LED indicators that indicate activation, additional PIN code credential required, operational systems status, system error conditions and low power conditions.
  - d. Door Position Switch
  - e. Interior Cover Tamper Guard
  - f. Mechanical Key Override
  - g. Request to Exit
  - h. Request to Enter
  - i. Lock/Unlock Status
6. Credential Reader
  - a. Credential Reader Configuration: Provide credential reader modules in the following configurations as indicated in door hardware sets.
  - b. Credential Reader Capabilities: Provide credential readers capable of operating with the following integrated software partners.
    - 1) 13.56 MHz Smart card credentials:
      - a) Secure section (Multi-Technology and Smartcard): Schlage MIFARE Classic, Schlage MIFARE DESFire EV1/EV3, PIV and PIV-I Compatible
      - b) 13.56 MHz Serial number only (Multi-Technology and Smartcard): MIFARE, DESFire, HID iClass, MIFARE DESFire EV1/EV3
      - c) 125 kHz Proximity card credentials: Schlage, XceedID, HID, GE/CASI ProxLite and AWID.
    - 2) Multi-Technology readers that read both 13.56 MHz Smart Cards and 125 kHz Prox cards.
    - 3) Dual credential reading capabilities credential card or fob and PIN.
    - 4) 12 button keypad with backlit buttons.
    - 5) Magnetic Card Reader:
      - a) Full insertion or swipe reader capable of reading information along full length of magnetic stripe.
      - b) Magnetic card triple track reader capable of reading tracks 1, 2 or 3 per configuration in field.
7. Operation:
  - a. Networked – wireless
    - 1) Adaptable electronic access control product system interface:

- 2) Adaptable electronic access control products to have real-time bidirectional communication between access control system and lock.
- 3) Remote Commanding By Partner Integrated Access Control Network Software: Battery-powered lockset shall have "Wake on Radio" feature causing activation of remote, wireless access control devices, enabling activated devices to be configured, locked or unlocked from a centralized location within 10 seconds or less without user interface at the device.
- 4) Local Commanding: Provide adaptable electronic access control product with the ability to be configured, locked or unlocked locally by handheld programming device, in real-time.
- 5) When Utilized with Access Control Network Software with Remote Commanding Capability: Provide adaptable electronic access control product with the ability to be remotely locked down or unlocked within 10 seconds or less while battery powered without user interface at the device.
- 6) Real-time response of battery powered device capable of being configured at door by handheld programming device and remotely by Partner integrated software.
- 7) Upon Loss of Power to Device: Provide adaptable electronic access control product with the ability to manage access control offline in one of three methods below that can be configured in the field at device by handheld programming device and remotely by Partner integrated software:
  - a) Fail locked (secured)
  - b) Fail unlocked (unsecured)
  - c) Fail As-Is
- 8) Upon Loss of Communication Between Device and Network: Provide adaptable electronic access control product with the ability to manage access control offline in one of four methods below that can be configured in the field at lockset by handheld programming device and remotely by Partner integrated software:
  - a) Fail locked (secured)
  - b) Fail unlocked (unsecured)
  - c) Fail As-Is
  - d) Fail to Degraded/cache mode utilizing cache memory with following selectable options:
    - i. Grant access up to the last 1,000 unique previously accepted User IDs.
    - ii. Grant access up to the last 1,000 unique previously accepted facility/site codes
    - iii. Remove from cache previously stored User IDs or facility/site codes that have not been presented to lock within the last 5 days.
- 9) Provide adaptable electronic access control product with the ability to be configured at door by handheld programming device and remotely by Partner integrated software the length of time device is unlocked upon access grant.
- 10) Provide adaptable electronic access control product with the ability to communicate identifying information such as firmware versions, hardware versions, serial numbers, and manufacturing dates by handheld programming device and remotely by Partner integrated software.
- 11) Wireless Transmission:
  - a) Modulation: 900 MHz spread spectrum, direct sequence, 10 channels.
  - b) Encryption: AES-128-bit Key minimum.

### C. Components

1. Product: Schlage HHD series with Utility Software. (OFFLINE)
  - a. Provide Handheld Programming Device for adaptable electronic access control products capable of the following minimum requirements.
    - 1) Capable of initializing lock and accessories using preloaded software.
    - 2) Utilized to field configure electronic access control devices, to download firmware updates and door files to device, and to download audit files from device.
2. Provide Panel Interface for adaptable electronic access control products.
  - a. Product: Schlage PIM400-485 or PIM400-TD2 Panel Interface Module as required. (AD-400)
  - b. Product: Schlage PIM400-1501 Panel Interface Module. (AD-400)

## 2.12 ELECTRIC STRIKES

### A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
  - a. Von Duprin 6000 Series
2. Acceptable Manufacturers and Products:
  - a. Folger Adam 300 Series
  - b. HES 1006 Series

### B. Requirements:

1. Provide electric strikes designed for use with type of locks shown at each opening.
2. Provide electric strikes UL Listed as burglary resistant that are tested to a minimum endurance test of 1,000,000 cycles.
3. Where required, provide electric strikes UL Listed for fire doors and frames.
4. Provide transformers and rectifiers for each strike as required. Verify voltage with electrical contractor.

## 2.13 POWER SUPPLIES

### A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
  - a. Schlage/Von Duprin PS900 Series
2. Acceptable Manufacturers and Products:
  - a. Securitron BPS series
  - b. Security Door Controls 600 series

### B. Requirements:

1. Provide power supplies approved by manufacturer of supplied electrified hardware.
2. Provide appropriate quantity of power supplies necessary for proper operation of electrified locking components as recommended by manufacturer of electrified locking components with consideration for each electrified component using power supply, location of power supply, and approved wiring diagrams. Locate power supplies as directed by Architect.
3. Provide regulated and filtered 24 VDC power supply, and UL class 2 listed.
4. Provide power supplies with the following features:
  - a. 12/24 VDC Output, field selectable.
  - b. Class 2 Rated power limited output.
  - c. Universal 120-240 VAC input.
  - d. Low voltage DC, regulated and filtered.
  - e. Polarized connector for distribution boards.
  - f. Fused primary input.
  - g. AC input and DC output monitoring circuit w/LED indicators.
  - h. Cover mounted AC Input indication.
  - i. Tested and certified to meet UL294.
  - j. NEMA 1 enclosure.
  - k. Hinged cover w/lock down screws.
  - l. High voltage protective cover.

## 2.14 CYLINDERS

### A. Manufacturers and Products:



1. Scheduled Manufacturer and Product:
    - a. Best
  2. Acceptable Manufacturers and Products:
    - a. No Substitute
- B. Requirements:
1. Provide cylinders/cores compliant with ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset; manufacturer's series as indicated. Refer to "KEYING" article, herein.
  2. Provide cylinders in the below-listed configuration(s), distributed throughout the Project as indicated.
    - a. Patented Restricted Small Format: cylinder with small format interchangeable cores (SFIC) with restricted, patented keyway.
  3. Patent Protection: Cylinders/cores requiring use of restricted, patented keys, patent protected.
  4. Nickel silver bottom pins.

## 2.15 CYLINDERS

- A. Manufacturers:
1. Scheduled Manufacturer and Product:
    - a. Match Owner existing system
  2. Acceptable Manufacturers and Products:
    - a. No Substitute
- B. Requirements:
1. Provide cylinders/cores to match Owner's existing key system, compliant with ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset, manufacturer's series as indicated. Refer to "KEYING" article, herein.

## 2.16 KEYING

- A. Scheduled System:
1. Existing non-factory registered system:
    - a. Provide cylinders/cores keyed into Owner's existing keying system managed by Owner's locksmith, complying with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference. Contact:
      - 1) Firm Name:
      - 2) Contact Person:
      - 3) Telephone:
- B. Requirements:
1. Construction Keying:
    - a. Replaceable Construction Cores.
      - 1) Provide temporary construction cores replaceable by permanent cores, furnished in accordance with the following requirements.
        - a) 3 construction control keys
        - b) 12 construction change (day) keys.
      - 2) Owner or Owner's Representative will replace temporary construction cores with permanent cores.

2. Permanent Keying:
  - a. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.
    - 1) Master Keying system as directed by the Owner.
  - b. Forward biting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements will be cause for replacement of cylinders/cores involved at no additional cost to Owner.
  - c. Provide keys with the following features:
    - 1) Material: Nickel silver; minimum thickness of .107-inch (2.3mm)
    - 2) Patent Protection: Keys and blanks protected by one or more utility patent(s).
  - d. Identification:
    - 1) Mark permanent cylinders/cores and keys with applicable blind code for identification. Do not provide blind code marks with actual key cuts.
    - 2) Identification stamping provisions must be approved by the Architect and Owner.
    - 3) Stamp cylinders/cores and keys with Owner's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with "DO NOT DUPLICATE" along with the "PATENTED" or patent number to enforce the patent protection.
    - 4) Failure to comply with stamping requirements will be cause for replacement of keys involved at no additional cost to Owner.
    - 5) Forward permanent cylinders/cores to Owner, separately from keys, by means as directed by Owner.
  - e. Quantity: Furnish in the following quantities.
    - 1) Permanent Control Keys: 3.
    - 2) Master Keys: 6.
    - 3) Change (Day) Keys: 3 per cylinder/core that is keyed differently
    - 4) Key Blanks: Quantity as determined in the keying meeting.
    - 5) Key Cutter: Part No. AD433
    - 6) Heavy Duty Core capper: Part No. CD517

## 2.17 KEY CONTROL SYSTEM

### A. Manufacturers:

1. Scheduled Manufacturer:
  - a. Telkee
2. Acceptable Manufacturers:
  - a. HPC
  - b. Lund

### B. Requirements:

1. Provide key control system, including envelopes, labels, tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet, all as recommended by system manufacturer, with capacity for 150% of number of locks required for Project.
  - a. Provide complete cross index system set up by hardware supplier, and place keys on markers and hooks in cabinet as determined by final key schedule.
  - b. Provide hinged-panel type cabinet for wall mounting.

## 2.18 DOOR CLOSERS

### A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
  - a. LCN 4010/4110/4020 series

## B. Requirements:

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. Certify surface mounted mechanical closers to meet fifteen million (15,000,000) full load cycles. ISO 9000 certify closers. Stamp units with date of manufacture code.
2. Provide door closers with fully hydraulic, full rack and pinion action with high strength cast iron cylinder, and full complement bearings at shaft.
3. Cylinder Body: 1-1/2-inch (38 mm) diameter with 11/16-inch (17 mm) diameter double heat-treated pinion journal.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck.
7. Provide closers with solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers. When closers are parallel arm mounted, provide closers which mount within 6-inch (152 mm) top rail without use of mounting plate so that closer is not visible through vision panel from pull side.
8. Pressure Relief Valve (PRV) Technology: Not permitted.
9. Finish for Closer Cylinders, Arms, Adapter Plates, and Metal Covers: Powder coating finish which has been certified to exceed 100 hours salt spray testing as described in ANSI/BHMA Standard A156.4 and ASTM B117, or has special rust inhibitor (SRI).
10. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

## 2.19 DOOR TRIM

## A. Manufacturers:

1. Scheduled Manufacturer:
  - a. Ives
2. Acceptable Manufacturers:
  - a. Burns
  - b. Trimco

## B. Requirements:

1. Provide push plates, push bars, pull plates, pulls, and hands-free reversible door pulls with diameter and length as scheduled.

## 2.20 PROTECTION PLATES

## A. Manufacturers:

1. Scheduled Manufacturer:
  - a. Ives
2. Acceptable Manufacturers:
  - a. Burns
  - b. Trimco

## B. Requirements:

1. Provide protection plates with a minimum of 0.050 inch (1 mm) thick, beveled four edges as scheduled. Furnish with sheet metal or wood screws, finished to match plates.
2. Sizes plates 2 inches (51 mm) less width of door on single doors, pairs of doors with a mullion, and doors with edge guards. Size plates 1 inch (25 mm) less width of door on pairs without a mullion or edge guards.
3. At fire rated doors, provide protection plates over 16 inches high with UL label.

## 2.21 OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS

### A. Manufacturers:

1. Scheduled Manufacturers:
  - a. Glynn-Johnson
2. Acceptable Manufacturers:
  - a. Rixson
  - b. ABH

### B. Requirements:

1. Provide overhead stop at any door where conditions do not allow for a wall stop or floor stop presents tripping hazard.

## 2.22 DOOR STOPS AND HOLDERS

### A. Manufacturers:

1. Scheduled Manufacturer:
  - a. Ives
2. Acceptable Manufacturers:
  - a. Burns
  - b. Trimco

### B. Provide door stops at each door leaf:

1. Provide wall stops wherever possible. Provide concave type where lockset has a push button of thumbturn.
2. Where a wall stop cannot be used, provide universal floor stops.
3. Where wall or floor stop cannot be used, provide overhead stop.
4. Provide roller bumper where doors open into each other and overhead stop cannot be used.

## 2.23 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

### A. Manufacturers:

1. Scheduled Manufacturer:
  - a. Zero International
2. Acceptable Manufacturers:
  - a. National Guard
  - b. Reese

### B. Requirements:

1. Provide thresholds, weather-stripping, and gasketing systems as specified and per architectural details. Match finish of other items.
2. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
3. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.
4. Size thresholds 1/2 inch (13 mm) high by 5 inches (127 mm) wide by door width unless otherwise specified in the hardware sets or detailed in the drawings.

## 2.24 SILENCERS

### A. Manufacturers:

1. Scheduled Manufacturer:
  - a. Ives
2. Acceptable Manufacturers:
  - a. Burns
  - b. Trimco

### B. Requirements:

1. Provide "push-in" type silencers for hollow metal or wood frames.
2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair frame.
3. Omit where gasketing is specified.

## 2.25 MAGNETIC HOLDERS

### A. Manufacturers:

1. Scheduled Manufacturer:
  - a. LCN
2. Acceptable Manufacturers:
  - a. Rixson
  - b. Sargent

### B. Requirements:

1. Provide wall or floor mounted electromagnetic door release as specified with minimum of 25 pounds of holding force. Coordinate projection of holder and armature with other hardware and wall conditions to ensure that door sits parallel to wall when fully open. Connect magnetic holders on fire-rated doors into the fire control panel for fail-safe operation.

## 2.26 FINISHES

### A. FINISH: BHMA 626/652 (US26D); EXCEPT:

1. Hinges at Exterior Doors: BHMA 630 (US32D)
2. Aluminum Geared Continuous Hinges: BHMA 628 (US28)
3. Push Plates, Pulls, and Push Bars: BHMA 630 (US32D)
4. Protection Plates: BHMA 630 (US32D)
5. Overhead Stops and Holders: BHMA 630 (US32D)
6. Door Closers: Powder Coat to Match

7. Wall Stops: BHMA 630 (US32D)
8. Latch Protectors: BHMA 630 (US32D)
9. Weatherstripping: Clear Anodized Aluminum
10. Thresholds: Mill Finish Aluminum

B. FINISH: BHMA 630 (US32D); EXCEPT:

1. Aluminum Geared Continuous Hinges: BHMA 628 (US28)
2. Door Closers: Powder Coat to Match
3. Weatherstripping: Clear Anodized Aluminum
4. Thresholds: Mill Finish Aluminum

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance. Verify doors, frames, and walls have been properly reinforced for hardware installation.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Submit a list of deficiencies in writing and proceed with installation only after unsatisfactory conditions have been corrected.

### 3.02 INSTALLATION

- A. Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.
  1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
  2. Custom Steel Doors and Frames: HMMA 831.
  3. Interior Architectural Wood Flush Doors: ANSI/WDMA I.S. 1A
  4. Installation Guide for Doors and Hardware: DHI TDH-007-20
- B. Install door hardware in accordance with NFPA 80, NFPA 101 and provide post-install inspection, testing as specified in section 1.03.E unless otherwise required to comply with governing regulations.
- C. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.
- D. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.
- E. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.
- F. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- G. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.

- H. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated.
- I. Lock Cylinders:
  - 1. Install construction cores to secure building and areas during construction period.
  - 2. Replace construction cores with permanent cores as indicated in keying section.
  - 3. Furnish permanent cores to Owner for installation.
- J. Wiring: Coordinate with Division 26, ELECTRICAL and Division 28 ELECTRONIC SAFETY AND SECURITY sections for:
  - 1. Conduit, junction boxes and wire pulls.
  - 2. Connections to and from power supplies to electrified hardware.
  - 3. Connections to fire/smoke alarm system and smoke evacuation system.
  - 4. Connection of wire to door position switches and wire runs to central room or area, as directed by Architect.
  - 5. Connections to panel interface modules, controllers, and gateways.
  - 6. Testing and labeling wires with Architect's opening number.
- K. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
- L. Continuous Hinges: Re-locate the door and frame fire rating labels where they will remain visible so that the hinge does not cover the label once installed.
- M. Door Closers & Auto Operators: Mount closers/operators on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Mount closers/operators so they are not visible in corridors, lobbies and other public spaces unless approved by Architect.
- N. Overhead Stops/holders: Mount overhead stops/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.
- O. Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings or in equipment room, or alternate location as directed by Architect.
- P. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."
- Q. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.
- R. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
- S. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- T. Door Bottoms and Sweeps: Apply to bottom of door, forming seal with threshold when door is closed.

### 3.03 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
  - 1. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.

2. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
- B. Occupancy Adjustment: Approximately three to six months after date of Substantial Completion, examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors and door hardware.

### 3.04 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items per manufacturer's instructions to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

### 3.05 DOOR HARDWARE SCHEDULE

- A. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.
- B. Discrepancies, conflicting hardware, and missing items are to be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application.
- C. Hardware items are referenced in the following hardware schedule. Refer to the above specifications for special features, options, cylinders/keying, and other requirements.
- D. Hardware Sets:



## HARDWARE SET NO. 01

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	ELEC PANIC HARDWARE	LD-RX-LC-99-EO	✎ 626	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-70-MTK-SPA-B-LRX	✎ 626	SCE
			4AA BATTERY (PROVIDED BY ACCESS CONTROL SUPPLIER)		
2	EA	RIM CYLINDER	1E72	626	BES
1	EA	PERMANENT CORE	AS REQUIRED	626	BES
1	EA	SURFACE CLOSER	4111 EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	SET	GASKETING	770AA-S	AA	ZER
1	EA	DOOR BOTTOM	369AA	AA	ZER

COORDINATE WITH ALL RELATED TRADES.

ENTRY BY CREDENTIAL OR KEY OVERRIDE. PRESENTING VALID CREDENTIAL TO READER WILL  
MOMENTARILY UNLOCK TRIM AND ALLOW ENTRY.

DOOR IS ALWAYS AVAILABLE FOR FREE EGRESS.

DOOR CONTACT TIED TO ACCESS CONTROL SYSTEM FOR MONITORING.

## HARDWARE SET NO. 02

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	112XY	628	IVE
1	EA	PANIC HARDWARE	LD-99-EO	626	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-70-MTK-SPA-B-LRX	✎ 626	SCE
			4AA BATTERY (PROVIDED BY ACCESS CONTROL SUPPLIER)		
1	EA	RIM CYLINDER	1E72	626	BES
1	EA	SURFACE CLOSER	4111 SCUSH	689	LCN
1	EA	RAIN DRIP	142AA	AA	ZER
1	SET	GASKETING	BY DOOR/FRAME MANUFACTURER		
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	655A-223	A	ZER

COORDINATE WITH ALL RELATED TRADES. ENTRY BY CREDENTIAL OR KEY OVERRIDE.

PRESENTING VALID CREDENTIAL TO READER WILL UNLOCK DOOR FOR ENTRY.

FREE EGRESS AT ALL TIMES.

## HARDWARE SET NO. 03

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	CLASSROOM LOCK	ND70BD SPA	626	SCH
1	EA	PERMANENT CORE	AS REQUIRED	626	BES
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

## HARDWARE SET NO. 04

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	ELEC PANIC HARDWARE	LD-RX-LC-99-EO	⚡ 626	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-70-MTK-SPA-B-LRX 4AA BATTERY (PROVIDED BY ACCESS CONTROL SUPPLIER)	⚡ 626	SCE
1	EA	PERMANENT CORE	AS REQUIRED	626	BES
1	EA	SURFACE CLOSER	4111 EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

COORDINATE WITH ALL RELATED TRADES.

ENTRY BY CREDENTIAL OR KEY OVERRIDE. PRESENTING VALID CREDENTIAL TO READER WILL  
MOMENTARILY UNLOCK TRIM AND ALLOW ENTRY.

DOOR IS ALWAYS AVAILABLE FOR FREE EGRESS.

DOOR CONTACT TIED TO ACCESS CONTROL SYSTEM FOR MONITORING.

## HARDWARE SET NO. 05

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1HW 4.5 X 4.5 NRP	652	IVE
1	EA	FIRE RATED REMOVABLE MULLION	KR9954	689	VON
2	EA	FIRE EXIT HARDWARE	99-L-BE-F-17	626	VON
1	EA	MORTISE CYLINDER	1E74	626	BES
2	EA	SURFACE CLOSER	4111 SCUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	MULLION SEAL	8780NBK PSA	BK	ZER

## HARDWARE SET NO. 06

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1HW 4.5 X 4.5 NRP	652	IVE
1	EA	REMOVABLE MULLION	KR4954	689	VON
2	EA	PANIC HARDWARE	99-L-BE-17	626	VON
1	EA	MORTISE CYLINDER	1E74	626	BES
2	EA	SURFACE CLOSER	4111 SCUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	MULLION SEAL	8780NBK PSA	BK	ZER

## HARDWARE SET NO. 07

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	ELEC CLASSROOM LOCK	AD-400-CY-70-MTK-SPA-B 4AA	626	SCE
			BATTERY (PROVIDED BY ACCESS CONTROL SUPPLIER)		
1	EA	PERMANENT CORE	AS REQUIRED	626	BES
1	EA	SURFACE CLOSER	4011	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

COORDINATE WITH ALL RELATED TRADES.

ENTRY BY CREDENTIAL OR KEY OVERRIDE. PRESENTING VALID CREDENTIAL TO READER WILL  
MOMENTARILY UNLOCK LOCK AND ALLOW ENTRY.

DOOR IS ALWAYS AVAILABLE FOR FREE EGRESS.

DOOR CONTACT TIED TO ACCESS CONTROL SYSTEM FOR MONITORING.

## HARDWARE SET NO. 08

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112XY	628	IVE
1	EA	REMOVABLE MULLION	KR4954	689	VON
2	EA	PANIC HARDWARE	LD-99-EO	626	VON
1	EA	MORTISE CYLINDER	1E74	626	BES
2	EA	SURFACE CLOSER	4111 SCUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	RAIN DRIP	142AA	AA	ZER
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	MULLION SEAL	8780NBK PSA	BK	ZER
2	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	655A-223	A	ZER

## HARDWARE SET NO. 09

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	CONT. HINGE	112XY	628	IVE
1	EA	ELEC PANIC HARDWARE	LD-RX-LC-99-EO	↗ 626	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-70-MTK-SPA-B-LRX	↗ 626	SCE
			4AA BATTERY (PROVIDED BY ACCESS CONTROL SUPPLIER)		
1	EA	PERMANENT CORE	AS REQUIRED	626	BES
1	EA	SURFACE CLOSER	4111 SCUSH	689	LCN
1	EA	RAIN DRIP	142AA	AA	ZER
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	DOOR SWEEP	8192AA	AA	ZER
1	EA	THRESHOLD	655A-223	A	ZER

COORDINATE WITH ALL RELATED TRADES.

ENTRY BY CREDENTIAL OR KEY OVERRIDE. PRESENTING VALID CREDENTIAL TO READER WILL  
MOMENTARILY UNLOCK LOCK AND ALLOW ENTRY.

DOOR IS ALWAYS AVAILABLE FOR FREE EGRESS.

DOOR CONTACT TIED TO ACCESS CONTROL SYSTEM FOR MONITORING.

## HARDWARE SET NO. 10

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	MORTISE CYLINDER	1E74	626	BES

## HARDWARE SET NO. 11

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	CLASSROOM LOCK	ND70BD SPA	626	SCH
1	EA	MORTISE CYLINDER	1E74	626	BES
1	EA	SURFACE CLOSER	4111 SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

## HARDWARE SET NO. 12

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	FIRE EXIT HARDWARE	9927-EO-F-LBR-499F	626	VON
1	EA	ELEC FIRE EXIT HARDWARE	RX-LC-9927-EO-F-LBR-499F	626	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993S-70-MTK-SPA-B-LRX	626	SCE
			4AA BATTERY (PROVIDED BY ACCESS CONTROL SUPPLIER)		
1	EA	PERMANENT CORE	AS REQUIRED	626	BES
2	EA	SURFACE CLOSER	4111 SCUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	SET	MEETING STILE	328AA-S	AA	ZER
1	SET	GASKETING	770AA-S	AA	ZER
2	EA	DOOR BOTTOM	369AA	AA	ZER

COORDINATE WITH ALL RELATED TRADES.

ENTRY BY CREDENTIAL OR KEY OVERRIDE. PRESENTING VALID CREDENTIAL TO READER WILL MOMENTARILY UNLOCK TRIM AND ALLOW ENTRY.

DOOR IS ALWAYS AVAILABLE FOR FREE EGRESS.

DOOR CONTACT TIED TO ACCESS CONTROL SYSTEM FOR MONITORING.

## HARDWARE SET NO. 13

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	ELEC FIRE EXIT HARDWARE	RX-LC-99-EO-F	626	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-70-MTK-SPA-B-LRX	626	SCE
			4AA BATTERY (PROVIDED BY ACCESS CONTROL SUPPLIER)		
1	EA	PERMANENT CORE	AS REQUIRED	626	BES
1	EA	SURFACE CLOSER	4111 SCUSH	689	LCN
1	EA	GASKETING	488SBK PSA	BK	ZER
1	SET	GASKETING	770AA-S	AA	ZER
1	EA	DOOR BOTTOM	369AA	AA	ZER

COORDINATE WITH ALL RELATED TRADES.

ENTRY BY CREDENTIAL OR KEY OVERRIDE. PRESENTING VALID CREDENTIAL TO READER WILL MOMENTARILY UNLOCK LOCK AND ALLOW ENTRY.

DOOR IS ALWAYS AVAILABLE FOR FREE EGRESS.

DOOR CONTACT TIED TO ACCESS CONTROL SYSTEM FOR MONITORING.

## HARDWARE SET NO. 14

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	CLASSROOM LOCK	ND70BD SPA	626	SCH
1	EA	PERMANENT CORE	AS REQUIRED	626	BES
1	EA	SURFACE CLOSER	4011	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

## HARDWARE SET NO. 15

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	ELEC CLASSROOM LOCK	AD-400-CY-70-MTK-SPA-B 4AA	626	SCE
			BATTERY (PROVIDED BY ACCESS CONTROL SUPPLIER)		
1	EA	SURFACE CLOSER	4011	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

## HARDWARE SET NO. 16

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	ELEC CLASSROOM LOCK	AD-400-CY-70-MTK-SPA-B 4AA	626	SCE
			BATTERY (PROVIDED BY ACCESS CONTROL SUPPLIER)		
2	EA	PERMANENT CORE	AS REQUIRED	626	BES
1	EA	SURFACE CLOSER	4111 SCUSH	689	LCN
3	EA	SILENCER	SR64	GRY	IVE

COORDINATE WITH ALL RELATED TRADES.

ENTRY BY CREDENTIAL OR KEY OVERRIDE. PRESENTING VALID CREDENTIAL TO READER WILL  
MOMENTARILY UNLOCK LOCK AND ALLOW ENTRY.

DOOR IS ALWAYS AVAILABLE FOR FREE EGRESS.

DOOR CONTACT TIED TO ACCESS CONTROL SYSTEM FOR MONITORING.

## HARDWARE SET NO. 17

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	ELEC CLASSROOM LOCK	AD-400-CY-70-MTK-SPA-B 4AA	626	SCE
			BATTERY (PROVIDED BY ACCESS CONTROL SUPPLIER)		
1	EA	PERMANENT CORE	AS REQUIRED	626	BES
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

COORDINATE WITH ALL RELATED TRADES.

ENTRY BY CREDENTIAL OR KEY OVERRIDE. PRESENTING VALID CREDENTIAL TO READER WILL MOMENTARILY UNLOCK LOCK AND ALLOW ENTRY.

DOOR IS ALWAYS AVAILABLE FOR FREE EGRESS.

DOOR CONTACT TIED TO ACCESS CONTROL SYSTEM FOR MONITORING.

## HARDWARE SET NO. 18

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	STOREROOM LOCK	ND80BDC SPA	626	SCH
1	EA	PERMANENT CORE	AS REQUIRED	626	BES
1	EA	OH STOP	90S	630	GLY
3	EA	SILENCER	SR64	GRY	IVE

## HARDWARE SET NO. 19

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	112XY	628	IVE
1	EA	ELEC CLASSROOM LOCK	AD-400-CY-70-MTK-SPA-B 4AA	626	SCE
			BATTERY (PROVIDED BY ACCESS CONTROL SUPPLIER)		
1	EA	ELECTRIC STRIKE	6400 FSE 12/24 VAC/VDC	US32D	VON
1	EA	SURFACE CLOSER	4111 SCUSH	689	LCN
1	EA	REMOTE PUSH BUTTON	SUPPLIED BY ACCESS CONTROL PROVIDER	626	
1	EA	POWER SUPPLY	PS902 120/240 VAC Coordinate Power Supply Requirement with Security Provider	LGR	SCE
1	EA	DIAGRAM	ELEVATION		DLR
1	EA	DIAGRAM	POINT TO POINT		DLR

COORDINATE WITH ALL RELATED TRADES.

ENTRY BY CREDENTIAL OR KEY OVERRIDE. PRESENTING VALID CREDENTIAL TO READER WILL MOMENTARILY UNLOCK LOCK AND ALLOW ENTRY.

REMOTE RELEASE AT RECEPTION DESK TO RELEASE ELECTRIC STRIKE AND ALLOW ENTRY.

DOOR IS ALWAYS AVAILABLE FOR FREE EGRESS.

DOOR CONTACT TIED TO ACCESS CONTROL SYSTEM FOR MONITORING.

## HARDWARE SET NO. 20

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	CLASSROOM X STORERM	ND70X80BD SPA XN12-006	626	SCH
1	EA	ELECTRIC STRIKE	6400 FSE 12/24 VAC/VDC	✎ US32D	VON
1	EA	SURFACE CLOSER	4111 SCUSH	689	LCN
1	EA	CREDENTIAL READER	SUPPLIED BY ACCESS CONTROL PROVIDER		
1	EA	REMOTE PUSH BUTTON	SUPPLIED BY ACCESS CONTROL PROVIDER ✎ 626		
1	EA	POWER SUPPLY	PS902 120/240 VAC	✎ LGR	SCE
			Coordinate Power Supply Requirement with Security Provider		
1	EA	DIAGRAM	ELEVATION		DLR
1	EA	DIAGRAM	POINT TO POINT		DLR

COORDINATE WITH ALL RELATED TRADES.

ENTRY BY CREDENTIAL OR KEY OVERRIDE. DOOR CAN BE UNLOCKED FROM CORRIDOR TO RECEPTION.

PRESENTING VALID CREDENTIAL TO READER WILL MOMENTARILY RELEASE STRIKE AND ALLOW ENTRY TO RECEPTION OR CORRIDOR.

REMOTE RELEASE AT RECEPTION DESK TO RELEASE ELECTRIC STRIKE AND ALLOW ENTRY TO CORRIDOR.

DOOR IS ALWAYS AVAILABLE FOR FREE EGRESS.

DEADLOCK TO BE USED AFTER HOURS TO LOCK RECEPTION FROM CORRIDOR.

## HARDWARE SET NO. 21

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	ND80BDC SPA	626	SCH
1	EA	PERMANENT CORE	AS REQUIRED	626	BES
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

## HARDWARE SET NO. 22

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PRIVACY LOCK W/ OUTSIDE INDICATOR	ND40S SPA OS-OCC	626	SCH
1	EA	PERMANENT CORE	AS REQUIRED	626	BES
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

COORDINATE WITH ALL RELATED TRADES.

ENTRY BY CREDENTIAL OR KEY OVERRIDE. PRESENTING VALID CREDENTIAL TO READER WILL MOMENTARILY UNLOCK LOCK AND ALLOW ENTRY.

DOOR IS ALWAYS AVAILABLE FOR FREE EGRESS.

DOOR CONTACT TIED TO ACCESS CONTROL SYSTEM FOR MONITORING.



## HARDWARE SET NO. 23

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PASSAGE SET	ND10S SPA	626	SCH
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

## HARDWARE SET NO. 24

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	ELEC CLASSROOM LOCK	AD-400-CY-70-MTK-SPA-B 4AA	626	SCE
			BATTERY (PROVIDED BY ACCESS CONTROL SUPPLIER)		
1	EA	PERMANENT CORE	AS REQUIRED	626	BES
1	EA	OH STOP	90S	630	GLY
3	EA	SILENCER	SR64	GRY	IVE

COORDINATE WITH ALL RELATED TRADES.

ENTRY BY CREDENTIAL OR KEY OVERRIDE. PRESENTING VALID CREDENTIAL TO READER WILL  
MOMENTARILY UNLOCK LOCK AND ALLOW ENTRY.

DOOR IS ALWAYS AVAILABLE FOR FREE EGRESS.

DOOR CONTACT TIED TO ACCESS CONTROL SYSTEM FOR MONITORING.

## HARDWARE SET NO. 25

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	ELEC CLASSROOM LOCK	AD-400-CY-70-MTK-SPA-B 4AA	626	SCE
			BATTERY (PROVIDED BY ACCESS CONTROL SUPPLIER)		
1	EA	PERMANENT CORE	AS REQUIRED	626	BES
1	EA	SURFACE CLOSER	4011	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

COORDINATE WITH ALL RELATED TRADES.

ENTRY BY CREDENTIAL OR KEY OVERRIDE. PRESENTING VALID CREDENTIAL TO READER WILL  
MOMENTARILY UNLOCK LOCK AND ALLOW ENTRY.

DOOR IS ALWAYS AVAILABLE FOR FREE EGRESS.

DOOR CONTACT TIED TO ACCESS CONTROL SYSTEM FOR MONITORING.

## HARDWARE SET NO. 26

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	FIRE RATED REMOVABLE MULLION	KR9954	689	VON
1	EA	FIRE EXIT HARDWARE	99-EO-F	626	VON
1	EA	ELEC FIRE EXIT HARDWARE	RX-LC-99-EO-F	626	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-70-MTK-SPA-B-LRX	626	SCE
			4AA BATTERY (PROVIDED BY ACCESS CONTROL SUPPLIER)		
1	EA	MORTISE CYLINDER	1E74	626	BES
1	EA	PERMANENT CORE	AS REQUIRED	626	BES
2	EA	SURFACE CLOSER	4111 SCUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	MULLION SEAL	8780NBK PSA	BK	ZER

COORDINATE WITH ALL RELATED TRADES.

ENTRY BY CREDENTIAL OR KEY OVERRIDE. PRESENTING VALID CREDENTIAL TO READER WILL MOMENTARILY UNLOCK TRIM AND ALLOW ENTRY.

DOOR IS ALWAYS AVAILABLE FOR FREE EGRESS.

DOOR CONTACT TIED TO ACCESS CONTROL SYSTEM FOR MONITORING.

## HARDWARE SET NO. 27

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1HW 4.5 X 4.5 NRP	652	IVE
1	EA	REMOVABLE MULLION	KR4954	689	VON
2	EA	PANIC HARDWARE	99-L-BE-17	626	VON
1	EA	MORTISE CYLINDER	1E74	626	BES
2	EA	SURFACE CLOSER	4111 SCUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	MULLION SEAL	8780NBK PSA	BK	ZER
2	EA	SILENCER	SR64	GRY	IVE

## HARDWARE SET NO. 28

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	ELEC CLASSROOM LOCK	AD-400-CY-70-MTK-SPA-B 4AA	626	SCE
			BATTERY (PROVIDED BY ACCESS CONTROL SUPPLIER)		
1	EA	PERMANENT CORE	AS REQUIRED	626	BES
1	EA	OH STOP	90S	630	GLY
1	EA	SURFACE CLOSER	4011	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

COORDINATE WITH ALL RELATED TRADES.

ENTRY BY CREDENTIAL OR KEY OVERRIDE. PRESENTING VALID CREDENTIAL TO READER WILL  
MOMENTARILY UNLOCK LOCK AND ALLOW ENTRY.

DOOR IS ALWAYS AVAILABLE FOR FREE EGRESS.

DOOR CONTACT TIED TO ACCESS CONTROL SYSTEM FOR MONITORING.

## HARDWARE SET NO. 29

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	CLASSROOM DEAD LOCK	L463L	626	SCH
1	EA	MORTISE CYLINDER	1E74	626	BES
1	EA	PUSH PLATE	8200 6" X 16"	630	IVE
1	EA	PULL PLATE	8303 10" 4" X 16"	630	IVE
1	EA	SURFACE CLOSER	4111 HCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP/HOLDER	WS45/WS45X	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

## HARDWARE SET NO. 31

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	ELEC CLASSROOM LOCK	AD-400-CY-70-MTK-SPA-B 4AA	626	SCE
			BATTERY (PROVIDED BY ACCESS CONTROL SUPPLIER)		
1	EA	PERMANENT CORE	AS REQUIRED	626	BES
1	EA	SURFACE CLOSER	4111 EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

COORDINATE WITH ALL RELATED TRADES.

ENTRY BY CREDENTIAL OR KEY OVERRIDE. PRESENTING VALID CREDENTIAL TO READER WILL  
MOMENTARILY UNLOCK LOCK AND ALLOW ENTRY.

DOOR IS ALWAYS AVAILABLE FOR FREE EGRESS.

DOOR CONTACT TIED TO ACCESS CONTROL SYSTEM FOR MONITORING.

## HARDWARE SET NO. 32

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PUSH PLATE	8200 6" X 16"	630	IVE
1	EA	PULL PLATE	8303 10" 4" X 16"	630	IVE
1	EA	SURFACE CLOSER	4011	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

## HARDWARE SET NO. 33

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	CLASSROOM LOCK	ND70BD SPA	626	SCH
1	EA	MORTISE CYLINDER	1E74	626	BES
1	EA	OH STOP	90S	630	GLY
3	EA	SILENCER	SR64	GRY	IVE

## HARDWARE SET NO. 34

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
2	EA	MANUAL FLUSH BOLT	FB458	626	IVE
1	EA	DUST PROOF STRIKE	DP2	626	IVE
1	EA	ELEC CLASSROOM LOCK	AD-400-CY-70-MTK-SPA-B 4AA	626	SCE
			BATTERY (PROVIDED BY ACCESS CONTROL SUPPLIER)		
1	EA	PERMANENT CORE	AS REQUIRED	626	BES
1	EA	SURFACE CLOSER	4111 HEDA	689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
2	EA	SILENCER	SR64	GRY	IVE

COORDINATE WITH ALL RELATED TRADES.

ENTRY BY CREDENTIAL OR KEY OVERRIDE. PRESENTING VALID CREDENTIAL TO READER WILL  
MOMENTARILY UNLOCK LOCK AND ALLOW ENTRY.

DOOR IS ALWAYS AVAILABLE FOR FREE EGRESS.

DOOR CONTACT TIED TO ACCESS CONTROL SYSTEM FOR MONITORING.

## HARDWARE SET NO. 35

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
2	EA	AUTO FLUSH BOLT	FB41P	630	IVE
1	EA	DUST PROOF STRIKE	DP2	626	IVE
1	EA	ELEC CLASSROOM LOCK	AD-400-CY-70-MTK-SPA-B 4AA	626	SCE
			BATTERY (PROVIDED BY ACCESS CONTROL SUPPLIER)		
1	EA	PERMANENT CORE	AS REQUIRED	626	BES
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	MOUNTING BRACKET	MB	689	IVE
2	EA	SURFACE CLOSER	4111 SHCUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	RAIN DRIP	142AA	AA	ZER
1	SET	MEETING STILE	328AA-S	AA	ZER
1	EA	GASKETING	488SBK PSA	BK	ZER
2	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	655A-223	A	ZER

## HARDWARE SET NO. 36

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PRIVACY LOCK	ND40S SPA	626	SCH
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

## HARDWARE SET NO. 37

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	MANUAL FLUSH BOLT	FB458	626	IVE
1	EA	DUST PROOF STRIKE	DP2	626	IVE
1	EA	CLASSROOM LOCK	ND70BD SPA	626	SCH
1	EA	MORTISE CYLINDER	1E74	626	BES
2	EA	OH STOP & HOLDER	90H	630	GLY
2	EA	SILENCER	SR64	GRY	IVE

## HARDWARE SET NO. 38

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	PUSH PLATE	8200 6" X 16"	630	IVE
1	EA	PULL PLATE	8303 10" 4" X 16"	630	IVE
1	EA	SURFACE CLOSER	4011	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	MOP PLATE	8400 4" X 1" LDW B-CS	630	IVE
1	EA	WALL STOP/HOLDER	WS45/WS45X	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

## HARDWARE SET NO. 39

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	ELEC CLASSROOM LOCK	AD-400-CY-70-MTK-SPA-B 4AA	626	SCE
			BATTERY (PROVIDED BY ACCESS CONTROL SUPPLIER)		
2	EA	PERMANENT CORE	AS REQUIRED	626	BES
1	EA	SURFACE CLOSER	4111 SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

COORDINATE WITH ALL RELATED TRADES.

ENTRY BY CREDENTIAL OR KEY OVERRIDE. PRESENTING VALID CREDENTIAL TO READER WILL MOMENTARILY UNLOCK LOCK AND ALLOW ENTRY.

DOOR IS ALWAYS AVAILABLE FOR FREE EGRESS.

DOOR CONTACT TIED TO ACCESS CONTROL SYSTEM FOR MONITORING.

## HARDWARE SET NO. 40

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	ELEC CLASSROOM LOCK	AD-400-CY-70-MTK-SPA-B 4AA	626	SCE
			BATTERY (PROVIDED BY ACCESS CONTROL SUPPLIER)		
1	EA	PERMANENT CORE	AS REQUIRED	626	BES
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

COORDINATE WITH ALL RELATED TRADES.

ENTRY BY CREDENTIAL OR KEY OVERRIDE. PRESENTING VALID CREDENTIAL TO READER WILL MOMENTARILY UNLOCK LOCK AND ALLOW ENTRY.

DOOR IS ALWAYS AVAILABLE FOR FREE EGRESS.

DOOR CONTACT TIED TO ACCESS CONTROL SYSTEM FOR MONITORING.

## HARDWARE SET NO. 41

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	PRIVACY LOCK W/ OUTSIDE INDICATOR	ND40S SPA OS-OCC	626	SCH
1	EA	OH STOP	90S	630	GLY
3	EA	SILENCER	SR64	GRY	IVE

## HARDWARE SET NO. 42

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	CLASSROOM LOCK	ND70BD SPA	626	SCH
1	EA	MORTISE CYLINDER	1E74	626	BES
1	EA	OH STOP	90S	630	GLY
3	EA	SILENCER	SR64	GRY	IVE

## HARDWARE SET NO. 43

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	ELEC CLASSROOM LOCK	AD-400-CY-70-MTK-SPA-B 4AA	626	SCE
			BATTERY (PROVIDED BY ACCESS CONTROL SUPPLIER)		
1	EA	PERMANENT CORE	AS REQUIRED	626	BES
1	EA	OH STOP	90S	630	GLY
1	EA	SURFACE CLOSER	4011	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

COORDINATE WITH ALL RELATED TRADES.

ENTRY BY CREDENTIAL OR KEY OVERRIDE. PRESENTING VALID CREDENTIAL TO READER WILL  
MOMENTARILY UNLOCK LOCK AND ALLOW ENTRY.

DOOR IS ALWAYS AVAILABLE FOR FREE EGRESS.

DOOR CONTACT TIED TO ACCESS CONTROL SYSTEM FOR MONITORING.

## HARDWARE SET NO. 44

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PRIVACY LOCK W/ OUTSIDE INDICATOR	ND40S SPA OS-OCC	626	SCH
1	EA	SURFACE CLOSER	4011	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

## HARDWARE SET NO. 45

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	112XY	628	IVE
1	EA	PANIC HARDWARE	CDSI-99-L-DT-17	626	VON
1	EA	MORTISE CYLINDER	1E74	626	BES
1	EA	SURFACE CLOSER	4111 SCUSH	689	LCN



## HARDWARE SET NO. 46

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	112XY	628	IVE
1	EA	PANIC HARDWARE	CD-99-L-DT-17	626	VON
1	EA	MORTISE CYLINDER	1E74	626	BES
1	EA	PERMANENT CORE	AS REQUIRED	626	BES
1	EA	SURFACE CLOSER	4111 SCUSH	689	LCN
1	EA	RAIN DRIP	142AA	AA	ZER
1	SET	GASKETING	BY DOOR/FRAME MANUFACTURER		
1	EA	DOOR SWEEP	8192AA	AA	ZER
1	EA	THRESHOLD	655A-223	A	ZER

## HARDWARE SET NO. 47

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	112XY	628	IVE
1	EA	PANIC HARDWARE	LD-99-EO	626	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-70-MTK-SPA-B-LRX 4AA BATTERY (PROVIDED BY ACCESS CONTROL SUPPLIER)	626	SCE
1	EA	PERMANENT CORE	AS REQUIRED	626	BES
1	EA	SURFACE CLOSER	4111 SCUSH	689	LCN

## HARDWARE SET NO. 48

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	112XY	628	IVE
1	EA	ELEC PANIC HARDWARE	LD-RX-LC-99-EO	✎ 626	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-70-MTK-SPA-B-LRX	✎ 626	SCE
			4AA BATTERY (PROVIDED BY ACCESS CONTROL SUPPLIER)		
1	EA	RIM CYLINDER	1E72	626	BES
1	EA	SURFACE CLOSER	4111 SCUSH	689	LCN
1	EA	RAIN DRIP	142AA	AA	ZER
1	SET	GASKETING	BY DOOR/FRAME MANUFACTURER		
1	EA	DOOR SWEEP	8192AA	AA	ZER
1	EA	THRESHOLD	655A-223	A	ZER
1	EA	DIAGRAM	ELEVATION		DLR
1	EA	DIAGRAM	POINT TO POINT		DLR

COORDINATE WITH ALL RELATED TRADES. ENTRY BY CREDENTIAL OR KEY OVERRIDE.  
PRESENTING VALID CREDENTIAL TO READER WILL MOMENTARILY UNLOCK TRIM AND ALLOW ENTRY.

UPON LOSS OF POWER DOOR IS LOCKED. DOOR IS ALWAYS AVAILABLE FOR FREE EGRESS.  
DOOR CONTACT/RX TIED TO ACCESS CONTROL SYSTEM FOR MONITORING.

## HARDWARE SET NO. 49

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112XY	628	IVE
1	EA	REMOVABLE MULLION	KR4954	689	VON
1	EA	PANIC HARDWARE	LD-99-EO	626	VON
1	EA	ELEC PANIC HARDWARE	LD-RX-LC-99-EO	✎ 626	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-70-MTK-SPA-B-LRX	✎ 626	SCE
			4AA BATTERY (PROVIDED BY ACCESS CONTROL SUPPLIER)		
1	EA	MORTISE CYLINDER	1E74	626	BES
1	EA	PERMANENT CORE	AS REQUIRED	626	BES
2	EA	SURFACE CLOSER	4111 SCUSH	689	LCN
1	EA	RAIN DRIP	142AA	AA	ZER
1	EA	MULLION SEAL	8780NBK PSA	BK	ZER
1	SET	GASKETING	BY DOOR/FRAME MANUFACTURER		
2	EA	DOOR SWEEP	8192AA	AA	ZER
1	EA	THRESHOLD	655A-223	A	ZER

COORDINATE WITH ALL RELATED TRADES.  
ENTRY BY CREDENTIAL OR KEY OVERRIDE. PRESENTING VALID CREDENTIAL TO READER WILL  
MOMENTARILY UNLOCK LOCK AND ALLOW ENTRY.

DOOR IS ALWAYS AVAILABLE FOR FREE EGRESS.  
DOOR CONTACT TIED TO ACCESS CONTROL SYSTEM FOR MONITORING.

## HARDWARE SET NO. 50

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	ELEC CLASSROOM LOCK	AD-400-CY-70-MTK-SPA-B 4AA	626	SCE
			BATTERY (PROVIDED BY ACCESS CONTROL SUPPLIER)		
1	EA	PERMANENT CORE	AS REQUIRED	626	BES
1	EA	SURFACE CLOSER	4111 SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

COORDINATE WITH ALL RELATED TRADES.

ENTRY BY CREDENTIAL OR KEY OVERRIDE. PRESENTING VALID CREDENTIAL TO READER WILL MOMENTARILY UNLOCK LOCK AND ALLOW ENTRY.

DOOR IS ALWAYS AVAILABLE FOR FREE EGRESS.

DOOR CONTACT TIED TO ACCESS CONTROL SYSTEM FOR MONITORING.

## HARDWARE SET NO. 51

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	112XY EPT	628	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	ELEC PANIC HARDWARE	RX-LC-99-EO	626	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-70-MTK-SPA-B-LRX	626	SCE
			4AA BATTERY (PROVIDED BY ACCESS CONTROL SUPPLIER)		
1	EA	RIM CYLINDER	1E72	626	BES
1	EA	ELECTRIC STRIKE	6111 FSE CON 12/24 VAC/VDC	630	VON
1	EA	SURFACE CLOSER	4111 SCUSH	689	LCN
1	EA	RAIN DRIP	142AA	AA	ZER
1	SET	GASKETING	BY DOOR/FRAME MANUFACTURER		
1	EA	DOOR SWEEP	8192AA	AA	ZER
1	EA	THRESHOLD	655A-223	A	ZER
1	EA	POWER SUPPLY	PS902 900-2RS 120/240 VAC	LGR	SCE
			Coordinate Power Supply Requirement with Security Provider		
1	EA	DIAGRAM	ELEVATION		DLR
1	EA	DIAGRAM	POINT TO POINT		DLR

COORDINATE WITH ALL RELATED TRADES. ENTRY BY CREDENTIAL, REMOTE RELEASE OF STRIKE, OR KEY OVERRIDE.

PRESENTING VALID CREDENTIAL TO READER WILL MOMENTARILY UNLOCK TRIM AND ALLOW ENTRY.

UPON LOSS OF POWER DOOR IS LOCKED. DOOR IS ALWAYS AVAILABLE FOR FREE EGRESS.

DOOR CONTACT TIED TO ACCESS CONTROL SYSTEM FOR MONITORING.

## HARDWARE SET NO. 52

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
8	EA	HINGE	5BB1HW 5 X 4.5 NRP	652	IVE
1	EA	PANIC HARDWARE	LD-9927-EO-LBR	626	VON
1	EA	PANIC HARDWARE	LD-9927-L-LBR-17	626	VON
1	EA	RIM CYLINDER	1E72	626	BES
2	EA	SURFACE CLOSER	4111 HCUSH	689	LCN

DOORS NORMALLY HELD OPEN BY WALL MAGNETS. UPON LOSS OF POWER OR FIRE ALARM, MAGNETS TO RELEASE.

## HARDWARE SET NO. 53

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	112XY	628	IVE
1	EA	DUMMY PUSH BAR	330-996-17	626	VON
1	EA	SURFACE CLOSER	4111 SCUSH	689	LCN

## HARDWARE SET NO. 54

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	112XY	628	IVE
1	EA	PANIC HARDWARE	CDSI-99-L-DT-17	626	VON
1	EA	MORTISE CYLINDER	1E74	626	BES
1	EA	SURFACE CLOSER	4111 SCUSH	689	LCN
1	EA	RAIN DRIP	142AA	AA	ZER
1	SET	GASKETING	BY DOOR/FRAME MANUFACTURER		
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	655A-223	A	ZER

## HARDWARE SET NO. 55

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	CONT. HINGE	112XY	628	IVE
1	EA	ELEC PANIC HARDWARE	CDSI-RX-LC-99-EO	✎ 626	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-70-MTK-SPA-B-LRX	✎ 626	SCE
			4AA BATTERY (PROVIDED BY ACCESS CONTROL SUPPLIER)		
1	EA	MORTISE CYLINDER	1E74	626	BES
1	EA	PERMANENT CORE	AS REQUIRED	626	BES
1	EA	SURFACE CLOSER	4111 SCUSH	689	LCN
1	EA	RAIN DRIP	142AA	AA	ZER
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	DOOR SWEEP	8192AA	AA	ZER
1	EA	THRESHOLD	655A-223	A	ZER

COORDINATE WITH ALL RELATED TRADES.

ENTRY BY CREDENTIAL OR KEY OVERRIDE. PRESENTING VALID CREDENTIAL TO READER WILL  
MOMENTARILY UNLOCK LOCK AND ALLOW ENTRY.

DOOR IS ALWAYS AVAILABLE FOR FREE EGRESS.

DOOR CONTACT TIED TO ACCESS CONTROL SYSTEM FOR MONITORING.

## HARDWARE SET NO. 56

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	FIRE EXIT HARDWARE	9927-EO-F-LBR-499F	626	VON
1	EA	FIRE EXIT HARDWARE	9927-L-F-LBR-17-499F	626	VON
1	EA	RIM CYLINDER	1E72	626	BES
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
2	EA	MAGNET	SEM7850 12V/24V/120V	✎ 695	LCN
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	MEETING STILE GASKETING	8217SBK PSA	BK	ZER

## HARDWARE SET NO. 57

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112XY	628	IVE
2	EA	DUMMY PUSH BAR	330-DT-990	626	VON
2	EA	SURFACE CLOSER	4111 SCUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
2	EA	SILENCER	SR64	GRY	IVE

## HARDWARE SET NO. 58

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	AUTO FLUSH BOLT	FB41P	630	IVE
1	EA	DUST PROOF STRIKE	DP2	626	IVE
1	EA	CLASSROOM LOCK	ND70BD SPA	626	SCH
1	EA	MORTISE CYLINDER	1E74	626	BES
2	EA	OH STOP	90S	630	GLY
2	EA	SURFACE CLOSER	4011	689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	MEETING STILE GASKETING	8217SBK PSA	BK	ZER

## HARDWARE SET NO. 59

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
8	EA	HINGE	5BB1 5 X 4.5 NRP	652	IVE
2	EA	FIRE EXIT HARDWARE	9927-EO-F-LBR-499F	626	VON
2	EA	SURFACE CLOSER	4111 EDA	689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
2	EA	FIRE/LIFE WALL MAG	SEM7850 AS REQ (12/24/120V AC/DC TRI-VOLT)	689	LCN
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	ASTRAGAL	AS REQUIRED BY DOOR MANUFACTURER		

DOORS NORMALLY HELD OPEN. UPON LOSS OF POWER OR FIRE ALARM, WALL MAGNETS TO RELEASE AND DOORS WILL CLOSE. DOOR IS ALWAYS AVAILABLE FOR FREE EGRESS

## HARDWARE SET NO. 60

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
2	EA	MANUAL FLUSH BOLT	FB458	626	IVE
1	EA	DUST PROOF STRIKE	DP2	626	IVE
1	EA	STOREROOM LOCK	ND80BDC SPA	626	SCH
1	EA	PERMANENT CORE	AS REQUIRED	626	BES
1	EA	OH STOP	90S	630	GLY
1	EA	SURFACE CLOSER	INACTIVE LEAF 4111 SCUSH ACTIVE LEAF	689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
2	EA	SILENCER	SR64	GRY	IVE

## HARDWARE SET NO. 61

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112XY	628	IVE
1	EA	REMOVABLE MULLION	KR4954	689	VON
1	EA	PANIC HARDWARE	LD-99-EO	626	VON
1	EA	ELEC PANIC HARDWARE	LD-RX-LC-99-EO	⚡ 626	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-70-MTK-SPA-B-LRX	⚡ 626	SCE
			4AA BATTERY (PROVIDED BY ACCESS CONTROL SUPPLIER)		
1	EA	MORTISE CYLINDER	1E74	626	BES
1	EA	PERMANENT CORE	AS REQUIRED	626	BES
2	EA	SURFACE CLOSER	4111 SCUSH	689	LCN
1	EA	RAIN DRIP	142AA	AA	ZER
1	EA	MULLION SEAL	8780NBK PSA	BK	ZER
1	SET	GASKETING	BY DOOR/FRAME MANUFACTURER		
2	EA	DOOR SWEEP	8192AA	AA	ZER
1	EA	THRESHOLD	655A-223	A	ZER

COORDINATE WITH ALL RELATED TRADES.

ENTRY BY CREDENTIAL OR KEY OVERRIDE. PRESENTING VALID CREDENTIAL TO READER WILL  
MOMENTARILY UNLOCK LOCK AND ALLOW ENTRY.

DOOR IS ALWAYS AVAILABLE FOR FREE EGRESS.

DOOR CONTACT TIED TO ACCESS CONTROL SYSTEM FOR MONITORING.

## HARDWARE SET NO. 62

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	ND80BDC SPA	626	SCH
1	EA	PERMANENT CORE	AS REQUIRED	626	BES
1	EA	SURFACE CLOSER	4011	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

## HARDWARE SET NO. 64

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	FIRE EXIT HARDWARE	9927-EO-F-LBR-499F	626	VON
1	EA	FIRE EXIT HARDWARE	9927-L-BE-F-LBR-17-499F	626	VON
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
2	EA	MAGNET	SEM7850 12V/24V/120V	⚡ 695	LCN
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	MEETING STILE GASKETING	8217SBK PSA	BK	ZER

## HARDWARE SET NO. 65

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PRIVACY LOCK	ND40S SPA	626	SCH
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

## HARDWARE SET NO. 66

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	CONT. HINGE	112XY	628	IVE
1	EA	ELEC PANIC HARDWARE	LD-RX-LC-99-EO	✎ 626	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-70-MTK-SPA-B-LRX	✎ 626	SCE
			4AA BATTERY (PROVIDED BY ACCESS CONTROL SUPPLIER)		
1	EA	PERMANENT CORE	AS REQUIRED	626	BES
1	EA	ELECTRIC STRIKE	6111 FSE CON 12/24 VAC/VDC	✎ 630	VON
1	EA	SURFACE CLOSER	4111 SCUSH	689	LCN
1	EA	RAIN DRIP	142AA	AA	ZER
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	DOOR SWEEP	8192AA	AA	ZER
1	EA	THRESHOLD	655A-223	A	ZER
1	EA	AIPHONE	SUPPLIED BY ACCESS CONTROL PROVIDER	✎	

COORDINATE WITH ALL RELATED TRADES.

ENTRY BY CREDENTIAL, ELECTRIC STRIKE TIED TO AIPHONE, OR KEY OVERRIDE. PRESENTING VALID CREDENTIAL TO READER WILL MOMENTARILY UNLOCK LOCK AND ALLOW ENTRY.

DOOR IS ALWAYS AVAILABLE FOR FREE EGRESS.

DOOR CONTACT TIED TO ACCESS CONTROL SYSTEM FOR MONITORING.

## HARDWARE SET NO. 67

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PASSAGE SET	ND10S SPA	626	SCH
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE



## HARDWARE SET NO. 68

Provide each with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PASSAGE SET	ND10S SPA	626	SCH
1	EA	SURFACE CLOSER	4111 SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

## DOOR INDEX

Door#	HwSet#
100	01
100.1X	02
100A	03
101	01
101.1X	02
101A	03
102	04
102.1X	02
102A	03
103	04
103.1X	02
103A	03
104	04
104.1X	02
104A	03
105.1	05
105.2	06
105.3	07
105.4X	08
105.5X	09
105.6X	10
105.7	11
105.8	12
105.9	13
105D	58
106	14
107	14
108	14
110	44
111	44
200	16
201	17
202	17
203	17
204	18
205	17
206	17
207	17
208	17
209	17
209.1	07
210	15
211	15
212	19
212.1	20
213	17
213A	65

Door#	HwSet#
214	17
215	17
216.1	17
216.2	21
216A	22
217.1	17
217.2	23
218.1	24
218.2	17
219	15
220	15
221	25
222	17
223	26
223.1X	09
223.2X	09
224	17
224.1	17
225	17
225.1	43
225.2	03
226	17
227	28
228	15
300.1X	08
300.2X	61
300.3	29
300.4	10
300.5	29
300.6	10
303.1	31
303.2	32
303A	33
303B	17
304.1	34
304.2X	35
305	07
306	32
306A	36
307.1	26
307.2	26
307.3	26
307.4	26
307.5X	61
307A	07
307B	37
308.1	29

Door#	HwSet#
308.2	38
309	17
309A	36
310	17
310A	36
311.1	29
311.2	38
313	39
315.1	07
315.2	10
316	40
316A	03
317	40
400	07
401	04
402	07
403	04
403.1X	09
403A	41
404	40
405	40
406.1	04
406.2	04
406.3	03
406B	42
407.1	04
407.2	04
407.3	03
407B	42
408.1	04
408.2	04
408.3	03
409.1	04
409.2	04
409.3	03
410	43
410A	15
410B	15
412	25
414	25
415	40
416	40
417	40
418	40
419	40
420	40
421	40

Door#	HwSet#
422	40
500	04
500.1X	09
501	04
501.1X	09
501A	41
502	40
503	40
504.1	04
504.2	04
504.3	03
504B	42
505.1	04
505.2	04
505.3	03
505B	42
506.1	04
506.2	04
506.3	03
507.1	04
507.2	04
507.3	03
508	43
510A	15
510B	15
511	39
512	17
514	17
515	40
516	40
517	40
518	40
519	40
520	40
521	40
522	40
600A	40
600A.1	10
600A.2	10
600G	06
601	40
601A	41
602	40
603	40
604	40
605.1	04
605.2	04
605.3	03

Door#	HwSet#
605B	42
606.1	04
606.2	04
606.3	03
606B	42
607.1	04
607.2	04
607.3	03
608.1	04
608.2	04
608.3	03
610	43
611	39
612A	44
612B	44
614A	17
614B	17
615	40
616	40
617	40
618	40
619	40
620	40
621	40
622	40
C100	27
C100.1	45
C100.1X	46
C100.2	45
C100.2X	46
C100.3	45
C100.4	47
C100X	48
C102.1X	49
C103	50
C200.1X	54
C200.2X	54
C200.3X	51
C200.4	45
C200.5	45
C200.6	45
C200.7	47
C200X	54
C201	52
C201.1	52
C202	07
C203	07
C203.1	25

Door#	HwSet#
C300	53
C300.1	53
C300.2	53
C301.1X	54
C301.2X	55
C301X	54
C302X	66
C400	56
C400.1	64
C400.2	49
C400.3	57
C500	56
C500.1X	49
C500.2X	49
C600B	17
C600C	17
C601	59
CW26	49
M100	60
M100.1	68
M101	60
M200	07
M200.1	67
M300X	61
M301X	61
M302X	61
M303	60
M400	60
M401	25
M402	25
M403	50
M500	60
M501	60
M502	60
M503	60
M504	60
M505	60
M506	60
M506	07
M507	60
M508	60
M508	07
M600	60
M601	62
M602	07
M603	07

**END OF SECTION**



**SECTION 08 80 00****GLAZING****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Glass glazing materials and installation requirements are included in this Section for frame assemblies specified in other Sections.
- B. Related Requirements:
  - 1. Section 07 90 00 - Joint Protection: Sealant and back-up material other than glazing sealants.
  - 2. Section 08 11 13 - Hollow Metal Doors and Frames: Doors and frames to receive glazing in this Section.
  - 3. Section 08 14 16 - Flush Wood Doors: Doors to receive glazing in this Section.
  - 4. Section 08 11 16.10 - Aluminum Doors with FRP Face Panel: Doors to receive glazing in this Section.
  - 5. Section 08 41 13 - Aluminum-Framed Entrances and Storefronts: Framing system to receive glazing in this Section.
  - 6. Section 08 44 13 - Glazed Aluminum Curtain Walls: Framing system to receive glazing in this Section.

**1.2 REFERENCES**

- A. American National Standards Institute (ANSI):
  - 1. ANSI Z97.1 - Safety Glazing Materials Used In Buildings - Safety Performance Specifications And Methods Of Test; 2015, Reapproval 2020.
- B. American Society of Civil Engineers (ASCE):
  - 1. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- C. ASTM International (ASTM):
  - 1. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005, Reapproval 2019.
  - 2. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
  - 3. ASTM C1036 - Standard Specification for Flat Glass; 2021.
  - 4. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.
  - 5. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2019.
  - 6. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016; Reapproval 2023.
  - 7. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass; 2021a.
  - 8. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2023.
  - 9. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2022.
  - 10. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2016.
  - 11. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2019.
- D. Code of Federal Regulations (CFR):

1. 16 CFR 1201 - Safety Standard for Architectural Glazing; Current Edition.
- E. Glass Association of North America (GANA):
  1. GANA (GM) - GANA Glazing Manual; 2022.
  2. GANA (SM) - GANA Sealant Manual; 2008.
  3. GANA (LGRM) - Laminated Glazing Reference Manual; 2019.
- F. National Fenestration Rating Council Incorporated (NFRC):
  1. NFRC 100 - Procedures for Determining Fenestration Product U-Factors; 2023.
  2. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence; 2023.
  3. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems; 2023.
- G. National Fire Protection Association (NFPA):
  1. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2022.
  2. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2022.
  3. NFPA 257 - Standard on Fire Test for Window and Glass Block Assemblies; 2022.
- H. Underwriters Laboratories Inc. (UL):
  1. UL (BMD) - Building Materials Directory; Current Edition.
  2. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

### 1.3 PRE-INSTALLATION MEETING

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week before starting Work of this Section; require attendance by all affected installers.

### 1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data:
  1. Glass: Provide structural, physical, and environmental characteristics, size limitations, special handling, or installation requirements. Include manufacturer's full range of samples of glass tinting options for Architects selection.
  2. Glazing Sealants, Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify full range of available colors.
- C. Shop Drawings:
  1. Indicate sizes, layout, thicknesses, and loading conditions for glass.
- D. Samples:
  1. Glass: Submit one sample, 12 x 12 inches in size, of each glass type.
  2. Glazing Units: Submit one sample, 12 x 12 inches size, of assembled sealed insulating glazing units.
  3. Glazing Materials: Submit 12 inch long bead of glazing sealant and gaskets, color as selected.
  4. **Do not submit samples until product data has been approved.**
- E. Design Data: Submit design calculations indicating compliance with requirements for resistance of wind loads for glass and glazing units.
- F. Certifications: Submit the follow.
  1. Certify that products of this Section meet or exceed specified requirements.

2. Manufacturer's qualification certification.
3. Fabricator's qualification certification.
4. Installer's qualification certification.

## 1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with the following standards:
  1. GANA (GM) - GANA Glazing Manual.
  2. GANA (SM) - GANA Sealant Manual.
  3. GANA (LGRM) - Laminated Glazing Reference Manual.
  4. Maintain one copy of each document on site.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum five (5) years of documented experience.
- C. Fabricator Qualifications: Fabricator certified by glass manufacturer for type of glass, glass unit, coating, and treatment involved and capable of providing requirements indicated in this Section.
- D. Installer Qualifications: Company specializing in performing work of this Section with minimum five (5) years of documented experience.

## 1.6 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements.
- B. Do not install glazing when ambient temperature is less than 50 degrees F.
- C. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

## 1.7 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Sealed Insulating Glass Units: Provide a ten (10) year warranty to include coverage for seal failure, interpane dusting, condensation or misting, and replacement of failed units.
- C. Laminated Glass: Provide a ten (10) year warranty to include coverage for delamination, including replacement of failed units.
- D. Spandrel Glass: Provide a five (5) year warranty to include coverage for deterioration of spandrel glass coating, including replacement of failed units.

## 1.8 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
  1. Extra Insulating Glass Units: One percent (1%), but no less than one (1) each, of each type and size installed. Furnish storage rack to hold all pieces of glass.

## PART 2 PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Provide glazing and glazing assemblies of type and thickness designed to support assembly dead loads and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass. Comply with the State Building Code for the State in which the project is located.

1. Wind Loads: Design and size glazing and glazing assemblies to withstand dead loads and live loads caused by positive and negative wind loads acting normal to plane of wall, including increased wind loads at building corners.
    - a. Design calculations of glass and glass assemblies to be in accordance with ASCE 7.
    - b. Comply with Design Loads indicated on Drawings and applicable code requirements based on geographical location.
    - c. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
  2. Seismic Loads: Design and size components and system to withstand seismic loads and sway displacement as calculated in accordance with ASCE 7 and applicable code requirements.
  3. Exterior Glass Deflection: Maximum of 1/175 of glass edge length or 3/4 inch, whichever is less with full recovery of glazing materials.
  4. Glass thickness listed in this Section and on Drawings is minimum. Actual thickness to be as required by design to comply with performance requirements.
- B. Fire Rated Door Glazing:
1. Provide glazing complying with NFPA 80 and tested in accordance with one of the following:
    - a. NFPA 252; with neutral pressure level at 40 inches maximum above sill at 5 minutes into test.
    - b. UL 10C.
    - c. Maintain one copy of each document on site.
  2. Apply label from agency approved by authority having jurisdiction to identify each fire rated glass lite.
- C. Vapor Retarder and Air Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure vapor retarder and air barrier.
1. In conjunction with vapor retarder and joint sealer materials described in other Sections.
  2. To utilize the inner pane of multiple pane insulating glass units for the continuity of the vapor retarder and air barrier seal.
  3. To maintain a continuous vapor retarder and air barrier throughout the glazed assembly from glass pane to heel bead of glazing sealant.
- D. Thermal and Solar Optical Performance: Measured or calculated in accordance with the following:
1. U-Values: NFRC 100.
  2. Solar Heat Gain Coefficients: NFRC 200.
  3. Solar Optical Properties: NFRC 300.

## 2.2 GLASS MATERIALS

- A. Float Glass: Provide float glass based glazing unless noted otherwise.
1. Glass Lite Thicknesses: As indicated, but not less than 1/4 inch; provide greater thickness as required for exterior glazing wind load design.
  2. Annealed Glass: ASTM C1036, Type I (transparent flat), Class 1 (clear), Quality-Q3.
  3. Tinted Glass: ASTM C1036, Type 1 (transparent flat), Class 2 (tinted), Quality-Q3, color and performance characteristics as indicated.
  4. Heat-Strengthened Glass: ASTM C1048, Kind HS.
  5. Fully Tempered Safety Glass: ASTM C1048, Kind FT.
  6. Acid Etched Glass: ASTM C1036, Type II (transparent flat), Class 1 (clear), Quality-Q3.



7. Tempered Acid Etched Glass: ASTM C1048 Kind FT (fully tempered), Type II (transparent flat), Class 1 (clear), Quality-Q3.
- B. Laminated Glass: Float glass laminated in accordance with ASTM C1172.
  1. Laminated Safety Glass:
    - a. Comply with ANSI Z97.1 - Class A or 16 CFR 1201 - Category II impact test requirements.
  2. Interlayer:
    - a. Polyvinyl Butyral (PVB) Interlayer; 0.030 inch thick, minimum.
- C. Low-E Coating:
  1. Low-E (solar control): Manufactured using the magnetron sputtered vacuum deposition (MSVD) process and in compliance with ASTM C1376.
- D. Spandrel Coating:
  1. Water-base silicone coating that is supplied as a flowable, thixotropic emulsion.

### 2.3 INSULATING GLASS UNITS - GENERAL

- A. Manufacturers:
  1. Cardinal Glass Industries.
  2. Guardian Industries Corporation.
  3. Pilkington North America Inc.
  4. Viracon (Subsidiary of Apogee Enterprises, Inc.)
  5. Vitro Architectural Glass (formerly PPG Glass).
  6. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design: Guardian Industries Corporation.
- C. Fabricators:
  1. Fabricator certified by glass manufacturer for type of glass, glass unit, coating, and treatment involved and capable of providing requirements indicated in this Section.
- D. Insulating Glass Units: Types as indicated.
  1. Factory assembled units consisting of continuously sealed lites of glass separated by an aluminum (or stainless steel) spacer with sealants.
  2. Overall Unit Thickness: Dependent on assembled unit components.
  3. Durability: Certified by an independent testing agency to comply with ASTM E2190.
  4. Metal Edge Spacers:
    - a. Aluminum, mitered and spigoted.
      - 1) Desiccant: Molecular sieve or silica gel, or blend of both.
  5. Edge Seal: Dual Seal - Glass to elastomer with supplementary silicone sealant.
  6. Interspace Air Space: Purged dehydrated space, and hermetically sealed. Space fill type to be Argon gas in each IGU Type, unless otherwise indicated.
  7. Primary IGU Seal:
    - a. The primary IGU sealant must be fully wetted against the glass and be continuous around the perimeter of each side with a targeted width of 5/32 inch and a minimum width of 3/32 inch.
    - b. The minimum thickness of the primary seal after pressing is 1/16 inch.

### 2.4 INSULATING GLASS UNITS

- A. **Type IG1** - Insulating Glass Unit: Clear, Tempered North Facing.
  1. Outboard Lite:
    - a. Coating:
      - 1) Low-E Coating (solar control type), on #2 surface.

- a) Basis of Design:
    - (1) Guardian - SunGuard SN 54.
  - b. Tint:
    - 1) Class 1 - Clear.
  - c. Glass Type:
    - 1) Fully Tempered Safety Glass.
  - d. Glass Thickness: 1/4 inch (6 mm) minimum.
2. Inboard Lite:
- a. Coating:
    - 1) None.
  - b. Tint:
    - 1) Class 1 - Clear.
  - c. Glass Type:
    - 1) Fully Tempered Safety Glass.
  - d. Glass Thickness: 1/4 inch (6 mm) minimum.
3. Interspace Content: 1/2 inch (12.7 mm) wide.
- a. Dehydrated Argon filled.
4. Overall Unit Thickness: 1 inch (25 mm).
5. Provide labeling where safety glazing labeling is required.
- B. Type IG1L - Insulating Glass Unit: Clear, Laminated North Facing.**
1. Outboard Lite:
- a. Coating:
    - 1) Low-E Coating (solar control type), on #2 surface.
      - a) Basis of Design:
        - (1) Guardian - SunGuard SN 54.
  - b. Tint:
    - 1) Class 1 - Clear.
  - c. Glass Type:
    - 1) Fully Tempered Safety Glass.
  - d. Glass Thickness: 1/4 inch (6 mm) minimum.
2. Inboard Lite:
- a. Coating:
    - 1) None.
  - b. Tint:
    - 1) Class 1 - Clear.
  - c. Glass Type:
    - 1) Laminated Safety Glass.
  - d. Glass Thickness: 1/4 inch (6 mm) minimum.
3. Interspace Content: 1/2 inch (12.7 mm) wide.
- a. Dehydrated Argon filled.
4. Overall Unit Thickness: 1 inch (25 mm).
5. Provide labeling where safety glazing labeling is required.
- C. Type IG2 - Insulating Glass Unit: Translucent, Tinted South, East, & West Facing.**
1. Outboard Lite:
- a. Coating:
    - 1) Low-E Coating (solar control type), on #2 surface.
      - a) Basis of Design:
        - (1) Guardian - SunGuard SNX 51/23.
  - b. Tint:
    - 1) Class 2 - Tinted:
      - a) Color:
        - (1) As selected by Architect from manufacturer's full range.

- c. Glass Type:
    - 1) Fully Tempered Safety Glass.
  - d. Glass Thickness: 1/4 inch (6 mm) minimum.
  - 2. Inboard Lite:
    - a. Coating:
      - 1) None.
    - b. Tint:
      - 1) Class 1 - Clear.
    - c. Translucent Finish Type:
      - 1) Acid etched texture on #3 surface.
        - a) Basis of Design: Guardian - SatinDeco.
      - 2) Translucent Appearance/Design/Privacy:
        - a) Matte Frosted - Object image presents as shadow but no form.
        - b) As selected by Architect from manufacturer's full range.
    - d. Glass Type:
      - 1) Fully Tempered Safety Glass.
    - e. Glass Thickness: 1/4 inch (6 mm) minimum.
  - 3. Interspace Content: 1/2 inch (12.7 mm) wide.
    - a. Dehydrated Argon filled.
  - 4. Overall Unit Thickness: 1 inch (25 mm).
  - 5. Provide labeling where safety glazing labeling is required.
- D. **Type IG3** - Insulating Glass Unit: Tinted, Tempered South, East, & West Facing.
- 1. Outboard Lite:
    - a. Coating:
      - 1) Low-E Coating (solar control type), on #2 surface.
        - a) Basis of Design:
          - (1) Guardian - SunGuard SNX 51/23.
    - b. Tint:
      - 1) Class 2 - Tinted:
        - a) Color:
          - (1) As selected by Architect from manufacturer's full range.
    - c. Glass Type:
      - 1) Fully Tempered Safety Glass.
    - d. Glass Thickness: 1/4 inch (6 mm) minimum.
  - 2. Inboard Lite:
    - a. Coating:
      - 1) None.
    - b. Tint:
      - 1) Class 1 - Clear.
    - c. Glass Type:
      - 1) Fully Tempered Safety Glass.
    - d. Glass Thickness: 1/4 inch (6 mm) minimum.
  - 3. Interspace Content: 1/2 inch (12.7 mm) wide.
    - a. Dehydrated Argon filled.
  - 4. Overall Unit Thickness: 1 inch (25 mm).
  - 5. Provide labeling where safety glazing labeling is required.
- E. **Type IG3L** - Insulating Glass Unit: Tinted, & Laminated South, East, & West Facing.
- 1. Outboard Lite:
    - a. Coating:
      - 1) Low-E Coating (solar control type), on #2 surface.
        - a) Basis of Design:
          - (1) Guardian - SunGuard SNX 51/23.

- b. Tint:
    - 1) Class 2 - Tinted:
      - a) Color:
    - 2) As selected by Architect from manufacturer's full range.
  - c. Glass Type:
    - 1) Fully Tempered Safety Glass.
  - d. Glass Thickness: 1/4 inch (6 mm) minimum.
2. Inboard Lite:
- a. Coating:
    - 1) None.
  - b. Tint:
    - 1) Class 1 - Clear.
  - c. Glass Type:
    - 1) Laminated Safety Glass.
  - d. Glass Thickness: 1/4 inch (6 mm) minimum.
3. Interspace Content: 1/2 inch (12.7 mm) wide.
- a. Dehydrated Argon filled.
4. Overall Unit Thickness: 1 inch (25 mm).
5. Provide labeling where safety glazing labeling is required.
- F. **Type IG4 - Insulating Glass Unit: Tinted, Tempered Spandrel.**
1. Outboard Lite:
- a. Coating:
    - 1) Low-E Coating (solar control type), on #2 surface.
      - a) Basis of Design:
        - (1) Guardian - SunGuard SNX 51/23.
  - b. Tint:
    - 1) Class 2 - Tinted:
      - a) Color:
    - 2) As selected by Architect from manufacturer's full range.
  - c. Glass Type:
    - 1) Fully Tempered Safety Glass.
  - d. Glass Thickness: 1/4 inch (6 mm) minimum.
2. Inboard Lite:
- a. Coating:
    - 1) None.
  - b. Tint:
    - 1) Class 1 - Clear.
  - c. Spandrel - Opacifier Coating:
    - 1) Type and Surface:
      - a) Elastomeric silicone coating; ASTM C1048, Type I, Quality Q3; on #4 surface.
        - (1) Basis of Design: ICD High Performance Coatings.
  - d. Glass Type:
    - 1) Fully Tempered Safety Glass.
  - e. Glass Thickness: 1/4 inch (6 mm) minimum.
3. Interspace Content: 1/2 inch (12.7 mm) wide.
- a. Dehydrated Argon filled.
4. Overall Unit Thickness: 1 inch (25 mm).
5. Provide labeling where safety glazing labeling is required.

## 2.5 GLASS UNITS - SINGLE PANE

- A. **Type FG - Float Glass (non-safety type).**

1. Applications: Locations as follows.
    - a. Locations as indicated on Drawings.
  2. Tint:
    - a. Class 1 - Clear.
      - 1) Exception: If adjacent glass is tinted, match tinted glass.
  3. Glass Type:
    - a. Heat-Strengthened float glass.
  4. Total Thickness: 1/4 inch.
- B. Type SG - Safety Glass, Tempered.**
1. Application: Locations as follows.
    - a. Locations as indicated on Drawings, and locations required by applicable federal, state, and local codes and regulations.
  2. Tint:
    - a. Class 1 - Clear.
  3. Glass Type:
    - a. Fully Tempered Safety Glass.
  4. Thickness: 1/4 inch.
- C. Type SGL - Safety Glass, Laminated.**
1. Application: Locations as follows.
    - a. Locations indicated on Drawings.
  2. Tint:
    - a. Class 1 - Clear.
  3. Glass Type:
    - a. Laminated Safety Glass.
  4. Thickness: 1/4 inch.
- D. Type SGT - Safety Glass, Tempered and Translucent.**
1. Applications: Locations as indicated on Drawings.
  2. Tint:
    - a. Class 1 - Clear.
  3. Translucent Finish Type:
    - a. Acid Etched Texture on #2 surface.
      - 1) Basis of Design: Guardian - SatinDeco.
      - 2) Translucent Appearance/Design/Privacy:
        - a) Matte Frosted - Object image presents as shadow but no form.
        - b) As selected by Architect from manufacturer's full range.
  4. Glass Type:
    - a. Fully Tempered Safety Glass.
  5. Thickness: 1/4 inch.
- E. Type FRG: Fire-Resistance-Rated Glazing.**
1. Glass type, thickness, and configuration of glazing that contains flame, smoke, and blocks radiant heat, as required to achieve fire-rating period as indicated on Drawings and as required by applicable Codes.
  2. Applications:
    - a. Glazing in fire-rated door assembly.
    - b. Glazing in fire-rated window assembly.
    - c. Glazing in sidelights, borrowed lites, and other glazed openings in fire-rated wall assemblies.
    - d. Other locations as indicated on drawings.
  3. Provide products listed by ITS (DIR) or UL (DIR) and approved by authorities having jurisdiction.
  4. Safety Glazing Certification: 16 CFR 1201 Category II.

5. Fire-Rating Period: As indicated on Drawings.
  6. Markings for Fire-Resistance-Rated Glazing Assemblies: Provide permanent markings on fire-resistance-rated glazing in compliance with ICC (IBC), local building code, and authorities having jurisdiction.
- F. **Type FRGT:** Fire-Resistance-Rated Glazing, Translucent.
1. Glass type, thickness, and configuration of glazing that contains flame, smoke, and blocks radiant heat, as required to achieve fire-rating period as indicated on Drawings and as required by applicable Codes.
  2. Translucent Finish Type:
    - a. Acid Etched Texture on #2 surface.
      - 1) Translucent Appearance/Design/Privacy:
        - a) Matte Frosted - Object image presents as shadow but no form.
        - b) As selected by Architect from manufacturer's full range.
  3. Applications:
    - a. Glazing in fire-rated door assembly.
    - b. Glazing in fire-rated window assembly.
    - c. Glazing in sidelights, borrowed lites, and other glazed openings in fire-rated wall assemblies.
    - d. Other locations as indicated on drawings.
  4. Provide products listed by ITS (DIR) or UL (DIR) and approved by authorities having jurisdiction.
  5. Safety Glazing Certification: 16 CFR 1201 Category II.
  6. Fire-Rating Period: As indicated on Drawings.
  7. Markings for Fire-Resistance-Rated Glazing Assemblies: Provide permanent markings on fire-resistance-rated glazing in compliance with ICC (IBC), local building code, and authorities having jurisdiction.

## 2.6 DECORATIVE PLASTIC FILMS

- A. Decorative Plastic Film:
1. Allowance Work: Refer to Section 01 21 00 - Allowances. Locations and characteristics of plastic film to be as selected by Architect.
  2. Basis of Design: Lumar, an Eastman Chemical Company; Decorative Window Film.
  3. Application: Locations as indicated on Drawings.
  4. Material: Polyester type.
  5. Series Type: Commercial - Matte Frost Series.
  6. Color: Glacier NRM55 PS4 (Frosted).
  7. Thickness Without Liner: 0.004 inch.
  8. Privacy (Opacity) Film Rating: 9.
    - a. Rating scale is 0 (clear) to 10 (opaque) and viewed object and viewer are 2 feet from panel and on opposite sides.
  9. Visible Light Transmittance (VLT): 67 percent, nominal.
  10. Diffuse Visible Light Reflectance, Exterior: 36 percent, nominal.

## 2.7 GLAZING COMPOUNDS

- A. All materials to be approved by manufacturers of products to which glazing compounds are to be applied.
- B. Butyl Sealant: Single component; ASTM C920, Grade NS, Class 12-1/2, Uses M and A, Shore A hardness of 10 to 20; black color.
- C. Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; non-bleeding, non-staining; ASTM C920, Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; Black color.

## 2.8 ACCESSORIES

- A. All accessories to be approved by manufacturers of products to which accessories are to be applied.
- B. Setting Blocks: Neoprene, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inches x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.
- C. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inches long x one half the height of the glazing stop x thickness to suit application, self-adhesive on one face.
- D. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; 5 to 30 cured Shore A durometer hardness; coiled on release paper; black color.
  - 1. Width: As required for application.
  - 2. Thickness: As required for application.
  - 3. Manufacturers:
    - a. Pecora Corporation - Extru-Seal Glazing Tape.
    - b. Tremco Sealants - Tremco 440 Glazing Tape.
- E. Spacer Rod Diameter: As required for application.
- F. Glazing Gaskets (Splines): Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color black.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.
- C. Verify that the minimum required face and edge clearances are being provided.
- D. 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.
- E. Verify that sealing between joints of framing system members has been completed effectively.
- F. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment used during installation.
- C. 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.
- D. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

- E. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

### 3.3 INSTALLATION - GENERAL

- A. Perform installation in accordance with GANA Glazing Manual.
  - 1. Glazing Sealants: Comply with ASTM C1193.
  - 2. Fire Rated Openings: Comply with NFPA 80.
- B. 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.
- C. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.
- D. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.
- E. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.
- F. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.
- G. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as weld splatter, fire-safing, plastering, mortar droppings, etc.

### 3.4 INSTALLATION METHODS

- A. Utilize installation method required by manufacturer and glazing system design.
- B. Dry Glazing Method (Gasket Glazing):
  - 1. Application - Exterior and/or Interior Glazed: Set glazing infills from either the exterior or the interior of the building.
  - 2. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
  - 3. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.
  - 4. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.
- C. Dry Glazing Method (Tape and Gasket Spline Glazing):
  - 1. Application - Exterior Glazed: Set glazing infills from the exterior of the building.
  - 2. Cut glazing tape to length; install on glazing pane. Seal corners by butting tape and sealing junctions with butyl sealant.
  - 3. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
  - 4. Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.
  - 5. Install removable stops without displacing glazing spline. Exert pressure for full continuous contact.
  - 6. Carefully trim protruding tape with knife.
- D. Dry Glazing Method (Tape and Tape):
  - 1. Application - Interior Glazed: Set glazing infills from the interior of the building.
  - 2. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch above sight line.
  - 3. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
  - 4. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.
  - 5. Place glazing tape on free perimeter of glazing in same manner described above.
  - 6. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.



7. Carefully trim protruding tape with knife.
- E. Wet Glazing Method (Compound and Compound):
1. Application - Interior Glazed: Set glazing infills from the interior of the building.
  2. Install glazing resting on setting blocks. Install applied stop and center pane by use of spacer shims at 24 inches centers, kept 1/4 inch below sight line.
  3. Locate and secure glazing pane using glazers' clips.
  4. Fill gaps between glazing and stops with glazing compound until flush with sight line. Tool surface to straight line.
- F. Wet/Dry Glazing Method (Preformed Tape and Sealant):
1. Application - Exterior Glazed: Set glazing infills from the exterior of the building.
  2. Cut glazing tape to length and set against permanent stops, 3/16 inch below sight line. Seal corners by butting tape and dabbing with butyl sealant.
  3. Apply heel bead of butyl sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete the continuity of the air and vapor seal.
  4. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
  5. Rest glazing on setting blocks and push against tape and heel bead of sealant with sufficient pressure to attain full contact at perimeter of pane or glass unit.
  6. Install removable stops, with spacer strips inserted between glazing and applied stops 1/4 inch below sight lines.
    - a. Place glazing tape on glazing pane of unit with tape flush with sight line.
  7. Fill gap between glazing and stop with glazing manufacturer's required sealant type to depth equal to bite of frame on glazing, but not more than 3/8 inch below sight line.
  8. Apply cap bead of glazing manufacturer's required sealant type along void between the stop and the glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

### 3.5 INSTALLATION - DECORATIVE PLASTIC FILM

- A. Install plastic film with adhesive, applied in accordance with film manufacturer's instructions and glass manufacturer's requirements.
- B. Place without air bubbles, creases, or visible distortion.
- C. Install film tight to perimeter of glass and carefully trim film with razor sharp blade. Do not score, scratch, or mar the glass.

### 3.6 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Monitor quality of installation, inspection, and testing.
- B. Glass and Glazing product manufacturers to provide field surveillance of the installation of their products.
- C. Monitor and report installation procedures and unacceptable conditions.

### 3.7 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.
- C. Remove non-permanent labels immediately after glazing installation is complete.

- D. Clean glass and adjacent surfaces after sealants are fully cured.
- E. 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.

**3.8 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed construction from damage.

**3.9 SCHEDULE**

- A. Refer to Drawings for locations of Glass Unit Types.

**END OF SECTION**

**SECTION 08 91 00****LOUVERS****PART 1 GENERAL****1.1 SUMMARY**

- A. Section includes louvers, frames, and accessories.
- B. Related Requirements:
  - 1. Section 07 90 00 - Joint Protection: Sealant at louver perimeter.
  - 2. Division 23 - Heating, Ventilating and Air-Conditioning (HVAC): Coordinate Work of this Section with requirements of HVAC systems.

**1.2 REFERENCES**

- A. American Architectural Manufacturers Association (AAMA):
  - 1. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
- B. Air Movement and Control Association International, Inc. (AMCA):
  - 1. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating; 2023.
  - 2. AMCA 511 - Certified Ratings Program Product Rating Manual for Air Control Devices; 2021, Editorial Revisions 2022.
- C. American Society of Civil Engineers (ASCE):
  - 1. ASCE 7 - Minimum Design Loads and Associated Criteria For Buildings And Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- D. ASTM International (ASTM):
  - 1. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
  - 2. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

**1.3 COORDINATION**

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate Work with installation of masonry flashings.
- C. Coordinate Work with installation of mechanical ductwork and electrical services to motorized devices.
- D. Coordinate air-flow rate and capacity to comply with the design requirements indicated in the contract documents.
- E. Verify field measurements prior to fabrication.

**1.4 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data describing design characteristics, maximum recommended air velocity, design free area, materials, and finishes.

- C. Shop Drawings: Indicate louver layout plan and elevations, opening and clearance dimensions, tolerances; head, jamb, and sill details; blade configuration, screens, blank-off panel areas required, and frames.
- D. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of finishes and colors available for products with factory-applied finishes; submit for Architect's initial selection.
- E. Samples for Verification: From the Architect's initial selection, prepare two samples for each selected finish and color; samples on same product material type indicated for final Work; each sample 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

## 1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with AMCA 500-L testing and AMCA 511 certification. Attach AMCA seal to louvers.
- B. Maintain one copy of each document on site.

## 1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum five (5) years documented experience.

## 1.7 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Provide minimum fifteen (15) year manufacturer's warranty on finish.

# PART 2 PRODUCTS

## 2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Design and size system components and anchorage to safely withstand assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to louver plane.
  - 1. Wind Design Pressure:
    - a. As indicated on Drawings, in accordance with ASCE 7, and in accordance with the State Building Code for the State in which the project is located.
- B. Louver Air Passage: To permit passage of air at velocity of 750 ft / min without blade vibration or noise, with maximum static pressure loss of 0.10 inches measured at 750 ft / min.
- C. Louver Free Area: To permit 50 percent free area.
- D. Louver Water Penetration: Not more than 0.01 oz/sq ft of free area at minimum 750 ft / min face velocity.

## 2.2 WALL LOUVERS

- A. Manufacturers:
  - 1. Airline Products Company.
  - 2. Airolite.
  - 3. Arrow United Industries.

4. Construction Specialties Inc.
  5. Greenheck Corporation.
  6. Ruskin.
  7. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design: Construction Specialties, Inc. - Model RS-5300.
- C. Factory fabricated and assembled, complete with frame, mullions, and accessories; AMCA Certified in accordance with AMCA 511.
- D. Louver Construction: Extruded aluminum; size, configuration and face dimensions as indicated on Drawings.
- E. Louver Panel Depth: Minimum 5 inches deep, or deeper if required by size and performance requirements.
- F. Heads, sills, jambs, and mullions to be one-piece structural aluminum extrusion members; minimum extrusion wall thickness to be 0.081 inch and with integral perimeter formed with sealant slot and retaining bead to retain backer rod for sealant application.
1. Intermediate Mullions: Concealed of extruded aluminum, profiled to suit louver frame.
- G. Louver Blades: Drainable blades to be one-piece aluminum extrusions; minimum extrusion wall thickness to be 0.060 inch and with integral front lip gutter and multiple secondary gutters designed to stop and drain moisture to exterior of building envelope.
1. Storm proof, sloped at 45 degrees, chevron style.
- H. Sill Pan: Sill flashings to include sill pan, minimum 3 inch high by full depth formed from minimum 0.050 inch thick aluminum; single length one-piece construction; integral formed drip edge to divert moisture away from building face. End dam side panels to be continuous welded to sill pan and full height of sill pan.
- I. Hinged Units: Where indicated on Drawings, provide secondary frame to which louver frame is attached; non-ferrous hinges; all finishes to match colors selected by Architect.

### 2.3 MATERIALS

- A. Extruded Aluminum: ASTM B221; 6063 alloy, T5 temper typical or 6061 alloy, T6 temper for extruded structural members.
- B. Sheet Aluminum: ASTM B209/B209M, 5005 alloy, H15 or H34 temper, wall thickness as required for system application and use but not less than 0.050 inch.

### 2.4 ACCESSORIES

- A. Screens: Mechanically fasten to interior side of louver.
1. Bird Screen: Interwoven wire mesh of aluminum, 0.063 inch diameter wire, 1/2 inch open weave, square design, set in aluminum frame.
  2. Insect Screen: 18 x 16 size aluminum mesh, set in aluminum frame.
- B. Blank-Off Panels: Furnish where indicated on the Drawings; fabricated by the louver manufacturer; metal type to be same as louver and frame metal type; metal finish type to be same as louver finish type.
1. Panel Type:
    - a. Composite Metal Sheet Panel: Blank-off panels to be composite construction faced on both sides with 0.032 inch (0.81 mm) thick metal sheet and core to be expanded polystyrene (EPS) having R-value of 4, minimum. Panel perimeter frame to be 0.050 inch (1.27mm) thick-formed metal channels; mitered at the corners.

- 1) Composite Panel Thickness:
    - a) 2 inches.
  2. Secure blank-off panels to interior side of louver and fully sealed weathertight.
  3. Blank-Off Panels Finish: In accordance with AAMA 2605, 70 percent resin fluoropolymer coating, minimum 1.4 mil (0.035mm) thick; color to be flat black.
- C. Fasteners and Anchors: Concealed; stainless steel type.
- D. Flashings: Sheet aluminum; finish to match louver finish.
- E. Sealants: Silicone type specified in Section 07 90 00.

## 2.5 FACTORY FINISHING

- A. Powder Coat: Polyvinylidene fluoride (PVDF) powder coat system complying with AAMA 2605, minimum 70 percent PVDF resin with minimum total dry film thickness (DFT) of 1.5 mils, 0.0015 inch (0.038 mm).
- B. Colors and Gloss: As selected by Architect from manufacturer's full range.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify prepared openings and flashings are ready to receive Work and opening dimensions are as indicated on shop drawings.

### 3.2 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Provide continuous corrosion protection between dissimilar materials.
- C. Louver systems, including sill flashings, to be installed in accordance with Drawings the manufacturer's recommendations and to shed water to exterior of building envelope.
- D. Install flashings and align louver assembly to ensure moisture shed from flashings and diversion of moisture to exterior of building envelope.
- E. Sill pan to be embedded in full bed of sealant. Design system such that penetrations in flashings and sill pan are only for the purpose of structural anchoring of louver system.
- F. Fully seal anchor holes and heads to prevent water penetration.
- G. Install louvers level and plumb.
- H. Secure louvers in opening framing with concealed fasteners.
- I. Install bird and insect screen and frame to interior of louver.
- J. Install perimeter sealant and backing rod in accordance with Section 07 90 00.

### 3.3 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. In accordance with manufacturer's recommendations, strip protective finish coverings and clean surfaces and components.

**END OF SECTION**

**SECTION 09 21 16**  
**GYPSUM BOARD ASSEMBLIES**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
1. Interior Gypsum Board.
  2. Exterior Gypsum Board.
  3. Framing.
  4. Suspension Support.
  5. Acoustic Attenuation.
  6. Accessories.
- B. Related Requirements:
1. Section 01 33 00 – Submittal Procedures: Delegated-Design Services.
  2. Section 01 40 00 - Quality Requirements: Mockup requirements indicated in Schedule of Mockups at end of Section 01 40 00.
  3. Section 05 40 00 - Cold-Formed Metal Framing.
  4. Section 06 10 53 - Miscellaneous Rough Carpentry: Wood blocking for support of wall cabinets, toilet accessories and other wall mounted Work.
  5. Section 07 21 00 - Thermal Insulation: Insulation for gypsum board assemblies requiring thermal insulation.
  6. Section 07 90 00 - Joint Protection.
  7. Section 09 30 00 - Tiling: For Tile Backer Board that is to be installed on framing that is provided in this Section.

**1.2 REFERENCES**

- A. ASTM International (ASTM):
1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
  2. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members; 2015.
  3. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
  4. ASTM C303 - Standard Test Method for Dimensions and Density of Preformed Block and Board-Type Thermal Insulation; 2021.
  5. ASTM C473 - Standard Test Methods for Physical Testing of Gypsum Panel Products; 2019.
  6. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2017; Reapproval 2022.
  7. ASTM C635/C635M - Standard Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2022.
  8. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2018.
  9. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2023.
  10. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2020.
  11. ASTM C834 - Standard Specification for Latex Sealants; 2017, Reapproval 2023.

12. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2023.
  13. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications; 2022.
  14. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2022.
  15. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2022.
  16. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base; 2019.
  17. ASTM C1104/C1104M - Standard Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation; 2019.
  18. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2017.
  19. ASTM C1280 - Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing; 2018, Reapproval 2023.
  20. ASTM C1338 - Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings; 2019, Reapproval 2022.
  21. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.
  22. ASTM C1629/C1629M - Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels; 2023.
  23. ASTM C1658/C1658M - Standard Specification for Glass Mat Gypsum Panels; 2019, Editorial Changes 2020.
  24. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2021.
  25. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
  26. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009, Reapproval 2023.
  27. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C; 2024.
  28. ASTM E970 - Standard Test Method for Critical Radiant Flux of Exposed Attic Floor Insulation Using a Radiant Heat Energy Source; 2017, Editorial Changes 2022.
  29. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, Editorial Changes 2021.
- B. California Department of Public Health (CDPH):
1. CDPH Standard Method VOC V1.2 - Standard Method For The Testing And Evaluation Of Volatile Organic Chemical Emissions From Indoor Sources Using Environmental Chambers - Version 1.2; 2017.
- C. Gypsum Association (GA):
1. GA-216 - Application and Finishing of Gypsum Panel Products; 2021.
  2. GA-600 - Fire Resistance and Sound Control Design Manual; 2021.
- D. International Organization for Standardization (ISO):
1. ISO 11600 - Building Construction - Jointing Products - Classification and Requirements For Sealants; 2002, Amendments 2011.
- E. Intertek Testing Services (ITS):
1. ITS (DIR) - Directory of Listed Products; Current Edition.
- F. Underwriters Laboratories Inc. (UL):
1. UL (FRD) - Fire Resistance Directory; Current Edition.



### 1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on metal framing; gypsum board and sheathing; joint treatment materials; and acoustic accessories.
- C. Shop Drawings: Indicate special details associated with fireproofing and acoustic accessories.
  - 1. Show type, weight, location, and spacing of members. Clearly identify attachments and connections using AWS symbols for welds, standard designations for fasteners. Show bracing, supplemental strapping, clips, and other accessories required.
  - 2. Delegated Engineering Design: Shop drawings shall be sealed by a licensed Professional Structural Engineer registered in the State in which the project is located and shall include structural calculations verifying compliance with the performance data specified and as noted on the Building Code Data Sheet and Structural requirements on the Drawings. Design is to comply with the provisions of the State Building Code, for the State in which the Work is constructed.
    - a. Provide sealed calculations indicating that design of suspension systems provide compliance with seismic structural requirements indicated in the Performance and Design Requirements article in this Section.
    - b. Verify and coordinate stud depth with the partition schedule on the Drawings. Indicate component details, framed openings, bearing, anchorage, loading, welds, seismic design components, type and location of fasteners, accessories, and items required for the Work.
    - c. Show type, weight, location, and spacing of members. Clearly identify attachments and connections using AWS symbols for welds, standard designations for fasteners. Show bracing, supplemental strapping, clips, and other accessories required.
- D. Samples:
  - 1. Submit two sets of each item indicated in ACCESSORIES article in this Section, illustrating manufacturer's full range of options. Submit for selection by Architect.

### 1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three (3) years documented experience.
- B. Installer: Company specializing in performing Work of this section with minimum three (3) years documented experience.
- C. Delegated Engineering Design: Design all metal stud and cold rolled steel framing using the engineering services of a Professional Structural Engineer experienced in design of this Work and licensed to perform professional engineering services in the State in which the project is located.

## PART 2 PRODUCTS

### 2.1 PERFORMANCE AND DESIGN REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: Provide completed assemblies complying with applicable code.
- B. Fire Rated Wall Construction: Wall assembly fire rating to be as indicated on Drawings and as required by building code.
- C. Seismic Design is to comply with requirements for the Seismic Design Category as indicated on the Structural Drawings and Section 00 31 00 - Available Project Information.

- D. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.

## 2.2 MANUFACTURERS

- A. Manufacturers:
1. CertainTeed Corporation (CTC).
  2. Georgia-Pacific Gypsum Corporation (GPG).
  3. National Gypsum Company (NGC).
  4. USG Corporation (USG).
  5. Substitutions: Section 01 60 00 - Product Requirements.

## 2.3 INTERIOR GYPSUM BOARD MATERIAL

- A. Mold Resistant Gypsum Board: ASTM C1396/C1396M; paper faced; maximum available length in place; ends square cut; tapered edges; suitable for finish and paint.
1. 5/8 inch, Type X fire resistant complying with requirements of ASTM C1396/C1396M.
  2. Combustibility: Noncombustible complying with ASTM E136.
  3. Surface Burning Characteristics: When tested in accordance with ASTM E84.
    - a. Flame Spread: 15, maximum.
    - b. Smoke Development: 5, maximum.
    - c. Class: Class A.
  4. Water Absorption: 5 percent maximum by weight after two-hour immersion when tested in accordance with ASTM C473.
  5. Mold Growth Resistance: Score of 10 minimum, in accordance with ASTM D3273 for mold growth on interior coatings surface.
  6. Finish Level: Refer to Finish Levels Schedule at end of this Section.
  7. Basis of Design:
    - a. NGC - Gold Bond XP Fire-Shield X.
  8. Locations: All interior gypsum surfaces in the following areas unless indicated otherwise on Drawings.
    - a. All interior gypsum surfaces where no other gypsum board type is indicated.
- B. Abuse and Mold Resistant Gypsum Board: ASTM C1396/C1396M; paper faced; maximum available length in place; ends square cut; tapered edges; suitable for finish and paint.
1. 5/8 inch, Type X fire resistant complying with requirements of ASTM C1396/C1396M.
  2. Combustibility: Noncombustible complying with ASTM E136.
  3. Surface Burning Characteristics: When tested in accordance with ASTM E84.
    - a. Flame Spread: 15, maximum.
    - b. Smoke Development: 5, maximum.
    - c. Class: Class A.
  4. Water Absorption: 5 percent maximum by weight after two-hour immersion when tested per ASTM C473.
  5. Mold Resistance: Score of 10 minimum, in accordance with ASTM D3273 for mold growth on interior coatings surface.
  6. Finish Level: Refer to Finish Levels Schedule at end of this Section.
  7. Basis of Design:
    - a. NGC - Gold Bond XP Hi-Abuse.
      - 1) Surface Abrasion: Level 3 minimum, per ASTM C1629/C1629M.
      - 2) Indentation: Level 1 minimum, per ASTM C1629/C1629M.
      - 3) Soft Body Impact: Level 2 minimum, per ASTM C1629/C1629M.
      - 4) Hard Body Impact: Level 1 minimum, per ASTM C1629/C1629M.
  8. Locations: All interior gypsum surfaces in the following areas unless indicated otherwise on Drawings.

- a. All classrooms and rooms of instruction and teaching; minimum height from finish floor to 8 feet above finish floor unless otherwise indicated on Drawings.
- b. Media Center and Learning Commons Areas; minimum height from finish floor to 8 feet above finish floor unless otherwise indicated on Drawings.
- c. All circulation areas, corridors, and passageways; minimum height from finish floor to 8 feet above finish floor unless otherwise indicated on Drawings.
- d. Toilet Areas WITHOUT contiguous shower stalls.
- e. Kitchen Food Preparation Areas.
- f. Kitchen Food Storage Areas.
- g. Food Serving Areas.
- h. Dish Washing Area.
- i. Janitor And Custodian Closets.

## 2.4 EXTERIOR GYPSUM BOARD MATERIAL

- A. Exterior Soffit Gypsum Board: ASTM C1396/C1396M; maximum available length in place; tapered edges; suitable for finish and paint.
  1. 5/8 inch, Type X fire resistant complying with requirements of ASTM C1396/C1396M.
  2. Combustibility: Noncombustible complying with ASTM E136.
  3. Surface Burning Characteristics: When tested in accordance with ASTM E84.
    - a. Flame Spread: 20, maximum.
    - b. Smoke Development: Zero.
    - c. Class: Class A.
  4. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL (FRD) or ITS (DIR) listed.
  5. Comply with ASTM C1396/C1396M for water resistant and exterior gypsum soffit board.
  6. Finish Level: Refer to Finish Levels Schedule at end of this Section.
  7. Basis of Design:
    - a. USG - Sheetrock Mold Tough Firecode X.
  8. Locations: Exterior soffits and ceiling in protected areas unless indicated otherwise on Drawings. Protected areas are surfaces protected from excessive, repetitive or continuous moisture.
- B. Exterior Fiberglass Faced Sheathing Gypsum Board: ASTM C1177/C1177; glass mat faced gypsum substrate; maximum available length in place; tapered edges.
  1. 5/8 inch, Type X fire resistant complying with requirements of ASTM C1177/C1177M.
  2. Combustibility: Noncombustible complying with ASTM E136.
  3. Surface Burning Characteristics: When tested in accordance with ASTM E84.
    - a. Flame Spread: Zero.
    - b. Smoke Development: Zero.
    - c. Class: Class A.
  4. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly. If no tested assembly is indicated, use Type X board, UL (FRD) or ITS (DIR) listed.
  5. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
  6. Fungal Resistance: No fungal growth when tested in accordance with ASTM G21.
  7. Basis of Design:
    - a. NGC - Gold Bond eXP Sheathing Fire-Shield.
  8. Locations: Exterior sheathing unless indicated otherwise on Drawings.

## 2.5 FRAMING MATERIAL

- A. Thicknesses provided here are minimum and subject to increase by Delegated Engineer's design requirements.
  - 1. Studs: ASTM C645; galvanized sheet steel.
    - a. 0.0312 inch thick, C shape.
  - 2. Runners and Tracks: ASTM C645; galvanized sheet steel.
    - a. 0.0312 inch thick, C shape.
  - 3. Furring, Framing, and Accessories: ASTM C645; galvanized sheet steel.
    - a. 0.0312 inch thick, C shape.
  - 4. Shaft Wall Studs and Accessories: ASTM C645; galvanized sheet steel.
    - a. 0.0312 inch thick, C shape.
- B. Galvanizing: Comply with ASTM A653/A653M zinc-coated hot dipped galvanized steel.
  - 1. Interior Framing: G40.
  - 2. Exterior Framing: G60.
- C. Framed Partition Head To Structure Connections: Provide one of the following types and coordinate to provide fire rated constructed assemblies as indicated on Drawings.
  - 1. Single Long-Leg Runner System: ASTM C645 top runner with 2-inch- deep flanges in thickness not less than indicated for studs, installed with studs friction fitted into top runner and with continuous bridging located within 12 inches of the top of studs to provide lateral bracing.
  - 2. Double-Runner System: ASTM C645 top runners, inside runner with 2-inch-deep flanges in thickness not less than indicated for studs and fastened to studs, and outer runner sized to friction fit inside runner.
  - 3. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
- D. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding strength, and other properties required to fasten steel members to substrates. Use screws with low profile head where board, or other overlay sheathing, is to be applied.
- E. Anchorage to Substrate: Provide tie wire, fasteners, screws, metal supports, and other anchorage devices, of type and size to suit application, and to secure materials to building structural elements.

## 2.6 SUSPENSION SUPPORT MATERIAL

- A. Suspension Systems: ASTM C635/C635M heavy-duty main beam classification; ASTM A653/A653M zinc-coated hot dipped galvanized steel; ASTM C645 Standard specification for rigid furring channels for screw application of gypsum board.
- B. Accessories: Stabilizer bars, clips, splices, and perimeter moldings required for suspended grid system.
- C. Support Channels and Hangers: Primed steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.

## 2.7 ACOUSTIC ATTENUATION MATERIAL

- A. Acoustic Attenuation Insulation: Install at interior walls and ceilings as indicated on Drawings.
  - 1. Mineral Wool Batt Insulation: Flexible or semi-rigid preformed batt or blanket, complying with ASTM C665; friction fit.
    - a. Unfaced Type: ASTM C665 Type-I (unfaced).
    - b. Combustibility: Noncombustible complying with ASTM E136.

- c. Surface Burning Characteristics: When tested in accordance with ASTM E84.
    - 1) Flame Spread: 25, maximum.
    - 2) Smoke Development: 50, maximum.
  - d. Fungi Resistance: Passes when tested in accordance with ASTM C1338.
  - e. Nominal Density: Minimum 2.5 pcf when tested in accordance with ASTM C303.
  - f. Corrosivity to Steel: Passes when tested in accordance with ASTM C665.
  - g. Blanket Width: Sized to fully friction fit space between framing members.
  - h. Blanket Thickness: Sized to fully friction fit cavity, but not less than 3-1/2 inches.
  - i. Manufacturers:
    - 1) Johns Manville.
    - 2) Knauf Insulation.
    - 3) Owens Corning.
    - 4) Rockwool.
- B. Acoustic Sealant: For exposed and concealed joints and annular spaces around through-penetrations. Type to be non-sag, paintable, non-staining latex sealant complying with ASTM C834, ASTM C919 and as follows:
- 1. Sealant to reduce airborne sound transmission through head-of-wall and bottom-of-wall joints and openings to accommodate through-penetrations in building construction as demonstrated by testing representative assemblies in accordance with ASTM E90.
  - 2. Sound Transmission Class: Sealant to maintain STC ratings at sound rated partitions as indicated on the drawings.
  - 3. Surface Burning Characteristics: When tested in accordance with ASTM E84.
    - a. Flame Spread: 10, maximum.
    - b. Smoke Development: 10, maximum.
  - 4. Mold and Mildew Resistance: Rating of zero (0), “no growth”, in accordance with ASTM G21.
  - 5. Movement Capability: 10 percent minimum, in accordance with ISO 11600.
  - 6. Sealant materials and methods shall conform to applicable governing codes and authorities having jurisdiction.
  - 7. Maximum volatile organic compound content to be in accordance with CDPH Standard Method VOC V1.2.
  - 8. Basis of Design: As indicated on Drawings.
- C. Acoustic Sprays: For exposed and concealed locations; sprayable latex material complying with ASTM C919 and the following:
- 1. Spray to reduce airborne sound transmission through head-of-wall joints in building construction as demonstrated by testing representative assemblies in accordance with ASTM E90.
  - 2. Sound Transmission Class: Spray to maintain STC ratings at sound rated partitions as indicated on the drawings.
  - 3. Surface Burning Characteristics: When tested in accordance with ASTM E84.
    - a. Flame Spread: 10, maximum.
    - b. Smoke Development: 10, maximum.
  - 4. Mold and Mildew Resistance: Rating of zero (0), “no growth”, in accordance with ASTM G21.
  - 5. Movement Capability: 10 percent minimum, in accordance with ISO 11600.
  - 6. Spray materials and methods shall conform to applicable governing codes and authorities having jurisdiction.
  - 7. Maximum volatile organic compound content to be in accordance with CDPH Standard Method VOC V1.2.
  - 8. Basis of Design: As indicated on Drawings.

## 2.8 ACCESSORIES

- A. Finishing Trim: To be metal conforming to ASTM A653/A653M, ASTM A1003/A1003M, ASTM C1047, unless otherwise indicated. Includes trims such as corner beads, edge trim, control joints and expansion joints.
  - 1. Types: As detailed or required for finished appearance.
    - a. Continuous finishing bead profile required for termination and protection of gypsum board finish compound edge.
    - b. J-trim, without bead, is not permitted at gypsum board termination edge unless indicated on Drawings.
  - 2. Special Shapes: In addition to conventional corner bead and control joints, provide U-bead at exposed panel edges.
- B. Rigid Vinyl: Vinyl trim permitted only as follows, or where noted as vinyl on Drawings.
  - 1. Gypsum Board Termination at Dissimilar Surface: L-trim with tear-away strip.
    - a. Manufacturers:
      - 1) Trim-Tex - Tear Away L-Bead.
      - 2) Phillips Manufacturing Company - GripStik L-Tear.
      - 3) MarinoWare - L-Tear Strip
- C. Extruded Aluminum:
  - 1. Clear finished for Exposed Gypsum Board Edge Trim Bead:
    - a. L-trim molding with finish bead.
    - b. Basis of Design: Fry Reglet - "L" Trim Molding.
- D. Expansion Joints:
  - 1. Type: Accordion profile with factory-installed protective tape.
- E. Control Joints:
  - 1. Type: V-shaped metal with factory-installed protective tape.
- F. Joint Materials: ASTM C475/C475M; reinforcing tape, joint compound, and water.
  - 1. Joint Tape:
    - a. Fiberglass Tape: 2 inch (50 mm) wide, open-weave coated glass fiber tape for joints and corners, except as otherwise indicated.
  - 2. Joint Compound:
    - a. Drying-Type: Vinyl-based, ready-mixed.
- G. Screws for Fastening Board Materials to Steel Framing Members:
  - 1. Gypsum Board: Use S-Type screws complying with the following.
    - a. Metal thickness from 0.033 to 0.112 inch: ASTM C954; steel drill screws, corrosion resistant.
    - b. Metal thickness less than 0.033 inch: ASTM C1002; self-piercing tapping screws, corrosion resistant.
- H. Exterior Soffit Vents: One piece, perforated, ASTM B221 6063 T5 alloy aluminum, with edge suitable for direct application to gypsum board and manufactured especially for soffit application. Provide continuous vent unless otherwise indicated on Drawings.
  - 1. Finish and color to be selected by Architect for manufacturer's full range.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.



- B. Verify site conditions are ready to receive work and opening dimensions are as indicated on shop drawings.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.

### 3.3 INSTALLATION - GENERAL

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Installation requirements in this Section are minimum requirements and are subject to more stringent requirements as may be indicated in the design by the Delegated Engineering Design.
- C. SUPPORT AND ANCHOR FRAMING SYSTEMS TO FLOOR SYSTEM BELOW AND BUILDING STRUCTURAL MEMBERS ABOVE. DO NOT SUSPEND, SUPPORT, OR ANCHOR FRAMING SYSTEMS TO NON-STRUCTURAL BUILDING ELEMENTS ABOVE SUCH AS ROOF DECKING AND FLOOR DECKING. DO NOT ALLOW ANCHORS OR SUPPORTS TO TOUCH OR DAMAGE EMBEDDED, CONCEALED OR VISIBLE WORK SUCH AS HVAC, ELECTRICAL, AND PLUMBING COMPONENTS.
- D. Environmental Limitations: Install gypsum board, joint treatment materials, finish materials, and adhesives in accordance with ASTM C840 requirements and gypsum board manufacturer's written recommendations.
- E. Do not install panels that are wet, moisture damaged, or mold damaged.
  - 1. Indications that panels are wet, or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

### 3.4 METAL FRAMING INSTALLATION

- A. Install metal framing in accordance with GA-216, GA-600, ASTM C754, and manufacturer's recommendations.
- B. Wall Framing:
  - 1. Metal stud spacing to be 16 inches on center, minimum.
  - 2. Refer to Drawings for indication of partitions extending stud framing through ceiling to structure above. Maintain clearance under structural building members to avoid deflection transfer to studs. Provide extended leg ceiling runners.
  - 3. Door Opening Framing: Reinforce openings as required to withstand the forces imposed by the weight and operation of specified doors or operable panels, using not less than double studs at jambs and increased reinforcing as needed.
  - 4. Blocking: Screw wood blocking to studs. Install blocking as required for support of wall mounted construction, devices, and equipment similar to, but not limited to, the following:
    - a. Toilet partitions and accessories; cabinet units; visual display surfaces; televisions and monitors; handrails; fixtures.
- C. Wall Furring:
  - 1. Erect wall furring for direct attachment to concrete masonry walls.

2. Erect furring channels vertically; space maximum 24 inches o.c., not more than 4 inches from abutting walls. Secure in place on alternate channel flanges at maximum 24 inches on center.
  3. Erect metal stud framing spaced 1/2 inches from concrete masonry walls, attached by adjustable furring brackets.
  4. Wall Furring for Fire Ratings: Install furring as required for fire resistance ratings indicated and to GA-600 requirements.
- D. Ceiling Framing:
1. Coordinate location of hangers with other work.
  2. Install ceiling framing independent of walls, columns, and above ceiling work.
  3. Reinforce openings in ceiling suspension system which interrupt main carrying channels or furring channels, with lateral channel bracing. Extend bracing minimum 24 inches past each end of openings.
  4. Laterally brace entire suspension system.

### 3.5 ACOUSTIC ACCESSORIES INSTALLATION

- A. Install acoustic accessories in accordance with GA-600 as related to sound control.
- B. Acoustic Attenuation Insulation: Friction fit insulation within framing cavity in partitions tight within spaces, around cut openings, behind and around electrical and mechanical items within or behind partitions, and tight to items passing through partitions. Thickness to be as required to fill cavity.
- C. Acoustic Sealant and Spray:
1. General: Comply with Drawings and acoustic sealant and spray manufacturer's written installation instructions for products and applications indicated.
  2. Standards: Comply with recommendations of ASTM C919 for use of joint sealants in acoustical applications as applicable to materials, applications and conditions indicated.
  3. Install acoustic sealant backings of type indicated to support sealant and spray during application in accordance with manufacturer's written installation instructions.
  4. Install acoustic sealant and spray free of air pockets, embedded foreign matter, sags and ridges.
  5. Tooling of Non-sag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
    - a. Remove excess acoustic sealant from surfaces adjacent to joint.
    - b. Remove excess acoustic spray from surfaces adjacent to joint as indicated on the drawings.
    - c. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
    - d. Provide concave joint configuration unless otherwise indicated.

### 3.6 GYPSUM BOARD INSTALLATION

- A. Install gypsum board in accordance with ASTM C840, and GA-216.
- B. Gypsum Board:
1. Use screws when fastening gypsum board to metal furring or framing.
  2. Erect single layer gypsum board in most economical direction, with ends and edges occurring over firm bearing. Exception as follows:
    - a. Erect single layer fire rated gypsum board vertically, with edges and ends occurring over firm bearing.



3. Erect exterior gypsum sheathing in accordance with ASTM C1280, horizontally, with edges butted and ends occurring over firm bearing.
4. Double Layer Applications: Secure second layer to first with fasteners. Place second layer parallel to first layer. Offset joints of second layer from joints of first layer.
5. Treat cut edges and holes in moisture resistant gypsum board and exterior gypsum soffit board with sealant.
6. Control Joints: Construct control joint in accordance with the drawings, GA-216, and as follows:
  - a. Place control joints consistent with lines of building space and features. When not indicated in the drawings, install control joints per GA-216 and as follows:
    - 1) Not more than 30 feet apart on walls over 50 feet long.
    - 2) At ceilings, not more than 30 feet apart in both directions.
    - 3) At interior and exterior gypsum and stucco soffits and bulkheads, at all inside corners of vertical surfaces not more than 30 feet apart on vertical and horizontal surfaces. Control joints installed on vertical surfaces shall continue, in alignment/direction and through corner finish, onto contiguous horizontal surface of like material (like treatment from horizontal surfaces to contiguous vertical surfaces).
    - 4) At interior and exterior soffits and bulkheads, not more than 30 feet apart on vertical and horizontal surfaces. Control joints installed on vertical surfaces shall continue, in alignment/direction and through corner finish, onto contiguous horizontal surface of like material (like treatment from horizontal surfaces to contiguous vertical surfaces).
7. Place corner beads at external corners. Use longest practical length.
8. Edge Trim: Install LC Bead edge trim at locations where gypsum board abuts dissimilar materials. Allow appropriate space for application of appropriate sealant to seal and bridge between the gypsum finished edge trim and the dissimilar material.
9. Exterior Soffit Vents: Install according to manufacturer's written instructions and in locations shown on the drawings. Provide vent area indicated.

### 3.7 JOINT TREATMENT AND FINISH

- A. Finish gypsum board materials in accordance with ASTM C840 and to Finish Level as indicated in Schedule at end of this Section.
- B. Fiberglass Joint Tape: Embed and finish with setting-type joint compound in the following locations and as otherwise recommended by board manufacturer for application conditions.
  1. Exterior Locations: All exterior locations.
  2. Interior Locations: Tile backer board locations.
  3. All Glass Mat Faced Board Locations: Interior and exterior.
- C. Paper Joint Tape: Embed with drying-type joint compound and finish with drying-type joint compound in the following locations.
  1. Exterior Locations: No paper joint tape to be used.
  2. Interior Locations: To be used at locations where fiberglass joint tape is not indicated.
- D. Tape, fill and sand joints, edges and corners, ready to receive finishes.
- E. Glass Mat Faced Gypsum Board Surfaces:
  1. Use fiberglass joint tape, embed and finish with setting type joint compound.
  2. Provide full surface skim coat finishing as required to conceal and prevent telegraphing of glass mat texture, resulting in a smooth surface finish.

**3.8 SHAFT WALL INSTALLATION**

- A. Install in accordance with manufacturer's installation instructions, GA-216, GA-600, and ASTM C754.
- B. Fasten runners to structure with short leg to finished side, using appropriate power-driven fasteners at not more than 24 inches on center.
- C. Install studs at spacing required to meet performance requirements.
- D. Shaft Wall Liner: Cut panels to accurate dimension 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.

**3.9 ERECTION TOLERANCES**

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation of Finished Gypsum Board Surface from Flat Surface: 1/8 inch in 10 feet in any direction.

**3.10 SCHEDULES**

- A. Finish Levels Schedule: Gypsum finish levels to be in accordance with ASTM C840:
  - 1. Level 1: Surfaces above finished ceilings and concealed from view.
  - 2. Level 5: All surfaces exposed to view (includes GWB that is painted or covered with adhered wall covering sheet materials).

**END OF SECTION**

**SECTION 09 30 00****TILING****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Floor Tile and setting applications.
  - 2. Wall Tile and setting applications.
  - 3. Trim and accessories.
  - 4. Tile Backer Board.
  - 5. Accessories.
- B. Related Requirements:
  - 1. Section 03 30 00 - Cast-In-Place Concrete: Substrate for floor tile.
  - 2. Section 04 20 00 - Unit Masonry: Substrate for wall tile.
  - 3. Section 09 21 16 - Gypsum Board Assemblies: Framing and support construction for installation of tiling backer board specified in this Section.

**1.2 REFERENCE STANDARDS**

- A. American National Standards Institute (ANSI):
  - 1. ANSI A108/A118/A136 - Installation of Ceramic Tile; 2021:
    - a. Includes ANSI A108.01, .02, .1A, .1B, .1C, .4, .5, .6, .8, .9, .10, .11, .12, .13, .14, .15, .16, .17, .18, and 21 - defines the installation of ceramic tile.
      - 1) ANSI A108.1A - Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar.
      - 2) ANSI A108.1B - Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar.
      - 3) ANSI A108.11 - Interior Installation of Cementitious Backer Units.
      - 4) ANSI A108.13 - Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone.
      - 5) ANSI A108.17 - Installation of Crack Isolation Membranes for Thin-Set Ceramic Tile and Dimension Stone.
    - b. Includes ANSI A118.1, .3, .4, .5, .6, .7, .8, .9, .10, .11, .12, .13, .15, .16, and ANSI A136 - defines the test methods and physical properties for ceramic tile installation materials.
      - 1) ANSI A118.1 - Dry-Set Cement Mortar.
      - 2) ANSI A118.3 - Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive.
      - 3) ANSI A118.4 - Modified Dry-Set Cement Mortar
      - 4) ANSI A118.5 - Chemical Resistant Furan Mortars and Grouts for Tile Installation.
      - 5) ANSI A118.6 - Standard Cement Grouts for Tile Installation.
      - 6) ANSI A118.7 - High Performance Cement Grouts for Tile Installation.
      - 7) ANSI A118.8 - Modified Epoxy Emulsion Mortar/ Grout.
      - 8) ANSI A118.9 - Test Methods and Specifications for Cementitious Backer Units.
      - 9) ANSI A118.10 - Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation.

- 10) ANSI A118.11 - EGP (Exterior Glue Plywood) Modified Dry-Set Mortar.
  - 11) ANSI A118.12 - Crack Isolation Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation.
  - 12) ANSI A118.15 - Improved Modified Dry-Set Cement Mortar.
  - 13) ANSI A136.1 - Organic Adhesives for installation of Ceramic Tile.
  2. ANSI A137.1 - Standard Specification for Ceramic Tile; 2022.
  3. ANSI A137.2 - Standard Specifications for Glass Tile; 2022.
- B. ASTM International (ASTM):
1. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2022.
  2. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete; 2020.
  3. ASTM C373 - Standard Test Methods for Determination of Water Absorption and Associated Properties by Vacuum Method for Pressed Ceramic Tiles and Glass Tiles and Boil Method for Extruded Ceramic Tiles and Non-tile Fired Ceramic Whiteware Products; 2018, Reapproval 2023.
  4. ASTM C650 - Standard Test Method for Resistance of Ceramic Tile to Chemical Substances; 2020.
  5. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2022.
  6. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2022.
  7. ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel; 2018.
  8. ASTM C1278/C1278M - Standard Specification for Fiber-Reinforced Gypsum Panel; 2017.
  9. ASTM C1325 - Standard Specification for Fiber-Mat Reinforced Cementitious Backer Units; 2022.
  10. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.
  11. ASTM D2394 - Standard Test Methods for Simulated Service Testing of Wood and Wood-Based Finish Flooring; 2017, Reapproval 2022.
  12. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2021.
  13. ASTM D4397 - Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications; 2016.
  14. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023a.
  15. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2022, Editorial Changes 2023.
  16. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C; 2022.
  17. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, Editorial Changes 2021.
- C. Tile Council of North America (TCNA):
1. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation; 2023.

### 1.3 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this Section; require attendance by all affected installers.

#### 1.4 SUBMITTALS

- A. See Section 01 33 00 - Submittal Procedures, for submittal procedures.
- B. Product Data: Provide manufacturer's data sheets on tile, mortar, grout, and accessories. Include manufacturer's recommendations for using installation of system components including, but not limited to, tile, setting materials, accessories, trim, grouts, and adhesives.
- C. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, trim shapes and locations, junctions with dissimilar materials, control and expansion joints, termination edge conditions, accessories, areas receiving waterproofing membrane, and setting details.
- D. Samples for Initial Selections: Two manufacturer's complete set of color samples illustrating the full range of finishes, textures, and colors available for each product; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish, texture, and color; samples to be same product material type indicated for final Work; each sample 12 x 12 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Section 01 78 23 - Operation and Maintenance Data.
- B. Operation and Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods. Include recommended polishes, waxes and other restorative/protective products and methods.

#### 1.6 QUALITY ASSURANCE

- A. Perform work in accordance with ANSI A108/A118/A136 and TCNA (HB).
- B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this Section, with minimum ten (10) years of documented experience.
- C. Installer Qualifications: Company specializing in performing tile installation, with minimum of five (5) years of documented experience.
- D. Prior to grouting, prepare and protect the finish surfaces of tile work as needed to prevent staining of tile work during the grouting process and cleanup. Tile work that is stained by grout or other material is not acceptable tile work.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Protect adhesives and other temperature sensitive materials from freezing or overheating in accordance with manufacturer's instructions.

#### 1.8 ENVIRONMENTAL REQUIREMENTS

- A. Do not install solvent-based products in an unventilated environment.
- B. Maintain ambient and substrate temperature of 50 degrees F (10 degrees C) during installation of mortar materials.

**1.9 SPARE PARTS AND MAINTENANCE PRODUCTS**

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
1. Five percent (5%) full size units of each product type, size, color, shape, profile, and surface finish combination installed, but no less than the following:
    - a. Twenty (20) square feet of field tiles.
    - b. Five (5) units of each trim and accessory.
    - c. Sixteen (16) linear feet of each type and color non-ceramic trim.
    - d. Sixteen (16) linear feet of threshold.

**PART 2 PRODUCTS****2.1 TILE**

- A. Ceramic Wall Tile (TL): ANSI A137.1, Standard Grade.
1. Moisture Absorption: 7.0 to 20.0 percent, tested in accordance with ASTM C373.
  2. TL1
    - a. Basis of Design: Mosaic Tile Co, Cove Terra, 15TERAASH, 24x48 inches.
    - b. Alternate 1 - Mosaic Tile Color Blox
    - c. Alternate 2 – Daltile Soft Tile
  3. TL2
    - a. Basis of Design: Tilebar, Monet Wild Atelier Green, 24x48 inches
    - b. Alternate 1 – Specialty Tile, Kuano Tile, 12x12 inches.
    - c. Alternate 2 – Akdo Professional, Aplomb Leaf, 20x48 inches.
- B. Quarry Tile: ANSI A137.1, Standard Grade.
1. Moisture Absorption: 0.5 to 3.0 percent, tested in accordance with ASTM C373.
  2. Chemical Resistance: Resistant, tested in accordance with ASTM C650.
  3. Basis of Design:
    - a. Daltile - Quarry Textures.
  4. Colors:
    - a. To be selected by Architect from submitted samples.
  5. Grout Joints Size:
    - a. As recommended by manufacturer.
  6. Sizes:
    - a. As indicated on Drawings, but not less than 6 x 6 inches.
  7. Thickness: As indicated on Drawings, but not less than 1/2 inch.
  8. Edges:
    - a. Cushioned, unless indicated otherwise on Drawings.
  9. Surface Finishes:
    - a. Slip-resistant.
    - b. Raised abrasive grain.
  10. Patterns:
    - a. As indicated on Drawings.
  11. Tile Trim: Refer to TRIM AND ACCESSORIES article in this Section.

**2.2 TRIM AND ACCESSORIES**

- A. Wall Tile Trim Units:
1. Top Open Edges: Bullnosed open edge and provide single outcorner shape at top-to-side open edge transition.
  2. Side Open Edges: Bullnosed open edge and provide single outcorner shape at side-to-top open edge transition.

3. Inside Corners:
    - a. Miter.
    - b. Cove.
  4. Outside Open Corners: Bullnosed open edge and provide single outcorner shape at top.
  5. Same manufacturer and color as wall tile type.
  6. Coordinate tile size with size of wall tile type.
- B. Base Tile Trim Units - For Non-Porcelain Floor Tile and with no wall tile above:
1. Edge trim and other details to be as indicated on Drawings.
  2. Top Open Edges: Bullnosed open edge.
  3. Bottom:
    - a. Cove and edge to match floor tile edge type for flush transition.
    - b. Straight joint to floor.
  4. Inside Corners:
    - a. Miter.
    - b. Cove
  5. Outside Open Corners:
    - a. Bullnosed open edge and provide single outcorner shape to include smooth cove transition.
    - b. Bullnosed open edge and bottom to be straight joint to floor.
  6. Same manufacturer and color as floor tile type.
  7. Lengths and Joints:
    - a. Match lengths and joints with adjacent floor tile joints.
    - b. As indicated on Drawings.
  8. Heights:
    - a. Manufacturer's standard height, but not less than 4 inches.
    - b. As indicated on Drawings.
  9. Coordination: If plaster wall finish is scheduled for above tile base, form solid cement backing, same thickness as plaster, for tile base. The intent is to prevent the installed thickness of the plaster to overlap the top of the tile base.
- C. Base Tile Trim Units - With wall tile above:
1. Edge trim and other details to be as indicated on Drawings.
  2. Wall tile is to continue down to terminate at floor.
    - a. Bottom: Cove and edge to match floor tile edge type for flush transition.
      - 1) If wall tile is not available with bottom cove, wall tile is to terminate at floor tile with straight joint to floor.
- D. Base Tile Trim Units - For Quarry Floor Tile.:
1. Top Open Edges: Bullnosed open edge.
  2. Bottom:
    - a. Cove; edge to match floor tile edge type for flush transition.
  3. Inside Corners:
    - a. Cove
  4. Outside Open Corners:
    - a. Bullnosed open edge and provide single outcorner shape to include smooth cove transition.
  5. Same manufacturer and color as floor tile type.
  6. Lengths and Joints:
    - a. Match lengths and joints with adjacent floor tile joints.
  7. Height: 6 inches.
  8. Coordination: If plaster wall finish is scheduled for above tile base, form solid cement backing, same thickness as plaster, for tile base. The intent is to prevent the installed thickness of the plaster to overlap the top of the tile base.



- E. Non-Ceramic Trim Components:
1. Applications:
    - a. Porcelain Floor Tile Trim.
    - b. Porcelain Wall Tile Trim.
    - c. Ceramic Wall Tile Trim.
  2. Locations as follows unless indicated otherwise on Drawings.
    - a. Open edges of wall tile.
    - b. Open edges of floor tile.
    - c. Outside wall corners.
    - d. Transitions between floor finishes of different heights and dissimilar types.
    - e. Expansion and control joints.
    - f. Floor to wall joints.
    - g. Borders and other trim as indicated on Drawings.
  3. Basis of Design:
    - a. Schluter-Systems; [www.schluter.com](http://www.schluter.com).
  4. Trim Material Type:
    - a. Extruded Aluminum: Factory finished.
  5. Profile Design:
    - a. To be selected by Architect from manufacturer's full range of options.
  6. Lengths: Full lengths as manufactured.
  7. Finish and Colors:
    - a. To be selected by Architect from submitted samples.
  8. Setting Materials:
    - a. As recommended by Trim and Tile Manufacturers for applicable substrates.
- F. Floor Tile Thresholds:
1. Locations as follows, unless indicated otherwise on Drawings.
    - a. Doorways where tile terminates.
    - b. Open edges of floor tile where adjacent finish floor is dissimilar flooring material or is at different height.
  2. Marble, White Carrara color, honed finish; 2 inches wide by full width of wall or frame opening; both top edges beveled full length; without holes, cracks, or open seams.
    - a. Thickness as required such that the finish top of adjacent flooring and top of threshold are as indicated on Drawings.

## 2.3 SETTING MATERIALS

- A. Bond Coat Materials: As recommended by tile manufacturer and TCNA for substrate types and installation conditions.
1. Latex/Polymer Modified Portland Cement Mortar:
    - a. Complying with ANSI A118.4.
  2. Modified Dry-Set Mortar for Large and Heavy Tile (LHT) Mortar:
    - a. Application: Bond coat for large tiles with at least one side measuring 15 inches or greater.
    - b. Complying with ANSI A118.4H.
    - c. Approved by manufacturer for application thickness 3/32 inch to 1/2 inch.
    - d. Manufacturers:
      - 1) Laticrete International, Inc. - LHT Plus.
      - 2) Mapei Corporation - Ultraflex LHT.
      - 3) H.B. Fuller Corporation, Inc. - TEC PermaFlex 300 LHT Mortar.
- B. Mortar Bed Materials: Thick-set mortar bed setting method.
1. Pre-packaged or field-mixed; complying with ANSI A108.1A and ANSI A108.1B; includes portland cement, sand, latex additive, and water.



## 2.4 GROUT AND JOINT MATERIALS

- A. Manufacturers:
1. Ardex Engineered Cements: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
  2. Custom Building Products: [www.custombuildingproducts.com/#sle](http://www.custombuildingproducts.com/#sle).
  3. Laticrete International, Inc.: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
  4. MAPEI Corporation: [www.mapei.com](http://www.mapei.com).
  5. Merkrete, by Parex USA, Inc.: [www.merkrete.com/#sle](http://www.merkrete.com/#sle).
- B. High Performance Cement Grout: ANSI A118.7, polymer modified cement grout.
1. Applications:
    - a. Use this type of grout where indicated and where no other type of grout is indicated.
  2. Use sanded grout for joints 1/8 inch wide and larger; if joint design is indicated to be less than 1/8 inch wide, use unsanded grout.
  3. Color(s): To be selected by Architect from full range of colors
  4. Basis of Design: Laticrete PermaColor Grout.
- C. Epoxy Grout: ANSI A118.3, chemical resistant and water-cleanable epoxy grout.
1. Applications:
    - a. All Quarry Tile work.
  2. Use sanded grout for joints 1/8 inch wide and larger; if joint design is indicated to be less than 1/8 inch wide, use unsanded grout.
  3. Color(s): To be selected by Architect from full range of colors.
  4. Basis of Design: Laticrete SpectraLock Pro Premium.
- D. Tile Joint Sealant: Gunable, silicone, siliconized acrylic, or urethane sealant; moisture and mildew resistant type.
1. Applications: Control joints; tile surface change of plane; tile abutment joints to dissimilar materials such as, but not limited to, door frames, drains, gypsum wall board, concrete masonry units, and plumbing pipe penetrations.
  2. Color: Match grout color.
  3. Use sanded type for joints designed to be 1/8 inch or wider.
  4. Use unsanded type for joints designed to be less than 1/8 inch.
  5. Products: Same manufacturer as grout material or as per written recommendation from grout manufacturer.
- E. Grout Joint Sealer: Liquid-applied, moisture and stain protection for existing or new Portland cement grout.
1. Composition: Water-based colorless silicone.
  2. Products: Same manufacturer as grout material or as per written recommendation from grout manufacturer.

## 2.5 TILE BACKER BOARD MATERIAL

- A. Cement Backer Board: Non-gypsum-based; aggregated portland cement backer board with glass fiber mesh embedded in front and back surfaces complying with ANSI A118.9 or ASTM C1325 (Type A or B, depending on application as follows).
1. Application:
    - a. ASTM C1325 (Type A): Exterior applications.
    - b. ASTM C1325 (Type B): Interior applications and exterior soffit applications.
  2. Coordination: Coordinate material and installation with compatibility and requirements for tiling systems and manufacturer's recommendations.
  3. Combustibility: Noncombustible complying with ASTM E136.
  4. Surface Burning Characteristics: When tested in accordance with ASTM E84.
    - a. Flame Spread: Zero.

- b. Smoke Development: Zero.
  - c. Class: Class A.
5. Mold Resistance:
  - a. Score of 10, when tested in accordance with ASTM D3273.
  - b. Rating of zero for mold growth when tested in accordance with ASTM G21.
6. Compressive Strength: 1,250 psi minimum, when tested in accordance with ASTM D2394.
7. Thickness:
  - a. Interior Use: 5/8 inch.
  - b. Exterior Use: 5/8 inch.
8. Spacing of support framing members to be as recommended by board manufacturer, but no greater than 16 inches OC.
9. Screws for Fastening Board Materials to Steel Framing Members:
  - a. Non-corrosive type and in compliance with ANSI 108.11.
10. Joint Tape and Finish Compound: Comply with ANSI 108.11 and as recommended by backer board manufacturer for compatibility with subsequent applied materials.
  - a. Do not use paper tape or gypsum joint compound.
  - b. Joint tape to be coated glass fiber mesh type and as recommended by backer board manufacturer for application conditions.
11. Manufacturer:
  - a. USG - Durock Cement Board with EdgeGuard. (Basis of Design)
  - b. NGC - PermaBase Cement Board.
12. Locations: Framed construction indicated to receive tile finish.
  - a. Wet Areas: Includes tile areas at tubs, showers, floor sinks and where otherwise indicated on Drawings.
  - b. Other framed construction locations where the Drawings do not indicate backer board material type to be gypsum type.

## 2.6 ACCESSORY MATERIALS

- A. Waterproofing Membrane: Provide membrane system designed for bonding to cementitious substrate under thick mortar bed or thin-set tile; complying with ANSI A118.10 (waterproofing).
  1. Fluid or Trowel Applied Type:
    - a. Membrane Material: Synthetic rubber.
    - b. Thickness:
      - 1) 40 mils (1.00 mm), minimum, dry film thickness.
    - c. Products:
      - 1) Custom Building Products: RedGard Crack Prevention and Waterproofing Membrane: [www.custombuildingproducts.com](http://www.custombuildingproducts.com)
      - 2) Laticrete International, Inc.: Laticrete Hydro Ban: [www.laticrete.com](http://www.laticrete.com)
      - 3) Merkrete, by Parex USA, Inc.: Merkrete Hydro Guard 2000: [www.merkrete.com](http://www.merkrete.com)
      - 4) TEC, an H.B. Fuller Construction Products Brand; TEC HydraFlex Waterproofing Crack Isolation Membrane: [www.tecspecialty.com](http://www.tecspecialty.com)
  2. Crack Isolation Reinforcing Fabric: Fabric type as recommended by waterproofing membrane manufacturer.
  3. When both a Crack Isolation Membrane and a Waterproofing Membrane are indicated, both membranes are to be manufactured by same manufacturer and designed to be compatible with each other, the substrate, and the subsequent applied materials.

- B. Crack Isolation Membrane: Provide membrane system designed for bonding to cementitious substrate under thick mortar bed or thin-set tile; complying with ANSI A118.12 (crack isolation).
1. Fluid or Trowel Applied Type:
    - a. Membrane Material: Synthetic rubber.
    - b. Thickness:
      - 1) 40 mils (1.00 mm), minimum, dry film thickness.
    - c. Products:
      - 1) Custom Building Products: RedGard Crack Prevention and Waterproofing Membrane: [www.custombuildingproducts.com](http://www.custombuildingproducts.com)
      - 2) Laticrete International, Inc.: Laticrete Hydro Ban: [www.laticrete.com](http://www.laticrete.com)
      - 3) Merkrete, by Parex USA, Inc.: Merkrete Hydro Guard 2000: [www.merkrete.com](http://www.merkrete.com)
      - 4) TEC, an H.B. Fuller Construction Products Brand; TEC HydraFlex Waterproofing Crack Isolation Membrane: [www.tecspecialty.com](http://www.tecspecialty.com)
  2. Crack Isolation Reinforcing Fabric: Fabric type as recommended by crack isolation membrane manufacturer.
  3. When both a Crack Isolation Membrane and a Waterproofing Membrane are indicated, both membranes are to be manufactured by same manufacturer and designed to be compatible with each other, the substrate, and the subsequent applied materials.
- C. Cleavage Membrane: ANSI A108.02.
1. Polyethylene Sheeting: 4 mil (0.1 mm) thickness; complying with ASTM C171 or ASTM D4397.
    - a. Application: Under mortar bed of thick mortar bed tile installation method.
- D. Reinforcing Metal Fabric: ANSI A108.02.
1. Welded Wire Fabric: 2 x 2 inches (51 by 51 mm) size weave of 16/16 wire size; welded fabric; galvanized steel; complying with ASTM A1064/A1064M.
    - a. Application: Suspended in mortar bed of thick mortar bed tile installation method.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that substrates to be tiled are sound, smooth, and flat within the tolerances specified for that type of work and are ready to receive tiling.
- C. Verify that cracks in substrates to be tiled can be repaired, to include compatible crack isolation membrane, as required to prevent defects from occurring in the tiling work and finish. Remove and replace defective substrate materials.
- D. Verify that sufficient solid anchorage materials are installed for anchoring other work elements that are to be secured through tile.
- E. Verify that substrates to be tiled are dust-free and free of substances that could impair bonding of membrane and setting materials to substrate surfaces.
- F. Verify that substrate slopes to drains where floor drains are indicated in contract documents.
- G. For mortar bed method of tile installation, verify that sub-floor is recessed deep enough to accommodate mortar bed thickness variations to achieve slope to floor drains.

- H. Verify the locations of areas that are to receive specified waterproofing membrane prior to proceeding with thin-set method and mortar bed method of tile installations.
- I. Verify that concrete and CMU substrates are ready for tile installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within limits recommended by manufacturers of tile system components.
- J. Verify that required floor-and wall mounted utilities and devices are at correct location, alignment, and elevation.
- K. Verify that floor drains are aligned as indicated on Drawings. If alignment is not indicated on Drawings, aligned parallel with tile pattern joint lines.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Protect surrounding work from damage.
- D. Vacuum clean surfaces and damp clean.
- E. Seal substrate surface cracks with filler compatible with tiling system components. Level existing substrate surfaces to acceptable flatness tolerances.
- F. Prepare substrate surfaces for installation of waterproofing and crack isolation membrane in accordance with membrane manufacturer's instructions.
- G. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

### 3.3 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

### 3.4 INSTALLATION - GENERAL

- A. Install tile, transition and termination trim, accessories, setting materials, grout, joint sealants, and all tile work components in accordance with applicable requirements of ANSI A108/A118/A136, product manufacturer's instructions, TCNA (HB) recommendations, and the Drawings.
- B. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.
- C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor, base, and wall joints.
- D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size.
- E. Wall Corners: Form internal angles square and external angles bullnosed.
- F. Install non-ceramic trim in accordance with manufacturer's instructions.
- G. Install thresholds where indicated on Drawings and at floor tile open edges.

- H. Sound test tiles after setting. Replace hollow sounding tiles that are not fully bonded to substrate.
- I. Construct expansion, movement, control, contraction, perimeter, and soft joints in compliance with the applicable TCNA (HB) Methods prescribed for joint construction type indicated.
  - 1. Keep such joints free of mortar, grout, adhesive and debris that can interfere with application of final joint construction components.
- J. Prior to grouting, allow installation to completely cure; minimum of 48 hours.
- K. Prior to grouting, prepare and protect the finish surfaces of tile work as needed to prevent staining of tile work during the grouting process and cleanup. Tile work that is stained by grout or other material is not acceptable tile work.
- L. Grout tile joints unless otherwise indicated. Grout joints to be without voids, cracks, excess mortar or excess grout, or too little grout.
- M. Tile Sealant Application: Use tile joint sealant instead of grout at the following locations.
  - 1. Tile changes in plane and tile-to-tile control joints. Use either bond breaker tape or backer rod as appropriate to prevent sealant from bonding to tiled substrate.
  - 2. Tile abutment joints to dissimilar materials such as door frames, drains, GWB, CMU, and penetrations such as plumbing piping and countertop support brackets.
- N. Apply grout sealer in accordance with grout and tile manufacturers' instructions.

### **3.5 INSTALLATION - TILE BACKER BOARD**

- A. Install panels and finish joints and fastener locations according to ANSI A108.11 and backer board manufacturer's written instructions for type of application indicated.

### **3.6 INSTALLATION - CRACK ISOLATION MEMBRANE**

- A. Install components to comply with ANSI A108.17 (crack isolation), and manufacturer's written instructions.
- B. Existing Cracks: Comply with TCNA Method F125-Partial; bridging existing cracks and include use of crack isolation reinforcing fabric.
- C. Full Substrate Coverage: Comply with TCNA Method F125-Full; full substrate coverage.
  - 1. Include bridging existing cracks; TCNA Method F125-Partial.
  - 2. Membrane to be uniform thickness and bonded securely to substrate.
  - 3. Allow membrane to cure before installing tile or setting materials.

### **3.7 INSTALLATION - WATERPROOFING MEMBRANE**

- A. Install components to comply with ANSI A108.13 (waterproofing), and manufacturer's written instructions.
- B. Existing Cracks: Comply with TCNA Method F125-Partial for bridging existing cracks and include use of crack isolation reinforcing fabric.
- C. Full Substrate Coverage:
  - 1. Include bridging existing cracks; TCNA Method F125-Partial.
  - 2. Membrane to be waterproof, uniform thickness and bonded securely to substrate.
  - 3. Allow membrane to cure and verify waterproof condition by testing before installing tile or setting materials.
- D. Transition of waterproofing membrane from floor tile to wall:
  - 1. Extend continuous floor membrane up behind wall base tile.
  - 2. Extend continuous floor membrane up behind wall tile.

- a. Where Drawings indicate wall tile to be "without" waterproofing membrane, extend membrane up behind wall tile 4 inches from floor.
- E. Transition of waterproofing membrane from shower area to floor tile beyond where floor tile beyond is indicated to be "without" waterproofing membrane:
- 1. Extend continuous floor membrane beyond shower curtain line minimum 36 inches in front of shower and 24 inches left and right of shower opening, and up behind wall base tile contiguous to the extended membrane areas. Feather membrane edges at perimeters of extended membrane areas.

### 3.8 INSTALLATION - INTERIOR FLOORS: THIN-SET METHOD

- A. To be used at locations where concrete substrate IS NOT DEPRESSED.
- B. TCNA Method F122: On-ground concrete.
  - 1. Locations: Wet areas and as indicated here; otherwise use TCNA Method F113.
    - a. Showers (all tiling surfaces).
    - b. Wash Basins (all tiling surfaces).
    - c. Group Toilet Rooms (floor tiling and wall base tiling only).
    - d. Single Occupancy Toilet Rooms (floor tiling and wall base tiling only).
    - e. Locker and Dressing Rooms (floor tiling and wall base tiling only).
    - f. Dishwashing Areas (floor tiling and wall base tiling only).
    - g. Food Preparation Areas (floor tiling and wall base tiling only).
    - h. Mechanical Rooms (floor tiling and wall base tiling only).
    - i. Areas with similar surfaces subject to periods of running or standing water.
    - j. Other areas indicated on Drawings to receive waterproofing membrane.
  - 2. Waterproofing Membrane; ANSI A118.10.
  - 3. Crack Isolation Membrane; ANSI A118.12.
    - a. TCNA Method F125-Partial with crack isolation reinforcing fabric.
  - 4. Bonding Coat:
    - a. Latex/Polymer Modified Portland Cement Mortar; ANSI A118.4.
    - b. Modified Dry-Set Mortar for Large and Heavy Tile (LHT) Mortar; ANSI A118.4H.
  - 5. Grout:
    - a. High Performance Cement Grout; ANSI A118.7.
- C. TCNA Method F122A: Above-ground concrete.
  - 1. Locations: Wet areas and as indicated here; otherwise use TCNA Method F113A.
    - a. Showers (all tiling surfaces).
    - b. Wash Basins (all tiling surfaces).
    - c. Group Toilet Rooms (floor tiling and wall base tiling only).
    - d. Single Occupancy Toilet Rooms (floor tiling and wall base tiling only).
    - e. Locker and Dressing Rooms (floor tiling and wall base tiling only).
    - f. Dishwashing Areas (floor tiling and wall base tiling only).
    - g. Food Preparation Areas (floor tiling and wall base tiling only).
    - h. Mechanical Rooms (floor tiling and wall base tiling only).
    - i. Areas with similar surfaces subject to periods of running or standing water.
    - j. Other areas indicated on Drawings to receive waterproofing membrane.
  - 2. Waterproofing Membrane; ANSI A118.10.
  - 3. Crack Isolation Membrane; ANSI A118.12.
    - a. TCNA Method F125-Partial with crack isolation reinforcing fabric.
  - 4. Bonding Coat:
    - a. Latex/Polymer Modified Portland Cement Mortar; ANSI A118.4.
    - b. Modified Dry-Set Mortar for Large and Heavy Tile (LHT) Mortar; ANSI A118.4H.

5. Grout:
  - a. High Performance Cement Grout; ANSI A118.7.
- D. TCNA Method F113: On-ground concrete.
  1. Locations:
    - a. Locations that ARE NOT indicated to receive waterproofing membrane in this Section or on Drawings.
    - b. Locations that ARE NOT indicated to be installed with other TCNA Method.
  2. Crack Isolation Membrane; ANSI A118.12.
    - a. TCNA Method F125-Partial: At all existing cracks.
  3. Bonding Coat:
    - a. Latex/Polymer Modified Portland Cement Mortar; ANSI A118.4.
    - b. Modified Dry-Set Mortar for Large and Heavy Tile (LHT) Mortar; ANSI A118.4H.
  4. Grout:
    - a. High Performance Cement Grout; ANSI A118.7.
- E. TCNA Method F113A: Above-ground concrete.
  1. Locations:
    - a. Locations that ARE NOT indicated to receive waterproofing membrane in this Section or on Drawings.
    - b. Locations that ARE NOT indicated to be installed with other TCNA Method.
  2. Crack Isolation Membrane; ANSI A118.12.
    - a. TCNA Method F125-Partial: At all existing cracks.
  3. Bonding Coat:
    - a. Latex/Polymer Modified Portland Cement Mortar; ANSI A118.4.
    - b. Modified Dry-Set Mortar for Large and Heavy Tile (LHT) Mortar; ANSI A118.4H.
  4. Grout:
    - a. High Performance Cement Grout; ANSI A118.7.

### 3.9 INSTALLATION - INTERIOR FLOORS: MORTAR BED METHOD

- A. To be used at locations where concrete substrate IS DEPRESSED.
- B. TCNA Method F114.
  1. Cleavage Membrane, as specified in this Section.
  2. Mortar Bed with Welded Wire Reinforcing Fabric; as specified in the Section.
    - a. Mortar Bed Thickness: Minimum 1-1/4 inches; maximum 2 inches.
  3. Bonding Coat: Latex/Polymer Modified Portland Cement Bond Coat; ANSI A118.4, as specified in this Section.
  4. Grout: Epoxy Grout; ANSI A118.3.

### 3.10 INSTALLATION - WALLS: THIN-SET METHODS

- A. TCNA Method W202E.
  1. Locations:
    - a. Exterior and interior locations on masonry and concrete substrates.
    - b. Waterproofing membrane required in wet areas, and for exterior applications, or if otherwise indicated on Drawings.
  2. Waterproofing Membrane; ANSI A118.10 (waterproofing), specified in this Section.
  3. Bonding Coat:
    - a. Latex/Polymer Modified Portland Cement Mortar:
      - 1) Complying with ANSI A118.4.
    - b. Modified Dry-Set Mortar for Large and Heavy Tile (LHT) Mortar; ANSI A118.4H.



4. Grout:
  - a. High Performance Cement Grout: ANSI A118.7.
- B. TCNA Method W244E.
  1. Locations:
    - a. Exterior and interior locations on metal framed walls.
    - b. Waterproofing membrane required in wet areas, and for exterior applications, or if otherwise indicated on Drawings.
  2. Backer Board: Cement backer board; ANSI A118.9 or ASTM C1325 (Type A).
  3. Waterproofing Membrane; ANSI A118.10 (waterproofing), specified in this Section.
  4. Bonding Coat:
    - a. Latex/Polymer Modified Portland Cement Mortar:
      - 1) Complying with ANSI A118.4.
    - b. Modified Dry-Set Mortar for Large and Heavy Tile (LHT) Mortar; ANSI A118.4H.
  5. Grout:
    - a. High Performance Cement Grout: ANSI A118.7.

### 3.11 ADJUSTING

- A. Section 01 73 00 - Execution: Starting, testing, adjusting, and balancing.
- B. Remove and replace unacceptable tiles. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement. Unacceptable tiles include, but are not limited to, the following:
  1. Tile that is damaged.
  2. Tile that does not match adjoining tile or is not compliant with the color/pattern indicated.
  3. Tile that is not fully bonded to substrate.

### 3.12 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Clean all ceramic tile surfaces so they are free of foreign matter.
- C. Remove grout residue and stains from tile as soon as possible.
- D. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions and use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

### 3.13 PROTECTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed tile work with kraft paper or other heavy covering during construction period.
- C. Prohibit foot and wheel traffic from tiled floors for at least seven (7) days after grouting is completed.
- D. Remove protective coverings and clean for substantial completion inspection and for final inspection. Between inspections, reinstall protective coverings and maintain protection of work.



**END OF SECTION**



**SECTION 09 51 13**  
**ACOUSTICAL PANEL CEILINGS**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Acoustic Ceiling Panels.
  - 2. Suspension Grid Systems.
  - 3. Suspended Acoustical Clouds.
- B. Related Requirements:
  - 1. Section 04 20 00 - Unit Masonry.
  - 2. Section 07 95 13 - Expansion Joint Cover Assemblies.
  - 3. Section 09 21 16 - Gypsum Board Assemblies.
  - 4. Division 21 - Fire Suppression: Coordinate with devices in areas of work.
  - 5. Division 23 - HVAC: Coordinate with devices in areas of work.
  - 6. Division 26 - Electrical: Coordinate with devices in areas of work.
  - 7. Division 27 - Communications: Coordinate with devices in areas of work.
  - 8. Division 28 - Electronic Safety and Security: Coordinate with devices in areas of work.

**1.2 REFERENCES**

- A. American Society of Civil Engineers (ASCE):
  - 1. ASCE 7 - Minimum Design Loads And Associated Criteria For Buildings And Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- B. ASTM International (ASTM):
  - 1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy- Coated (Galvannealed) by the Hot-Dip Process; 2023.
  - 2. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
  - 3. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2022.
  - 4. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels; 2019.
  - 5. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
  - 6. 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; 2022.
  - 7. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2023.

**1.3 COORDINATION**

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate other construction that is concealed by or interfaces with the work of this Section. This includes, but is not limited to, wall devices, light fixtures, HVAC equipment, and fire suppression system components.

#### 1.4 SEQUENCING

- A. Section 01 30 00 - Administrative Requirements: Scheduling and sequencing.
- B. Sequence work as to not install work until building is enclosed, sufficient air temperature and humidity level is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- C. Install ceiling panels after interior wet work is dry.

#### 1.5 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on suspension grid system components, acoustic panels, and accessories.
- C. Shop Drawings: Show suspension grid layout and dimensioning, panel layouts, lighting fixtures, air diffusers, grilles, and all other items exposed in acoustical ceilings, locations of seismic braces and hangers, and suspension, seismic and bracing details. Show details of junctions with other work or ceiling finishes, and special conditions.
- D. Provide seismic design of suspended ceiling systems under direct supervision and sealed by Professional Structural Engineer.
  - 1. Provide sealed calculations indicating that design of suspension systems provide compliance with seismic structural requirements indicated in the Performance and Design Requirements article in this Section.
- E. Samples:
  - 1. Submit two samples 12 x 12 inches in size illustrating material, fabrication, and finish of acoustic panels.
  - 2. Submit two samples each, 6 inches long, of suspension system main runner, cross runner, perimeter wall molding and trim, and seismic components.
- F. Designer's Qualification Statement.
- G. Manufacturer's Qualification Statement.
- H. Installer's Qualification Statement.
- I. Manufacturer's Installation Instructions: Submit special procedures, and perimeter conditions requiring special attention.

#### 1.6 QUALIFICATIONS

- A. Designer Qualifications for Seismic Design: Perform 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. Acoustical Panels and Suspension System Manufacturer Qualifications: Company specializing in manufacturing products indicated with minimum five (5) years documented experience.
- C. Installer: Company specializing in performing indicated work with minimum five (5) years documented experience.

#### 1.7 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements.

- B. Maintain the following minimum environmental requirements in installation areas prior to, during, and after acoustic panel installation. If manufacturer's requirements are more stringent, comply with manufacture's requirements.
  - 1. Enclosed and weatherproof; wet work in place is completed and nominally dry; free of construction dust and debris.
  - 2. Ambient air conditions of temperature and humidity are continuously maintained at values intended for final occupancy and operations.

## 1.8 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
- B. Furnish the following extra materials to the Owner:
  - 1. Three (3) manufacturer's cartons of each tile panel type installed.
  - 2. Twenty (20) linear feet of each of the following components of each type and color of suspended grid system installed: Main grid runners, cross grid members, perimeter wall trim, and face trim.

## PART 2 PRODUCTS

### 2.1 PERFORMANCE AND DESIGN REQUIREMENTS:

- A. Seismic Loads: Design and size components to withstand seismic loads and sway displacement as calculated according to ASCE 7 and applicable codes.
  - 1. Design is to include compliance with ASTM E580/E580M.
  - 2. Seismic Design is to comply with requirements for the Seismic Design Category as indicated on the Structural Drawings and Section 00 31 00 - Available Project Information.
- B. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
- C. Suspension System: Secure acoustic ceiling system including integral mechanical and electrical components with maximum deflection of 1/360.

### 2.2 ACOUSTIC PANEL CEILING SYSTEMS

- A. Manufacturers:
  - 1. Armstrong World Industries.
  - 2. CertainTeed.
  - 3. USG Interiors.
  - 4. Substitutions: Section 01 60 00 - Product Requirements.

### 2.3 ACOUSTIC PANELS

- A. Acoustic Panels - **Type APC-1:**
  - 1. Basis of Design:
    - a. Armstrong - Calla (2820).
  - 2. Classification: ASTM E1264, Type IV - Mineral fiber with acoustically transparent membrane and factory-applied latex paint.
    - a. Form: 2 - water felted.
    - b. Pattern:
      - 1) E - lightly textured.
    - c. Fire Class A, ASTM E84.
    - d. Sag Resistant.

- e. Mold and Mildew Resistant.
  3. Size: 24 x 24 inches.
  4. Thickness:
    - a. 1 inch.
  5. Light Reflectance: 85 percent.
  6. NRC: 0.85.
  7. CAC: 35.
  8. Edge: Formed to suit grid profile.
    - a. Tegular Square (Calla 2824).
  9. Surface Color (Refer to Drawings for Color Locations) :
    - a. White.
    - b. Flat Black.
  10. Suspension Grid Type as indicated in this Section:
    - a. Suspension Grid Type SG-1.
- B. Acoustic Panels - **Type APC-2:**
1. Basis of Design: Armstrong - Kitchen Zone Non-Perforated (673).
  2. Classification: ASTM E1264, Type IX - Mineral fiber composite with factory-applied latex paint finish.
    - a. Form: 2 - water felted.
    - b. Pattern:
      - 1) G - smooth.
    - c. Fire Class A, ASTM E84.
    - d. Sag Resistant.
    - e. Sag Resistant; maximum resistance for exterior application.
    - f. Mold and Mildew Resistant.
  3. Size: 24 x 24 inches.
  4. Thickness:
    - a. 5/8 inch.
  5. Light Reflectance: 89 percent.
  6. NRC: N/A.
  7. CAC: 33.
  8. Edge: Formed to suit grid profile.
    - a. Square.
  9. Surface Color: White.
  10. Suspension Grid Type as indicated in this Section:
    - a. Suspension Grid Type SG-1.
- C. Acoustic Panels - **Type APC-3:**
1. Basis of Design: Armstrong - Ceramaguard Non-Perforated (605).
  2. Classification: ASTM E1264, Type XX - Wet-formed ceramic and mineral fiber composite with factory-applied plastic paint finish.
    - a. Form: N/A.
    - b. Pattern:
      - 1) G - smooth.
    - c. Fire Class A, ASTM E84.
    - d. Sag Resistant.
    - e. Sag Resistant; maximum resistance for exterior application.
    - f. Mold and Mildew Resistant.
  3. Size: 24 x 24 inches.
  4. Thickness:
    - a. 5/8 inch.
  5. Light Reflectance: 88 percent.
  6. NRC: N/A.

7. CAC: 40.
8. Edge: Formed to suit grid profile.
  - a. Square.
9. Surface Color: White.
10. Suspension Grid Type as indicated in this Section:
  - a. Suspension Grid Type SG-1.

## 2.4 SUSPENSION GRID SYSTEMS

- A. General:
  1. Support Channels and Hangers: Primed steel; size and type to suit application, seismic requirements, load support requirements, and ceiling system flatness requirements.
  2. Provide stabilizer bars, clips, splices, and perimeter wall moldings and trim required for suspension grid system, and as indicated on Drawings and in this Section.
- B. Suspension Grid - **Type SG-1**: Exposed to view.
  1. Basis of Design: Manufacturer to be same as manufacturer of ceiling panels.
    - a. Armstrong - Prelude XL.
  2. Non-fire Rated Grid: ASTM C635/C635M, exposed T; components die cut and interlocking.
    - a. Structural Classification:
      - 1) Intermediate-duty.
  3. Grid Materials: Hot-dipped galvanized steel sheet complying with ASTM A653/A653M.
  4. Exposed Grid Surface Width:
    - a. 15/16 inch.
  5. Grid Finish Color:
    - a. Match color of Acoustic Panel. If no match is available, submit full range of colors available for selection by Architect.
  6. Perimeter Wall Moldings and Trim: As indicated in ACCESSORIES article.

## 2.5 SUSPENDED ACOUSTICAL CLOUDS

- A. Suspended Acoustical Clouds - **Type SAC-1**:
  1. Acoustical Panels: Type APC-1 as specified in this Section.
  2. Suspension Grid: Type SG-1 as specified in this Section.
  3. Perimeter Face Trim:
    - a. Basis of Design: Axiom Vector Trim (inverted for smooth bottom edge).
    - b. Profiles and Configurations.
      - 1) Height: 6 inches.
      - 2) Bottom Edge: Aligned flush with ceiling suspension grid system.
        - a) Width to be 3/4 inch wide.
      - 3) Curved and straight trim profiles and configurations to conform to details and layouts indicated on Drawings.
    - c. Finish: Factory applied powder coat finish.
    - d. Color: Color to match grid.
    - e. Accessories:
      - 1) For straight perimeter trim corners, provide factory formed, single piece units with finished corner legs that receive and join the two perimeter trim ends.
      - 2) Provide concealed diagonal trim face bracing when trim vertical face is 8 inches or greater. This is to reinforce trim face at vertical alignment.
      - 3) Fasteners, connection, and splice plates are to be concealed from view.

## 2.6 ACCESSORIES

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.
- B. Perimeter Wall Moldings: Perimeter wall moldings for termination and support of suspension grid system at abutment to vertical construction and other grid system interruptions:
  - 1. Material, Finish Type and Color: Match suspension grid system.
  - 2. For Exposed Suspension Grid System:
    - a. L-shaped molding; 7/8 inch exposed face; mounted flush with grid face.
  - 3. For Concealed Suspension Grid System:
    - a. Concealed molding.
  - 4. Manufactured Corners: Provide single piece seamless corners conforming to corner angle or radius.
  - 5. Manufactured Radius: Provide seamless radius trim at maximum lengths practical but not less than 8 feet.
  - 6. Manufactured Column Rings: For conditions where curved columns penetrate or abut ceiling, provide column trim ring at radius to match column size and radius.
- C. Perimeter Face Trim: Perimeter face trim for floating edge (exposed edge) termination of ceiling and suspension grid system. Provide the following except for elements herein that are indicated otherwise on Drawings or in this Section:
  - 1. Basis of Design: Manufacturer to be same as manufacturer of Grid System.
    - a. Armstrong: Axiom Vector Trim (inverted for smooth bottom edge).
  - 2. Profiles and Configurations.
    - a. Height:
      - 1) 6 inches.
    - b. Bottom Edge:
      - 1) Aligned flush with ceiling suspension grid system.
      - 2) Width to be 3/4 inch wide.
    - c. Curved and straight trim profiles and configurations to conform to details and layouts indicated on Drawings.
  - 3. Finish: Factory applied powder coat finish.
  - 4. Color:
    - a. For exposed suspension grid system, color to match grid.
    - b. For concealed suspension grid systems, color to be selected by Architect for full range of colors.
  - 5. Accessories:
    - a. For straight perimeter face trim corners, provide factory formed, single piece units with finished corner legs that receive and join the two perimeter trim ends.
    - b. Provide concealed diagonal trim face bracing when trim vertical face is 8 inches or greater. This is to reinforce trim face at vertical alignment.
    - c. Fasteners, connection, and splice plates are to be concealed from view.
- D. Exposed fastener heads to be shop finished to match grid system finish type and color.
- E. Touch-up Paint: Type and color to match acoustic panels and grid components.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Examination, coordination, and project conditions.
- B. Verify layout of hangers will not interfere with other work.



### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Suspension Grid 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. Suspended ceilings are subject to special inspection.
  - 3. Locate system on room axis according to reflected ceiling plan in Drawings.
  - 4. Install after major above ceiling work is complete. Coordinate location of hangers with other work. Coordinate with sprinkler head penetrations for oversized trim if not braced. Ceilings without rigid bracing must have 2 inch oversized trim rings for sprinklers and other penetrations.
  - 5. Install suspension system in accordance with manufacturer's seismic requirements and installation guide, and in compliance with the Seismic Design Category design requirements.
  - 6. Ceiling areas over 1,000 SF must have horizontal restraint wire or rigid bracing.
  - 7. Ceiling areas over 2,500 SF must have seismic separation joints or full height partitions.
  - 8. Install system capable of supporting imposed loads to deflection of 1/360 maximum.
  - 9. Ends of cross tees to be locked into main beams to prevent their spreading.
  - 10. Hang suspension system from building structural members and independent of walls, columns, ducts, pipes, cable trays, and conduit. Do not hang suspension system from non-structural building elements. Do not hang suspension system from roof deck. Do not allow suspension system components to touch ducts, pipes, conduit, or other ceiling installations.
  - 11. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
  - 12. Changes in ceiling plane must have positive bracing.
  - 13. Where ducts or other equipment prevent regular spacing of hangers, reinforce nearest affected hangers, and related carrying channels to span extra distance.
  - 14. Do not support components on main runners or cross runners when weight causes total dead load to exceed deflection capability. Support fixture loads by supplementary hangers located within 6 inches of each corner; or support components independently.
  - 15. Do not eccentrically load system or produce rotation of runners.
  - 16. Perimeter Wall Moldings:
    - a. Install perimeter wall molding at ceiling abutment to vertical construction.
    - b. Use longest practical lengths.
    - c. Install manufactured seamless corners.
    - d. Install manufactured seamless radius trim at curved walls and round columns.
    - e. Overlap and rivet corners.
  - 17. Perimeter Face Trim:
    - a. Install perimeter face trim at floating edge (exposed edge) termination of ceiling and suspension grid system if such conditions are indicated on Drawings.
    - b. Use longest practical lengths.

- c. For straight perimeter face trim corners, provide factory formed, single piece units with finished corner legs that receive and join the two perimeter trim ends.
  - d. Provide concealed diagonal trim face bracing when trim vertical face is 8 inches or greater. This is to reinforce trim face at vertical alignment.
18. Form expansion joints as detailed. Form to accommodate plus or minus 1 inch movement. Maintain visual closure.
- C. Acoustic Panels:
1. Fit acoustic panels in place, free from damaged edges or other defects detrimental to appearance and function.
  2. Lay directional patterned panels as shown on the Drawings. Fit border trim neatly against abutting surfaces.
  3. Install panels after above ceiling work is complete.
  4. Install acoustic panels level, in uniform plane, and free from twist, warp, and dents.
  5. Cutting Acoustic Panels:
    - a. Cut to fit irregular grid and perimeter edge trim.
    - b. Make field cut edges of same profile as factory edges.
    - c. Double cut and field finish exposed edges to match panel finish.
  6. Where round obstructions and bullnose concrete block corners occur, provide preformed closures to match perimeter wall molding or trim.
  7. Install hold-down clips on each panel to retain panels tight to grid system; comply with fire rating requirements.
  8. Install hold-down clips to retain panels tight to suspension grid system within 10 feet of exterior door.
  9. Install acoustical insulation as indicated on Drawings.

### 3.4 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- C. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

### 3.5 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work and comply with manufacturer's recommendations.
- B. Clean installed work in accordance with manufacturer's recommended materials and procedures.

### 3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect against modifications to completed suspension and hanger systems by unauthorized persons.
- C. Protect installed work from damage and marring of finishes. Remove and replace components that become damaged.

### 3.7 SCHEDULES

- A. Refer to Reflected Ceiling Plans, Finish Schedules, Details, and Notes on Drawings for locations and configurations of systems indicated in this Section.

**END OF SECTION**

**SECTION 09 64 29**  
**WOOD STRIP AND PLANK FLOORING**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Wood flooring system for performing arts platform and stage areas.
- B. Section Does Not Include: Wood flooring for athletic and sports areas.
  - 1. Refer to Section 09 64 66 - Wood Athletic Flooring.
- C. Related Requirements:
  - 1. Section 03 30 00 - Cast-In-Place Concrete Flooring system substrate.
  - 2. Section 09 65 95 - Polymer Panel Flooring: Refer to QUALITY ASSURANCE article and COORDINATION articles of this Section for Single Source Responsibility requirement.

**1.2 REFERENCES**

- A. APA-The Engineered Wood Association (APA).
- B. ASTM International (ASTM):
  - 1. ASTM D2240 - Standard Test Method for Rubber Property-Durometer Hardness; 2015, Reapproval 2021.
  - 2. ASTM D3676 - Standard Specification for Rubber Cellular Cushion Used for Carpet or Rug Underlay; 2018.
  - 3. ASTM D4397 - Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Application; 2016, Reapproval 2023.
  - 4. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2023.
  - 5. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2022.
  - 6. ASTM F1861 - Standard Specification for Resilient Wall Base; 2021.
  - 7. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2023.
  - 8. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019a.
- C. American Wood Protection Association (AWPA).
  - 1. AWPA U1 - Use Category System: User Specification for Treated Wood; 2023.
- D. California Department of Public Health (CDPH):
  - 1. CDPH Standard Method VOC V1.2 - Standard Method For The Testing And Evaluation Of Volatile Organic Chemical Emissions From Indoor Sources Using Environmental Chambers - Version 1.2; 2017.
- E. Maple Flooring Manufacturers Association, Inc. (MFMA):
  - 1. MFMA Standards:
    - a. Guide Specifications for Maple Flooring Systems; Current Edition Online, [www.maplefloor.org/ForArchitects/Specifying-a-Floor.aspx](http://www.maplefloor.org/ForArchitects/Specifying-a-Floor.aspx).
    - b. Athletic Flooring Sealer and Finish Specifications and Conformance List; Current Edition Online, [www.maplefloor.org/TechnicalInfo/Finishes-Sealers.aspx](http://www.maplefloor.org/TechnicalInfo/Finishes-Sealers.aspx).

- F. National Wood Flooring Association (NWFA):
  - 1. NWFA (IG) - Installation Guidelines; Current Edition Online, [www.nwfa.org](http://www.nwfa.org).
  - 2. NWFA - Sanding and Finishing Guidelines: Current Edition Online, [www.nwfa.org](http://www.nwfa.org).
  - 3. NWFA/NOFMA - International Standards for Unfinished Wood Flooring; Current Edition Online, [www.nwfa.org/manufacturing/](http://www.nwfa.org/manufacturing/).

### 1.3 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate the installation of the concrete substrate with the requirements of the Work of this Section.
  - 1. The finish elevation of the depressed concrete is to be equal to the assembled and finished flooring system as required to achieve flush flooring transitions. The concrete finish is to be steel troweled to a true level and finished smooth and straight to a tolerance of 1/4 inch in a 10 foot radius. High spots are to be ground level and low spots filled in with approved leveling compounds to achieve the required elevation and level flatness.
    - a. Sloped Concrete: Levelness is relative to slopes indicated such as slopes to drains.
- C. Floor Boxes, Access Covers, Trim and Other Floor Devices: Coordinate work of this Section with work requirements by others that interface with the work of this Section.
- D. Where Drawings indicate stage/platform flooring area to be partly wood strip flooring and partly polymer panel flooring, refer to Section 09 65 95 - Polymer Panel Flooring for the polymer panel flooring system requirements. The subfloor construction components of the polymer panel flooring system are to match the wood strip flooring system construction. However, the finish surfaces of the two stage/platform flooring materials must finish flush with each other; therefore, minor adjustments to the thicknesses of the sleepers and subfloor components will be required to achieve the required flush floor finish. Acquire approval from the Architect for required adjustments in thicknesses.
  - 1. Single Source Responsibility: The polymer panel flooring system and the wood strip flooring system are to be provided by the same Installer.

### 1.4 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this Section. Review the work requirements, application procedures, quality control, testing and inspection and production schedule.
- C. Using a small mockup assembly (about 12 inches square) of the flooring systems, demonstrate that the assembled flooring systems will finish level and flush with adjacent floor finishes at doorways, openings, and points of egress.

### 1.5 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Provide data for materials and accessories; include standard construction details, material descriptions, dimensions of individual components, profiles, assemblies, and finishes.
- C. Shop Drawings: Indicate floor joint pattern and termination details.
  - 1. Indicate materials, layout, dimensions, installation details, moisture protection, methods of attachment in construction, relationships, and transitions to surrounding

- and adjacent construction, base and trim details, direction of wood strips and floor boxes and devices.
  - 2. Indicate provisions for expansion and contraction, base, and base corner details.
  - 3. Indicate equipment inserts, floor boxes, sockets, and other devices within the flooring area.
- D. Samples - Wood Flooring Samples:
- 1. Samples for Initial Selection: Submit two paper chip samples; 2 x 3 inches in size; illustrating full range of stained and non-stained colors and sheens available for each wood species indicated; submit for Architect's initial selections.
  - 2. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected color and sheen; minimum 8 x 8 inches assembled of actual wood strips of each wood species required in construction. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- E. Manufacturer's Certifications:
- 1. Certify products meet or exceed specified requirements.
  - 2. Certify compatibility of complete finishing systems.
  - 3. Certify approval of Installer.
- F. Installation Instructions: Indicate standard and special installation procedures. Include instructions for applying finishing system.
- G. Maintenance Data: Include maintenance procedures and recommended maintenance materials.

## 1.6 CLOSEOUT SUBMITTALS

- A. Section 01 77 00 - Closeout Procedures.
- B. Operation and Maintenance Data: Submit manufacturer's instructions for maintaining and refinishing of each flooring type installed.

## 1.7 QUALITY ASSURANCE

- A. Perform work of this Section in accordance with NWFA and NOFMA Standards.
- B. Single Source Responsibility: Engage a single qualified Installer to provide the work of this Section.
  - 1. When the wood strip flooring system of this Section interfaces with (abuts) a polymer panel flooring system, both flooring systems are to be provided by the same Installer. Refer to the following Sections:
    - a. Section 09 64 29 - Wood Strip and Plank Flooring (This Section).
    - b. Section 09 65 95 - Polymer Panel Flooring.
- C. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section with minimum six (6) years documented experience.
  - 1. Certification: Provide flooring that carries NWFA/NOFMA mark on each bundle or piece.
  - 2. Accredited member of the National Wood Flooring Association (NWFA).
- D. Installer Qualifications: Company specializing in performing work of the type specified and with at least six (6) years of documented experience.
  - 1. National Wood Flooring Association (NWFA) Certified Professional Installer (CI).
  - 2. National Wood Flooring Association (NWFA) Certified Professional Sand and Finisher (CSF).

**1.8 DELIVERY, STORAGE, AND HANDLING**

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Do not deliver wood components and other materials until after concrete, masonry, ceramic tile, terrazzo, and similar wet work is complete, cured, and dry.
- C. Moisture Content: At time of delivery to Project, maintain 6 to 9 percent average moisture content.
- D. Accept materials on site in manufacturer's original packaging. Inspect for damage.
- E. Store wood components and other materials in a dry, warm, well-ventilated, weathertight location, in a horizontal position, and protected from exposure to moisture.

**1.9 ENVIRONMENTAL REQUIREMENTS**

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after Work.
- B. Do not install wood flooring until wet construction work is complete and permanent heat and air conditioning is installed and operating.
- C. Maintain room temperature between 65 degrees F and 75 degrees F and relative humidity between 35 to 40 percent for a period of seven (7) days prior to delivery of materials to installation area, during installation, and after installation.
- D. Acclimate flooring materials by storing materials in conditioned installation area prior to installation as follows:
  - 1. 7 days, minimum.

**1.10 WARRANTY**

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Manufacturer's Warranty: Provide two (2) year warranty against defects in materials and workmanship.
- C. Installer's Warranty: Provide three (3) year warranty for materials, installation, and finish.

**1.11 SPARE PARTS AND MAINTENANCE PRODUCTS**

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
- B. Extra Flooring Material: Furnish the following unfinished, full size, and unassembled units to Owner.
  - 1. Sixteen (16) sf of wood planks for each flooring type installed.

**PART 2 PRODUCTS****2.1 WOOD STAGE FLOORING**

- A. Description: Floating system; tongue and groove wood strips; over plywood subfloor; over wood sleepers with resilient pads; over vapor retarder; on concrete slab-on-grade.
  - 1. Where Drawings indicate stage flooring area to be partly wood flooring and partly polymer panel flooring, refer to Section 09 65 95 - Polymer Panel Flooring for the polymer panel flooring finish portion of the completed stage flooring. The subfloor construction components of the polymer panel flooring are to match the wood stage flooring construction. However, the finish surfaces of the two stage flooring materials

must finish flush with each other; therefore, adjustments to the thicknesses of the sleepers and subfloor components will be required to achieve the required flush floor finish. Acquire approval from the Architect for required adjustments in thicknesses.

**B. Components:**

1. Wood Strip Flooring: Comply with NWFA and NOFMA Standards.
  - a. Species: Red Oak.
  - b. Grade:
    - 1) Select and better grade.
  - c. Cut: Edge grain.
  - d. Moisture Content: 6 to 9 percent.
  - e. Actual Thickness: 25/32 inch.
  - f. Actual Width: 2-1/4 inches.
  - g. Edge: Tongue and groove cut.
  - h. End: End matched.
  - i. Back Channeling: Back channel each piece according to manufacturer's standards, unless specifically recommended by manufacturer and installer to be plain or flat backed for application indicated.
  - j. Length: Random, 8 feet, minimum of 9 inches.
  - k. Seasoning: Kiln dry flooring before milling. Air dried flooring will not be acceptable.
2. Sheathing Paper: Plain building paper.
3. Wood Subflooring: Plywood; APA Rated Sheathing, span rating of 40/20; C-D Exposure 1; preservative-treated.
  - a. Edges: Tongue and groove cut.
  - b. Thickness: Number of layers and thickness to be as indicated on Drawings, but initial layer on sleepers to be not less than 5/8 inch thick.
4. Wood Sleepers and Shims: Standard grade, nominal 2 by 3 inches by 4 feet long, kiln dried Eastern hemlock, fir, pine, or spruce, waterborne pressure preservative-treated according to AWPA U1, Use Category UC2.
5. Resilient Cushion Pads: Resilient pads, rubber material, unsealed air slots for resiliency; 2-1/4 x 3 inches size and 3/8 inch thick; factory applied to bottom of sleepers at 12 inches o.c. and each end.
6. Vapor Retarder: ASTM D4397, black polyethylene sheet, 8 mil thick; 2 inch wide tape as recommended by vapor retarder manufacturer for continuous joint sealing.

## 2.2 ACCESSORIES

- A. Flooring System Fasteners: Non-corrosive type as recommended by flooring system manufacturer.
- B. Subflooring Fasteners: Screws of non-corrosive type; length as required to secure each subflooring layer into sleepers below.
- C. Perimeter Springs: Flat spring steel, leaf shaped, with attachment clips, 0.093 x 1 x 9 inches size.
- D. Transition Covers: Extruded aluminum, ADA compliant, top grooved parallel to length, factory countersunk anchor holes, and mill finished.
- E. Wood Wall Base: Same species and finish as flooring; profile as indicated on Drawings and with toe profile as required to cover flooring system expansion void at wall.

## 2.3 WOOD FLOOR FINISH MATERIALS

- A. Provide certification that wood finish materials are compatible with each other and the wood flooring material.



- B. Wood Fillers and Penetrating Stain: Fillers to be tented and stained to match final color of wood. Stain color as selected by Architect from manufacturer's full range.
- C. Wood Sealer and Finish System: Comply with MFMA Standards and the current MFMA Conformance List.
  - 1. Manufacturer:
    - a. BonaKemi USA, Inc.
    - b. Hillyard Industries, Inc.
    - c. Poloplaz by Canlak Coatings Company.
  - 2. Oil-Based System:
    - a. Oil-Based Sealer: Two coats; MFMA Approved - Group 1.
      - 1) Basis of Design:
        - a) Hillyard - Gold Medalist Wood Seal (2 coats).
    - b. Oil-Based Finish: Two coats; MFMA Approved - Group 3.
      - 1) Basis of Design:
        - a) Hillyard - Gold Medalist Gym Finish (1 coat), and 450 Gym Finish (1 coat minimum).

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify compliance with the requirements in the PART 1, ENVIRONMENTAL REQUIREMENTS article.
- C. Verify that existing conditions are as required before starting work of the Section.
- D. Verify that the finish elevation of the depressed concrete is equal to the assembled and finished flooring system as required to achieve flush flooring transitions.
- E. Verify that the assembled and finished floor system of this Section will finish flush with floor boxes, inserts, devices, and adjacent finished floors. This flush transition requirement cannot be over emphasized. The transition joints must be tight and flush to eliminate trip hazards.
- F. Verify that floor boxes, inserts, utilities, and other floor devices are installed in correct locations.
- G. Verify that all adjacent work (including flooring by others) is completed and that overhead work trades have finished their work in the flooring areas.
- H. Verify that the building is dry, all openings are closed in, adequate ventilation is provided, and permanent heating and air conditioning is installed operating and providing the required conditioning of the air in the work area.
- I. Verify that surfaces are 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.
- J. Verify that the concrete finish has been steel troweled to a true level and finished smooth and straight to a tolerance of 1/4 inch in a 10 foot radius. High spots are to be ground level and low spots filled in with approved leveling compounds to achieve the required elevation and level flatness.
- K. 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 wall base material.



- L. Verify that the concrete substrate is dry in accordance with industry standard testing procedures, free of foreign materials, and broom cleaned.
- M. Cementitious Substrate Surfaces Testing: Verify that substrates are ready for flooring installation by testing for moisture and alkalinity (pH).
  - 1. Alkalinity (pH) Testing: ASTM F710. Measurement for pH range is to be not less than 7 pH and not more than 9 pH, unless written recommendations of flooring manufacturer or adhesive manufacturer are more stringent.
  - 2. Internal Relative Humidity Testing: ASTM F2170. Perform test using in situ probes. Humidity level of substrates is to measure no more than 75 percent relative humidity level, unless written recommendations of flooring manufacturer or adhesive manufacturer are more stringent.
  - 3. Moisture Vapor Emission Testing: ASTM F1869. Perform anhydrous calcium chloride test. Moisture vapor emission rate (MVER) from the slab is to be less than or equal to 3 lbs of water per 1,000 sf in 24 hours, unless written recommendations of flooring manufacturer or adhesive manufacturer are more stringent.
  - 4. Conduct tests by an independent testing agency acceptable to Owner.
- N. Do not proceed with installation work until noncompliant conditions have been corrected.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Comply with product manufacturer's site and material condition requirements for installation.
- D. Broom clean concrete subfloor.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Comply with NWFA Standards and the requirements in this Section.
- C. Floor Boxes, Access Covers, and Other Floor Devices: Coordinate work of this Section with other contractors/installers of such devices and trim components.
- D. Install floor sockets and inserts to a depth sufficient to ensure flush top surface with floor surface.
- E. Cushioned Sleepers:
  - 1. Place vapor retarder over concrete subfloor surface, lapping edges and ends minimum 6 inches and tape for continuous seal; spot glue in place.
  - 2. Place cushioned sleepers over vapor retarder; end to end at right angles to the direction of the finish wood flooring strips. Stagger end joints 24 inches minimum. Space sleepers 12 inches on center. Do not secure to concrete subfloor. Maintain an expansion void at walls and all vertical obstructions; void size as recommended by manufacturer, but no less than 1-1/2 inches.
  - 3. Install shims as required for equal bearing on concrete substrate and to achieve level line of plus or minus 1/8 inch in a 10 feet radius.
- F. Wood Subflooring: Place plywood subflooring over sleepers.
  - 1. Lay plywood with the long edge perpendicular to the sleepers, with end joints over sleepers, and secure to sleepers with fasteners at 12 inches on center or closer if recommended by manufacturer.

2. If two layers of subflooring are indicated, continue as follows:
  - a. Place sheathing paper between subflooring layers, lapping edges and ends 2 inches, staple in place.
  - b. Lay the second layer of subflooring in the same direction as first layer, with edge joints offset from first layer by 24 inches and end joints offset from first layer by one sleeper. Secure to sleepers with fasteners at 12 inches on center.
- G. Prepare wood subfloor to receive wood flooring in accordance with manufacturer's recommendations and NWFA Standards.
- H. Broom clean wood subfloor.
- I. Sheathing Paper: Place between top of wood subfloor and bottom of finish wood flooring; lap edges and ends 2 inches, staple in place.
- J. Wood Strip Flooring:
  1. Install in accordance with manufacturer's recommendations and NWFA Standards; predrill and blind nail to sleepers.
  2. Wood Strip Direction - Unless indicated otherwise on Drawings, lay wood flooring strips parallel to the front opening of the stage floor. Verify alignment as work progresses.
  3. Arrange flooring with end matched grain set flush and tight.
  4. Terminate flooring at adjacent flooring, allowing expansion void, and install aluminum saddle type threshold of such width and thickness as to bridge the expansion void.
  5. Where divider strips and transition strips are required, provide such strips in accordance with flooring manufacturer's recommendations and as indicated.
  6. Install edge strips at unprotected or exposed edges, and where flooring terminates.
  7. Secure edge strips before installation of flooring with stainless steel screws.
  8. Install flooring tight to floor access covers, unless indicated otherwise by manufacturer's installation recommendations.
  9. Install flooring under movable partitions without interrupting floor pattern.
  10. Provide expansion requirements in field and space at fixed walls and other interruptions as needed for expansion and contraction.
  11. At cushioned sleepers, install springs in perimeter expansion space at 24 inches.
- K. Finishing Wood Strip Flooring:
  1. Allow installed flooring to acclimate to ambient conditions for a minimum period of 7 days before sanding.
  2. Mask off and protect adjacent surfaces before beginning sanding.
  3. Sand flooring to smooth even finish with no evidence of sander marks. Take precautions to contain dust.
    - a. Machine sand with coarse, medium, and fine grades of sandpaper. After sanding, buff entire floor using 120 grit screen or equal grit sandpaper, with a heavy-duty buffing machine.
    - b. Clean with power vacuum, tack, and check to confirm that entire surface of each piece has been sanded, and that floor is level and smooth, without ridges or cups. Proceed immediately with finish process.
  4. Apply finish system in accordance with floor finish manufacturer's recommendations and MFMA Standards.
    - a. Where penetrating stain is indicated, apply prior to first coat of sealer.
  5. Allow each coat to cure. Buff lightly to remove irregularities. Vacuum clean and wipe with damp cloth and allow to dry before applying succeeding coat.
  6. Apply last coat of finish. After the last coat of finish has cured, if there are any areas of the finish that appear to have a dull or inconsistent sheen, apply additional finish coats as required to achieve a consistent and uniform sheen over entire floor.

- L. Install wall base at floor perimeter to cover expansion space in accordance with manufacturer's instructions. Miter inside corners and install premolded outside corners.

### **3.4 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work and comply with manufacturer's recommendations.
- B. Clean and polish floor surfaces in accordance with flooring and finishing manufacturers' recommended material, procedures, and instructions.

### **3.5 PROTECTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Prohibit traffic on floor finish for 48 hours after installation.
- C. Place protective coverings over finished floors; do not remove coverings until Substantial Completion inspection by Architect. Resume protection until final completion.

**END OF SECTION**



**SECTION 09 64 66**  
**WOOD ATHLETIC FLOORING**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Wood flooring for athletic and sports areas.
- B. Section Does Not Include: Wood flooring for arts performance platforms and stage areas.
  - 1. Refer to Section 09 64 29 - Wood Strip and Plank Flooring.
- C. Related Requirements:
  - 1. Section 03 30 00 - Cast-In-Place Concrete: Substrate for flooring system.

**1.2 REFERENCES**

- A. APA - The Engineered Wood Association (APA).
- B. ASTM International (ASTM):
  - 1. ASTM D2240 - Standard Test Method for Rubber Property-Durometer Hardness; 2015, Reapproval 2021.
  - 2. ASTM D3676 - Standard Specification for Rubber Cellular Cushion Used for Carpet or Rug Underlay; 2018.
  - 3. ASTM D4397 - Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Application; 2016, Reapproval 2023.
  - 4. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2023.
  - 5. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2022.
  - 6. ASTM F1861 - Standard Specification for Resilient Wall Base; 2021.
  - 7. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2023.
  - 8. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019a.
- C. American Wood Protection Association (AWPA).
  - 1. AWPA U1 - Use Category System: User Specification for Treated Wood; 2023.
- D. California Department of Public Health (CDPH):
  - 1. CDPH Standard Method VOC v1.2 - Standard Method For The Testing And Evaluation Of Volatile Organic Chemical Emissions From Indoor Sources Using Environmental Chambers - Version 1.2; 2017.
- E. Maple Flooring Manufacturers Association, Inc. (MFMA):
  - 1. MFMA Standards:
    - a. Guide Specifications for Maple Flooring Systems; Current Edition Online, [www.maplefloor.org/ForArchitects/Specifying-a-Floor.aspx](http://www.maplefloor.org/ForArchitects/Specifying-a-Floor.aspx).
    - b. PUR - Performance and Uniformity Rating Sport Specific Standards; Current Edition Online, [www.maplefloor.org/Standards/PUR-Standards.aspx](http://www.maplefloor.org/Standards/PUR-Standards.aspx).
    - c. Athletic Flooring Sealer and Finish Specifications and Conformance List; Current Edition Online, [www.maplefloor.org/TechnicalInfo/Finishes-Sealers.aspx](http://www.maplefloor.org/TechnicalInfo/Finishes-Sealers.aspx).
- F. National Federation of State High School Associations (NFHS):

1. NFHS - Court and Field Diagram Guide; Current Edition Online, [www.nfhs.com](http://www.nfhs.com).

### 1.3 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate the installation of the concrete substrate with the requirements of the Work of this Section.
  1. The finish elevation of the depressed concrete is to be equal to the assembled and finished flooring system as required to achieve flush flooring transitions. The concrete finish is to be steel troweled to a true level and finished smooth and straight to a tolerance of 1/4 inch in a 10 foot radius. High spots are to be ground level and low spots filled in with approved leveling compounds to achieve the required elevation and level flatness.
    - a. Sloped Concrete: Levelness is relative to slopes indicated such as slopes to drains.
- C. Floor Boxes, Access Covers, Trim and Other Floor Devices: Coordinate work of this Section with work requirements by others that interface with the work of this Section.

### 1.4 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this Section. Review the work requirements, application procedures, quality control, testing and inspection and production schedule.
- C. Using a small mockup assembly (about 12 inches square) of the flooring systems, demonstrate that the assembled flooring systems will finish level and flush with adjacent floor finishes at doorways, openings, and points of egress.

### 1.5 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Provide data for materials and accessories; include standard construction details, material descriptions, dimensions of individual components, profiles, assemblies, and finishes.
- C. Shop Drawings: Indicate floor joint pattern and termination details.
  1. Indicate materials, layout, dimensions, installation details, moisture protection, methods of attachment in construction, relationships, and transitions to surrounding and adjacent construction, base and trim details, direction of wood strips and floor boxes and devices.
  2. Indicate provisions for expansion and contraction, base, base corner details.
  3. Indicate equipment inserts, floor boxes, sockets, and other devices within the flooring area.
  4. Indicate location, size, design, and color of game line markings and graphics.
- D. Samples - Wood Flooring Samples:
  1. Samples for Initial Selection: Submit two paper chip samples; 2 x 3 inches in size; illustrating range of stained and non-stained colors and sheens available for each wood species indicated; submit for Architect's initial selections.
  2. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected color and sheen; minimum 8 x 8 inches assembled of actual wood strips of each wood species required in construction. Where finishes

involve normal color and texture variations, include sample sets showing the full range of variations expected.

- E. Manufacturer's Certifications:
  - 1. Certify products meet or exceed specified requirements.
  - 2. Certify compatibility of complete finishing systems.
  - 3. Certify approval of Installer.
- F. Installation Instructions: Indicate standard and special installation procedures. Include instructions for applying finishing system.
- G. Maintenance Data: Include maintenance procedures and recommended maintenance materials.

## 1.6 CLOSEOUT SUBMITTALS

- A. Section 01 77 00 - Closeout Procedures.
- B. Operation and Maintenance Data: Submit manufacturer's instructions for maintaining and refinishing of each flooring type installed.

## 1.7 QUALITY ASSURANCE

- A. Perform work of this Section in accordance with MFMA Standards.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section with minimum six (6) years documented experience.
  - 1. Certification: Provide flooring that carries MFMA mark on each bundle or piece.
  - 2. Member mill of the Maple Flooring Manufacturers Association, Inc (MFMA).
- C. Installer Qualifications: Company specializing in performing work of the type specified and with at least six (6) years of documented experience.
  - 1. Single Source Responsibility: Engage a single qualified Installer to provide the work of this Section.
  - 2. Approved by flooring manufacturer.

## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Do not deliver wood components and other materials until after concrete, masonry, ceramic tile, terrazzo, and similar wet work is complete, cured, and dry.
- C. Moisture Content: At time of delivery to Project, maintain 6 to 9 percent average moisture content.
- D. Accept materials on site in manufacturer's original packaging. Inspect for damage.
- E. Store wood components and other materials in a dry, warm, well-ventilated, weathertight location, in a horizontal position, and protected from exposure to moisture.

## 1.9 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after Work.
- B. Do not install wood flooring until wet construction work is complete and permanent heat and air conditioning is installed and operating.
- C. Maintain room temperature between 65 degrees F and 75 degrees F and relative humidity between 35 to 40 percent for a period of seven (7) days prior to delivery of materials to installation area, during installation, and after installation.

- D. Acclimate flooring materials by storing materials in conditioned installation area prior to installation as follows:
  - 1. 7 days, minimum.

### 1.10 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Manufacturer's Warranty: Provide two (2) year warranty against defects in materials and workmanship.
- C. Installer's Warranty: Provide three (3) year warranty for materials, installation, and finish.

### 1.11 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
- B. Extra Flooring Material: Furnish the following unfinished, full size, and unassembled units to Owner.
  - 1. Fifty (50) sf of wood planks for each flooring type installed.

## PART 2 PRODUCTS

### 2.1 WOOD ATHLETIC FLOORING

- A. Description: Floating system; tongue and groove wood strips; over plywood subfloor; over wood sleepers with resilient pads; over vapor retarder; on concrete slab-on-grade.
  - 1. Finishing: Refer to WOOD FLOOR FINISH MATERIALS articles in this Section.
- B. Manufacturers:
  - 1. Aacer Flooring, LLC.
  - 2. Action Floor Systems.
  - 3. Connor.
  - 4. Horner Flooring Company.
  - 5. Robbins, Inc.
  - 6. Substitutions: Section 01 60 00 - Product Requirements.
- C. Basis of Design:
  - 1. Connor - DuraCushion III.
- D. Components:
  - 1. Wood Strip Flooring: Comply with MFMA Standards.
    - a. Species: Northern Hard Maple.
    - b. Grade:
      - 1) Second and better grade.
    - c. Cut: Edge grain.
    - d. Moisture Content: 6 to 9 percent.
    - e. Actual Thickness: 25/32 inch.
    - f. Actual Width: 2-1/4 inches.
    - g. Edge: Tongue and groove cut.
    - h. End: End matched.
    - i. Back Channeling: Back channel each piece according to manufacturer's standards, unless specifically recommended by manufacturer and installer to be plain or flat backed for application indicated.
    - j. Length: Random, 8 feet, minimum of 9 inches.



- k. Seasoning: Kiln dry flooring before milling. Air dried flooring will not be acceptable.
2. Wood Subflooring: Plywood; APA Rated Sheathing, span rating of 40/20; C-D Exposure 1; square edges; preservative-treated.
  - a. Edges: Square cut.
  - b. Thickness: Number of layers and thickness to be as indicated on Drawings, but initial layer on sleepers to be not less than 5/8 inch thick.
3. Sleepers and Shims: Standard grade, nominal 2 by 3 inches by 4 feet long, kiln dried Eastern hemlock, fir, pine, or spruce, waterborne pressure preservative-treated according to AWPA U1, Use Category UC2.
4. Resilient Cushion Pads: Resilient pads, rubber material, unsealed air slots for resiliency; 2-1/4 x 3 inches size and 3/8 inch thick; factory applied to bottom of sleepers at 12 inches o.c. and each end.
5. Vapor Retarder: ASTM D4397, black polyethylene sheet, 8 mil thick; 2 inch wide tape as recommended by vapor retarder manufacturer for continuous joint sealing.

## 2.2 ACCESSORIES

- A. Flooring System Fasteners: Non-corrosive type as recommended by flooring system manufacturer.
- B. Subflooring Fasteners: Screws of non-corrosive type; length as required to secure each subflooring layer into sleepers below.
- C. Perimeter Springs: Flat spring steel, leaf shaped, with attachment clips, 0.093 x 1 x 9 inches size.
- D. Transition Covers: Extruded aluminum, ADA compliant, top grooved parallel to length, factory countersunk anchor holes, and mill finished.
- E. Vented Wall Base: Molded rubber complying with ASTM F1861, Type TS, Group 1 (solid) Standard Specification for Resilient Wall Base.
  1. Pre-molded outside corners with minimum 3 inch returns. Pre-molded end caps.
  2. Size: 4 inches (10.16 cm) high by 5/16 inch (7.94 mm) thick coved profile with a 3 inch (7.62 cm) long by 3/8 inch (9.53 mm) thick toe.
  3. Venting: Back of vertical surface grooved with vertical semi-circular vents. 15 vents per 4 ft. length.
  4. Length: Minimum 4 foot lengths.
  5. Hardness: ASTM D2240 - Not less than 85 Shore A.
  6. Fire Resistance: Meets ASTM E648 - Class I.
  7. Comply with ASTM F1861 requirements for resistance to heat/light aging, chemicals, and dimensional stability.
  8. Color: To be as selected by Architect from manufacturer's full range.

## 2.3 GAME LINES AND GRAPHICS

- A. Apply painted lines and graphics after wood sealer coating and before wood finish coating.
- B. Game Lines: Layout to be as indicated on Drawings and in compliance with the current NFHS - Court and Field Diagram Guide.
- C. Graphics:
  1. Provide twelve (12) graphic letters at each end of main gym basketball court; 20 inches high; uppercase; one color and font to be selected by Architect from full range.

2. Provide 14 ft diameter custom graphic logo at center of main gym basketball court. Graphic design to be provided by Architect. Three (3) colors to be selected by Architect from full range.

## 2.4 WOOD FLOOR FINISH MATERIALS

- A. Provide certification that wood floor finish materials are compatible with each other and the wood flooring material.
- B. Wood Fillers and Penetrating Stain: Fillers to be tinted and stained to match final color of wood. Stain color as selected by Architect from manufacturer's full range.
- C. Game Lines and Graphics Paint: High gloss acrylic paint to be provided by or recommended by wood sealer and finish system manufacturer.
  1. Apply after wood sealer coating and prior to wood finish coating.
- D. Wood Sealer and Finish System: Comply with MFMA Standards and the current MFMA Conformance List.
  1. Manufacturer:
    - a. BonaKemi USA, Inc.
    - b. Hillyard Industries, Inc.
    - c. Poloplaz by Canlak Coatings Company.
  2. Oil-Based System:
    - a. Oil-Based Sealer: Two coats; MFMA Approved - Group 1.
      - 1) Basis of Design:
        - a) Hillyard - Gold Medalist Wood Seal (2 coats).
    - b. Oil-Based Finish: Two coats; MFMA Approved - Group 3.
      - 1) Basis of Design:
        - a) Hillyard - Gold Medalist Gym Finish (1 coat), and 450 Gym Finish (1 coat minimum).

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify compliance with the requirements in the PART 1, ENVIRONMENTAL REQUIREMENTS article.
- C. Verify that existing conditions are as required before starting work of the Section.
- D. Verify that the finish elevation of the depressed concrete is equal to the assembled and finished flooring system as required to achieve flush flooring transitions.
- E. Verify that the assembled and finished floor system of this Section will finish flush with floor boxes, inserts, devices, and adjacent finished floors. This flush transition requirement cannot be over emphasized. The transition joints must be tight and flush to eliminate trip hazards.
- F. Verify that floor boxes, inserts, utilities, and other floor devices are installed in correct locations.
- G. Verify that all adjacent work (including flooring by others) is completed and that overhead work trades have finished their work in the flooring areas.
- H. Verify that the building is dry, all openings are closed in, adequate ventilation is provided, and permanent heating and air conditioning is installed operating and providing the required conditioning of the air in the work area.

- I. Verify that surfaces are 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.
- J. Verify that the concrete finish has been steel troweled to a true level and finished smooth and straight to a tolerance of 1/4 inch in a 10 foot radius. High spots are to be ground level and low spots filled in with approved leveling compounds to achieve the required elevation and level flatness.
- K. 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 wall base material.
- L. Verify that the concrete substrate is dry in accordance with industry standard testing procedures, free of foreign materials, and broom cleaned.
- M. Cementitious Substrate Surfaces Testing: Verify that substrates are ready for flooring installation by testing for moisture and alkalinity (pH).
  - 1. Alkalinity (pH) Testing: ASTM F710. Measurement for pH range is to be not less than 7 pH and not more than 9 pH, unless written recommendations of flooring manufacturer or adhesive manufacturer are more stringent.
  - 2. Internal Relative Humidity Testing: ASTM F2170. Perform test using in situ probes. Humidity level of substrates is to measure no more than 75 percent relative humidity level, unless written recommendations of flooring manufacturer or adhesive manufacturer are more stringent.
  - 3. Moisture Vapor Emission Testing: ASTM F1869. Perform anhydrous calcium chloride test. Moisture vapor emission rate (MVER) from the slab is to be less than or equal to 3 lbs of water per 1,000 sf in 24 hours, unless written recommendations of flooring manufacturer or adhesive manufacturer are more stringent.
  - 4. Conduct tests by an independent testing agency acceptable to Owner.
- N. Do not proceed with installation work until noncompliant conditions have been corrected.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Comply with product manufacturer's site and material condition requirements for installation.
- D. Clean substrate.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Comply with MFMA Standards and the requirements in this Section.
- C. Floor Boxes, Access Covers, and Other Floor Devices: Coordinate work of this Section with other contractors/installers of such devices and trim components.
- D. Install floor sockets and inserts to a depth sufficient to ensure flush top surface with floor surface.
- E. Cushioned Sleepers:
  - 1. Place vapor retarder over concrete subfloor surface, lapping edges and ends minimum 6 inches and tape for continuous seal; spot glue in place.

2. Place cushioned sleepers over vapor retarder; end to end at right angles to the direction of the finish wood flooring strips. Stagger end joints 24 inches minimum. Space sleepers 12 inches on center. Do not secure to concrete subfloor. Maintain an expansion void at walls and all vertical obstructions; void size as recommended by manufacturer, but no less than 1-1/2 inches.
    - a. Coordinate with requirements of fixed or telescoping bleachers to provide additional sleepers or blocking as support of bleachers bearing on or tracking across wood strip flooring system.
  3. Install shims as required for equal bearing on concrete substrate and to achieve level line of plus or minus 1/8 inch in a 10 feet radius.
- F. Wood Subflooring: Place plywood subflooring over sleepers.
1. Lay plywood with the long edge perpendicular to the sleepers, with end joints over sleepers, and secure to sleepers with fasteners at 12 inches on center or closer if recommended by manufacturer.
  2. If two layers of subflooring are indicated, continue as follows:
    - a. Place sheathing paper between subflooring layers, lapping edges and ends 2 inches, staple in place.
    - b. Lay the second layer of subflooring in the same direction as first layer, with edge joints offset from first layer by 24 inches and end joints offset from first layer by one sleeper. Secure to sleepers with fasteners at 12 inches on center.
- G. Prepare wood subfloor to receive wood flooring in accordance with manufacturer's recommendations and MFMA Standards.
- H. Broom clean wood subfloor.
- I. Sheathing Paper: Place between top of wood subfloor and bottom of finish wood flooring; lap edges and ends 2 inches, staple in place.
- J. Wood Strip Flooring:
1. Install in accordance with manufacturer's recommendations and MFMA Standards; predrill and blind nail to sleepers.
  2. Wood Strip Direction - Unless indicated otherwise on Drawings, lay wood flooring strips parallel to the main playing court. Verify alignment as work progresses.
  3. Arrange flooring with end matched grain set flush and tight.
  4. Terminate flooring at adjacent flooring, allowing expansion void, and install aluminum saddle type threshold of such width and thickness as to bridge the expansion void.
  5. Where divider strips and transition strips are required, provide such strips in accordance with flooring manufacturer's recommendations and as indicated.
  6. Install edge strips at unprotected or exposed edges, and where flooring terminates.
  7. Secure edge strips before installation of flooring with stainless steel screws.
  8. Install flooring tight to floor access covers, unless indicated otherwise by manufacturer's installation recommendations.
  9. Install flooring under movable partitions without interrupting floor pattern.
  10. Provide expansion requirements in field and space at fixed walls and other interruptions as needed for expansion and contraction.
  11. At cushioned sleepers, install springs in perimeter expansion space at 24 inches.
- K. Finishing Wood Strip Flooring:
1. Allow installed flooring to acclimate to ambient conditions for a minimum period of 7 days before sanding.
  2. Mask off and protect adjacent surfaces before beginning sanding.
  3. Sand flooring to smooth even finish with no evidence of sander marks. Take precautions to contain dust.

- a. Machine sand with coarse, medium, and fine grades of sandpaper. After sanding, buff entire floor using 120 grit screen or equal grit sandpaper, with a heavy-duty buffing machine.
  - b. Clean with power vacuum, tack, and check to confirm that entire surface of each piece has been sanded, and that floor is level and smooth, without ridges or cups. Proceed immediately with finish process.
  4. Apply finish system in accordance with floor finish manufacturer's recommendations and MFMA Standards.
    - a. Where penetrating stain is indicated, apply prior to first coat of sealer.
    - b. Where painted game lines or other graphics are indicated, apply after second coat of sealer.
      - 1) Lay out lines, fields and other graphics as indicated for colored enamel application. Mask flooring to provide sharp edges.
      - 2) Apply game lines and graphics with crisp and distinct edges.
      - 3) Apply game lines straight and true.
      - 4) Main basketball court lines are continuous. Main volleyball court lines are secondary and will break at main basketball court lines.
      - 5) Apply paint to minimum 1.0 mil thickness, in colors as indicated, or as selected by Architect.
  5. Allow each coat to cure. Buff lightly to remove irregularities. Vacuum clean and wipe with damp cloth and allow to dry before applying succeeding coat.
  6. Apply last coat of finish. After the last coat of finish has cured, if there are any areas of the finish that appear to have a dull or inconsistent sheen, apply additional finish coats as required to achieve a consistent and uniform sheen over entire floor.
- L. Install wall base at floor perimeter to cover expansion space in accordance with manufacturer's instructions. Miter inside corners and install premolded outside corners.

### 3.4 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work and comply with manufacturer's recommendations.
- B. Clean and polish floor surfaces in accordance with flooring and finishing manufacturers' recommended material, procedures, and instructions.

### 3.5 PROTECTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Prohibit traffic on floor finish for 48 hours after installation.
- C. Place protective coverings over finished floors; do not remove coverings until Substantial Completion inspection by Architect. Resume protection until final completion.

**END OF SECTION**



## SECTION 09 65 00

### RESILIENT FLOORING

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
  - 1. Resilient tile flooring.
  - 2. Resilient wall base - non-vented type.
  - 3. Resilient stair covering.
- B. Related Requirements:
  - 1. Section 03 30 00 - Cast-In-Place Concrete: Finishing of floor slab for resilient floor application.
  - 2. Sections indicating Plumbing, Electrical and Mechanical as related to floor installed devices such as drains, utility boxes, devices, and trim.

##### 1.2 REFERENCES

- A. ASTM International (ASTM):
  - 1. ASTM D2240 - Standard Test Method for Rubber Property-Durometer Hardness; 2015, Reapproval 2021.
  - 2. ASTM D3389 - Standard Test Method for Coated Fabrics Abrasion Resistance (Rotary Platform Abrader); 2021.
  - 3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
  - 4. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2023.
  - 5. ASTM E662 - Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials; 2021a, Editorial Revisions.
  - 6. ASTM F150 - Standard Test Method for Electrical Resistance of Conductive and Static Dissipative Resilient Flooring; 2006, Reapproval 2018.
  - 7. ASTM F386 - Standard Test Method for Thickness of Resilient Flooring Materials Having Flat Surfaces; 2017, Reapproval 2022.
  - 8. ASTM F410 - Standard Test Method for Wear Layer Thickness of Resilient Floor Coverings by Optical Measurement; 2008, Reapproval 2022.
  - 9. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2022.
  - 10. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile; 2023.
  - 11. ASTM F1344 - Standard Specification for Rubber Floor Tile; 2021a.
  - 12. ASTM F1700 - Standard Specification for Solid Vinyl Floor Tile; 2020.
  - 13. ASTM F1861 - Standard Specification for Resilient Wall Base; 2021.
  - 14. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2023.
  - 15. ASTM F1913 - Standard Specification for Vinyl Sheet Floor Covering Without Backing; 2019.
  - 16. ASTM F1914 - Standard Test Methods for Short-Term Indentation and Residual Indentation of Resilient Floor Covering; 2018, Reapproval 2023.
  - 17. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019a.
  - 18. ASTM F2195 - Standard Specification for Linoleum Floor Tile; 2018, Reapproval 2023.

19. ASTM F2421 - Standard Test Method for Measurement of Resilient Floor Plank by Dial Gauge; 2019a.
- B. National Fire Protection Association (NFPA):
  1. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2023.

### 1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data describing physical and performance characteristics; include manufacturer's full range of sizes, patterns, colors, and finishes available; include moldings, transition and edge trim as indicated on Drawings and otherwise recommended by manufacturer of Resilient Floor products; include installation instructions.
- C. Shop Drawings: Submit shop drawings indicating each product, locations, layouts, dimensions, patterns, trim details, and interface with adjacent work by others.
- D. Samples for Initial Selection: Two manufacturer's complete set of color samples illustrating the full range of sizes, patterns, colors, and finishes available; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selection; samples to be same product material type indicated for final Work; each sample 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.

### 1.4 CLOSEOUT SUBMITTALS

- A. Section 01 78 23 - Operation and Maintenance Data.
- B. Operation and Maintenance Data: Submit maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

### 1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

### 1.6 MOCK-UPS

- A. Section 01 40 00 - Quality Requirements: Mock-up requirements.
- B. At project site, install mock-up using acceptable products and manufacturer approved installation methods, including concrete substrate testing. Obtain Architect's approval of mock-up.
  1. Mock-up Size and Locations: One typical room; location as indicated by Architect.
  2. Mock-up may be incorporated into the final construction upon Architect's approval for mock-up to remain.

### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.



- C. Store all materials off the floor in an acclimatized, weather-tight space.
- D. Maintain temperature in storage area between 55 degrees F and 90 degrees F.
- E. Protect roll materials from damage by storing on end.
- F. Do not double stack pallets.

## 1.8 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after Work.
- B. Store materials for not less than 48 hours prior to installation in area of installation at temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

## 1.9 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Vinyl Composition Tile: Provide five (5) year manufacturer's warranty.
- C. Luxury Vinyl Tile:
  - 1. Flooring Tiles of Class III, Type B - Embossed Surface with minimum of 0.020 inch (20 mil) Wear Layer: Provide fifteen (15) year manufacturer's warranty.

## 1.10 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
- B. Resilient Flooring: Furnish to Owner the following for each type and color installed.
  - 1. Fifty (50) square feet of flooring.
- C. Resilient Wall Base: Furnish to Owner the following for each type and color installed.
  - 1. One hundred (100) linear feet of wall base.
  - 2. Ten (10) each of pre-molded corners matching color and profile of each wall base.
- D. Resilient Stair Covering: Furnish to Owner the following for each type and color installed.
  - 1. Five (5) percent of components and materials.

## PART 2 PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire Performance Characteristics: Unless otherwise indicated, provide resilient flooring products with the following fire performance characteristics in accordance with the standards. Testing to be by a certified testing laboratory or other testing agency acceptable to authorities having jurisdiction:
  - 1. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
  - 2. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter (Class 1) in accordance with ASTM E648 or NFPA 253.
  - 3. Smoke Density: 450 or less in accordance with ASTM E662.

### 2.2 RESILIENT TILE FLOORING

- A. Luxury Vinyl Tile (LVT):
  - 1. LVT1

- a. Basis of Design: Mannington Commercial: Active Lines Bend, 20 mil; Flash and Zoom Teal, 6x36 inches.
- b. Alternate 1 – Mohawk: Rendered Flax, Wild Indigo and Mist.
- c. Alternate 2 – J&J Flooring: Abridge, 1112 Fabric and 1111 Color.

### 2.3 RESILIENT WALL BASE - NON-VENTED TYPE

- A. Manufacturers:
  1. Mannington Commercial.
  2. Johnsonite, a Tarkett Company.
  3. Roppe Corporation.
  4. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design:
  1. As indicated on Drawings.
- C. Resilient Non-vented Wall Base:
  1. Comply with ASTM F1861.
    - a. Type:
      - 1) Type TS - Rubber, vulcanized thermoset.
    - b. Group:
      - 1) Group 1 - Solid.
    - c. Style:
      - 1) Style B - Top set, Cove.
  2. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter (Class 1), when tested in accordance with ASTM E648 or NFPA 253.
  3. Smoke Density: 450 or less in accordance with ASTM E662.
  4. Height:
    - a. 4 inches.
  5. Thickness: 0.125 inch thick.
  6. Finish: Satin.
  7. Length: Roll. Pre-cut lengths are not permitted.
  8. Accessories: Premolded external corners and end stops.
  9. Colors: Solid.
    - a. To be selected by Architect from manufacturer's full range.

### 2.4 RESILIENT STAIR COVERING

- A. Manufacturers:
  1. Flexco Corporation.
  2. Interface, Inc.
  3. Johnsonite, a Tarkett Company.
  4. Mannington Commercial.
  5. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design:
  1. As indicated on Drawings.
- C. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter (Class 1) in accordance with ASTM E648 or NFPA 253.
- D. Smoke Density: 450 or less in accordance with ASTM E662.
- E. Material:
  1. Rubber.
- F. Covering Style:

1. Nosing/Tread/Riser Style: Single piece covering full width and depth of stair nosing, tread, and riser in one piece; nosing not less than 1-3/4 inches deep.
  - a. Bottom edge of nosing is to abut and join to top edge of riser covering material below without gap or void and in a manner as to prevent protruding trip hazard at bottom of nosing edge.
- G. Nosing:
  1. Thickness: Minimum 0.210 inch.
  2. Angle and profile to match profile of riser below for full adhesion without gaps that could cause trip hazard.
  3. Integral non-slip abrasive nose strip; contrasting color complying with visually impaired requirements.
    - a. Width to be 2 inches.
  4. Integral photoluminescent (glow-in-the-dark) nose strip; 2 inches wide (1 inch along nose vertical face and 1 inch along nose top); contrasting color complying with visually impaired requirements.
- H. Tread Design Pattern:
  1. Round discs; raised.
- I. Stair Landings Flooring: Same manufacturer, material, color, and pattern as the Stair Covering.
- J. Colors: Integral throughout product.
  1. To be selected by Architect from manufacturer's full range.

## 2.5 ACCESSORIES

- A. Subfloor Filler: Factory mixed latex type recommended by manufacturers of flooring and adhesive materials and compatible with substrate materials and conditions.
- B. Primers and Adhesives: Waterproof type recommended by manufacturer of flooring material and compatible with substrate materials and conditions.
- C. Moldings, Transition and Edge Strips: As indicated on Drawings or as otherwise selected by Architect from Product Data submittals.
- D. Feature Strips: Of same material as tile. Width as indicated on Drawings.
- E. Cleaner, Sealer and Wax/Polish: Provide finishing products, equipment, and application as recommended by flooring material manufacturer.
  1. Cleaner: As required for cleaning.
  2. Sealer: 2 coats minimum.
  3. Wax/Polish: 4 coats minimum.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify compliance with the requirements in the PART 1, ENVIRONMENTAL REQUIREMENTS article.
- C. Verify that existing conditions are as required before starting work of the Section.
- D. Verify that the assembled and finished floor system of this Section will finish flush with floor boxes, inserts, devices, and adjacent finished floors. This flush transition requirement

- cannot be over emphasized. The transition joints must be tight and flush to eliminate trip hazards.
- E. Verify that floor boxes, inserts, utilities, and other floor devices are installed in correct locations.
  - F. Verify that overhead work trades have finished their work in the flooring areas.
  - G. Verify that the building is dry, all openings are closed in, adequate ventilation is provided, and permanent heating and air conditioning is installed operating and providing the required conditioning of the air in the work area.
  - H. Verify that surfaces are 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.
  - I. Verify that the concrete finish has been steel troweled to a true level and finished smooth and straight to a tolerance of 1/4 inch in a 10 foot radius. High spots are to be ground level and low spots filled in with approved leveling compounds to achieve the required elevation and level flatness.
    - 1. Sloped Concrete: Levelness is relative to slopes indicated such as slopes to drains.
  - J. 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 wall base material.
  - K. Verify that the concrete substrate is dry in accordance with industry standard testing procedures, free of foreign materials, and broom cleaned.
  - L. Cementitious Substrate Surfaces Testing: Verify that substrates are ready for flooring installation by testing for moisture and alkalinity (pH).
    - 1. Alkalinity (pH) Testing: ASTM F710. Measurement for pH range is to be not less than 7 pH and not more than 9 pH, unless written recommendations of flooring manufacturer or adhesive manufacturer are more stringent.
    - 2. Internal Relative Humidity Testing: ASTM F2170. Perform test using in situ probes. Humidity level of substrates is to measure no more than 75 percent relative humidity level, unless written recommendations of flooring manufacturer or adhesive manufacturer are more stringent.
    - 3. Moisture Vapor Emission Testing: ASTM F1869. Perform anhydrous calcium chloride test. Moisture Vapor Emission Rate (MVER) from the slab is to be less than or equal to 3 lbs of water per 1,000 sf in 24 hours, unless written recommendations of flooring manufacturer or adhesive manufacturer are more stringent.
    - 4. Conduct tests by an independent testing agency acceptable to Owner.
  - M. Do not proceed with installation work until noncompliant conditions have been corrected.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Prepare substrates to receive work as recommended by work product manufacturers.
- D. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.
- E. Prohibit traffic until filler is cured.
- F. Clean substrate.

- G. Apply primer as recommended by resilient flooring product manufacturer and where required to prevent "bleed-through" or interference with adhesion.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. General:
1. Starting installation constitutes acceptance of sub-floor conditions.
  2. Install in accordance with manufacturer's written instructions and recommendations to ensure warranty requirements.
  3. Spread only enough adhesive to permit installation of materials before initial set.
  4. Fit joints and butt seams tightly.
  5. Set flooring in place, press with heavy roller to attain full adhesion. Sound top surface of installed flooring material to ensure there are no hollow sounds (hollow sound may indicate flooring that is not fully adhered/bonded to substrate).
  6. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door (door in closed position).
  7. Install edge transition strips at unprotected or exposed edges, where flooring terminates, where flooring transitions to dissimilar flooring finishes and as indicated on Drawings.
  8. Resilient Strips: Attach to substrate using adhesive.
  9. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.
  10. Install flooring in recessed floor access covers, maintaining floor pattern.
  11. At movable partitions, install flooring under partitions without interrupting floor pattern.
  12. If feature strips/designs are indicated on Drawings, install feature strips/designs.
  13. Non-Factory Finished Flooring: Provide flooring finishes as indicated and in accordance with flooring manufacturer's recommendations.
- C. Resilient Tile Flooring:
1. Mix tile from containers to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.
  2. Unless flooring layout design is indicated otherwise on Drawings, lay flooring with joints and seams parallel to building lines to produce symmetrical tile pattern.
  3. Install tile to pattern indicated on Drawings. Allow minimum 1/2 full size tile width at room or area perimeter.
- D. Resilient Wall Base:
1. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.
  2. Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.
  3. Install wall base on solid backing. Bond tightly to wall and floor surfaces. Bottom edge of wall base should be consistently in contact with finished flooring.
  4. Scribe and fit to door frames and other interruptions.
- E. Resilient Stair Coverings:
1. Install stair coverings in one piece for full width of stairs.
  2. Install stringers configured tightly to stair profile.
  3. Adhere over entire surface. Fit accurately and securely.
  4. Nosing angle and profile is to match the profile of the riser below. Install nosing with full adhesion ensuring that bottom edge of the nosing is without gaps and does not create a protruding tripping hazard.

**3.4 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Remove excess adhesive from installed work and adjacent surfaces without damage to surfaces.
- C. Clean and maintain the work.

**3.5 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Prohibit traffic on flooring for duration recommended by manufacturer and not less than the following:
  - 1. Light Foot Traffic: 24 hours after installation.
  - 2. Rolling Load Traffic: 72 hours after installation.
- C. Protect the work from stains and damage.

**END OF SECTION**

**SECTION 09 65 66**  
**RESILIENT ATHLETIC FLOORING**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Flooring Type:
    - a. Vinyl sheet flooring, fully adhered.
  - 2. Game lines and graphics.
  - 3. Wall base.
- B. Related Requirements:
  - 1. Section 03 30 00 - Cast-in-Place Concrete: Coordinate compatibility of concrete curing compounds with finish flooring application requirements.
  - 2. Section 09 65 00 - Resilient Flooring: Wall base finish.
  - 3. Division 12 - Furnishings: Loads imposed on flooring by furnishings.

**1.2 REFERENCES**

- A. ASTM International (ASTM):
  - 1. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method; 2023.
  - 2. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2022.
  - 3. ASTM F1303 - Standard Specification for Sheet Vinyl Floor Covering with Backing; 2004, Reapproval 2021.
  - 4. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2023.
  - 5. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019a.
- B. National Fire Protection Association (NFPA):
  - 1. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2023.

**1.3 COORDINATION**

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Cast-in-Place Concrete: Coordinate compatibility of concrete curing compounds with finish flooring application requirements.
- C. Telescoping Bleachers: Coordinate installation of flooring with loads imposed by telescoping bleachers (if any) to provide adequate support for bleacher rollers and to not exceed resilient athletic flooring load rating (psi).

**1.4 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Manufacturer's printed data sheets for products specified.
- C. Shop Drawings:
  - 1. Fabrication and installation details.
  - 2. Layout, colors, and widths of game lines and graphics.

3. Equipment locations including floor inserts for athletic equipment installed through flooring.
- D. Samples for Initial Selection: Two manufacturer's complete sets of color samples illustrating the full range of finishes and colors available; submit for Architect's initial selections.
  1. Include color charts for game line and graphics paints.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples to be same product material type indicated for final Work; each sample 12 x 12 inches mounted on solid backing. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
  1. Include samples of game lines, illustrating colors selected.

## 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer certified in writing by the flooring manufacturer to be qualified for installation of specified flooring system.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.
- C. Store all materials off the floor in an acclimatized, weather-tight space.
- D. Maintain temperature in storage area between 55 degrees F and 90 degrees F.
- E. Protect roll materials from damage by storing on end.
- F. Do not double stack pallets.

## 1.7 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after Work.
- B. Store materials for not less than 48 hours prior to installation in area of installation at temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

## 1.8 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Provide ten (10) year manufacturer's warranty in which manufacturer agrees to repair or replace sports flooring, including labor, that fails within specified warranty period.
- C. Provide two (2) year installer's warranty in which installer agrees to repair or replace sports flooring that fails due to poor workmanship or faulty installation within the specified warranty period.

## 1.9 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
  1. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.



- a. Sheet Flooring: Furnish full-width rolls of not less than 10 linear feet for each 500 linear feet or fraction thereof, of each type, color, and pattern of flooring installed.

## **PART 2 PRODUCTS**

### **2.1 PREFORMED ATHLETIC FLOORING**

- A. Vinyl Sheet Flooring:
  1. Wearing Surface: Pure polyvinyl chloride, mechanically extruded and uniformly resilient material with uniform color throughout thickness. Comply with ASTM F1303.
  2. Backing: PVC foam. Comply with ASTM F1303.
  3. Sheet Total Thickness:
    - a. Minimum 0.26 inch (6.6 mm).
  4. Sheet Wear Layer Thickness: Minimum 0.040 inch (1.0 mm).
  5. Sheet Width: Minimum 59 inches (1500 mm).
  6. Sheet Lengths: Minimum 49 feet (15 m).
  7. Ball Rebound: Minimum 96 percent.
  8. Seaming Method: Welding with heat or chemical.
  9. Surface Texture: Embossed.
  10. Colors and Patterns:
    - a. As selected by Architect from manufacturer's full range.
  11. Game Lines and Graphics: High gloss coating as approved by sheet flooring manufacturer.
    - a. Game Lines:
      - 1) Refer to Drawings for required game line types and layouts (e.g. basketball, volleyball, etc.).
      - 2) Layout shall be as indicated on Drawings and in compliance with the current NFHS - Court and Field Diagram Guide.
  12. Top Coat: If recommended by sheet flooring manufacturer to protect game lines, graphics and wearing surface, apply clear top coat material as recommended by flooring manufacturer.
  13. Manufacturers: All products by the same manufacturer.
    - a. Gerflor.
    - b. Shaw Contract.
    - c. Tarkett Sports.
    - d. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Wall Base:
  1. Provide as indicated in Section 09 65 00 - Resilient Flooring and on Drawings.
  2. Colors:
    - a. As selected by Architect from manufacturer's full range as submitted under Section 09 65 00.

### **2.2 ACCESSORIES**

- A. Leveling Compound: Type recommended by flooring manufacturer for substrate conditions and bond for flooring adhesive.
- B. Flooring Adhesive: Waterproof type recommended by flooring manufacturer for the flooring material and substrate conditions.

**PART 3 EXECUTION****3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify compliance with the requirements in the PART 1, ENVIRONMENTAL REQUIREMENTS article.
- C. Verify that existing conditions are as required before starting work of the Section.
- D. Verify that the assembled and finished floor system of this Section will finish flush with floor boxes, inserts, devices, and adjacent finished floors. This flush transition requirement cannot be over emphasized. The transition joints must be tight and flush to eliminate trip hazards.
- E. Verify that floor boxes, inserts, utilities, and other floor devices are installed in correct locations.
- F. Verify that overhead work trades have finished their work in the flooring areas.
- G. Verify that the building is dry, all openings are closed in, adequate ventilation is provided, and permanent heating and air conditioning is installed operating and providing the required conditioning of the air in the work area.
- H. Verify that surfaces are 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.
- I. Verify that the concrete finish has been steel troweled to a true level and finished smooth and straight to a tolerance of 1/4 inch in a 10 foot radius. High spots are to be ground level and low spots filled in with approved leveling compounds to achieve the required elevation and level flatness.
  - 1. Sloped Concrete: Levelness is relative to slopes indicated such as slopes to drains.
- J. 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 wall base material.
- K. Verify that the concrete substrate is dry in accordance with industry standard testing procedures, free of foreign materials, and broom cleaned.
- L. Cementitious Substrate Surfaces Testing: Verify that substrates are ready for flooring installation by testing for moisture and alkalinity (pH).
  - 1. Alkalinity (pH) Testing: ASTM F710. Measurement for pH range is to be not less than 7 pH and not more than 9 pH, unless written recommendations of flooring manufacturer or adhesive manufacturer are more stringent.
  - 2. Internal Relative Humidity Testing: ASTM F2170. Perform test using in situ probes. Humidity level of substrates is to measure no more than 75 percent relative humidity level, unless written recommendations of flooring manufacturer or adhesive manufacturer are more stringent.
  - 3. Moisture Vapor Emission Testing: ASTM F1869. Perform anhydrous calcium chloride test. Moisture vapor emission rate (MVER) from the slab is to be less than or equal to 3 lbs of water per 1,000 sf in 24 hours, unless written recommendations of flooring manufacturer or adhesive manufacturer are more stringent.
  - 4. Conduct tests by an independent testing agency acceptable to Owner.
- M. Do not proceed with installation work until noncompliant conditions have been corrected.

**3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Prepare substrates to receive work as recommended by work product manufacturers.
- D. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.
- E. Prohibit traffic until filler is cured.
- F. Clean substrate.
- G. Apply primer as recommended by resilient flooring product manufacturer and where required to prevent "bleed-through" or interference with adhesion.

**3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Starting installation constitutes acceptance of sub-floor conditions.
- C. Vinyl Sheet Flooring:
  - 1. Comply with manufacturer's installation instructions and recommendations and approved shop drawings.
  - 2. Unroll flooring and allow to relax before beginning installation.
  - 3. Mix adhesive thoroughly and apply to substrate with notched trowel. Roll flooring into fresh adhesive, overlapping end seams and double cutting, butting factory edges and compression fitting.
  - 4. Roll entire flooring surface with steel roller to assure adhesion to substrate and eliminate air bubbles.
  - 5. Immediately remove any adhesive from flooring surface, using chemical recommended by flooring manufacturer.
  - 6. Weld seams using techniques and equipment recommended by manufacturer.
  - 7. Lay out game lines using tape and taping machine approved by flooring manufacturer. Apply game line paint with roller and allow to dry before removing tape.
  - 8. Apply transparent top coat over flooring if recommended by manufacturer for protection and to achieve a uniform finished appearance.
- D. Games Lines and Graphics: Refer to PART 2 PRODUCTS in this Section for sheet flooring material description and subparagraphs therein.
- E. Install wall base.

**3.4 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Clean flooring using methods recommended by manufacturer.

**3.5 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect finished flooring from construction traffic and maintain without damage.

**END OF SECTION**



**SECTION 09 65 95**  
**POLYMER PANEL FLOORING**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Solid polymer panels (polyboard) system on wood composite subfloor system.
- B. Related Requirements:
  - 1. Section 03 30 00 - Cast-In-Place Concrete Flooring system substrate.
  - 2. Section 09 64 29 - Wood Strip and Plank Flooring: Refer to QUALITY ASSURANCE article and COORDINATION articles of this Section for Single Source Responsibility requirement.

**1.2 REFERENCES**

- A. APA-The Engineered Wood Association (APA).
- B. ASTM International (ASTM):
  - 1. ASTM C365/C365M - Standard Test Method for Flatwise Compressive Properties of Sandwich Cores; 2022.
  - 2. ASTM D785 - Standard Test Method for Rockwell Hardness of Plastics and Electrical Insulating Materials; 2023.
  - 3. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials; 2017.
  - 4. ASTM D2240 - Standard Test Method for Rubber Property-Durometer Hardness; 2015, Reapproval 2021.
  - 5. ASTM D3676 - Standard Specification for Rubber Cellular Cushion Used for Carpet or Rug Underlay; 2018.
  - 6. ASTM D4397 - Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications; 2016, Reapproval 2023.
  - 7. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2023.
  - 8. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2022.
  - 9. ASTM F1861 - Standard Specification for Resilient Wall Base; 2021.
  - 10. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2023.
  - 11. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019a.
- C. American Wood Protection Association (AWPA).
  - 1. AWPA U1 - Use Category System: User Specification for Treated Wood; 2023.

**1.3 COORDINATION**

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate the installation of the concrete substrate with the requirements of the Work of this Section.
  - 1. The finish elevation of the depress concrete is to be equal to the assembled and finished flooring system as required to achieve flush flooring transitions. The concrete finish is to be steel troweled to a true level and finished smooth and straight to a

tolerance of 1/4 inch in a 10 foot radius. High spots are to be ground level and low spots filled in with approved leveling compounds to achieve the required elevation and level flatness.

- a. Sloped Concrete: Levelness is relative to slopes indicated such as slopes to drains.
- C. Floor Boxes, Access Covers, Trim and Other Floor Devices: Coordinate work of this Section with work requirements by others that interface with the work of this Section.
  - D. Where Drawings indicate stage/platform flooring area to be partly wood strip flooring and partly polymer panel flooring, refer to Section 09 64 29 - Wood Strip and Plank Flooring for the wood strip flooring system requirements. The subfloor construction components of the polymer panel flooring system are to match the wood strip flooring system construction. However, the finish surfaces of the two stage/platform flooring materials must finish flush with each other; therefore, minor adjustments to the thicknesses of the sleepers and subfloor components will be required to achieve the required flush floor finish. Acquire approval from the Architect for required adjustments in thicknesses.
    1. Single Source Responsibility: The polymer panel flooring system and the wood strip flooring system are to be provided by the same Installer.

#### 1.4 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this Section. Review the work requirements, application procedures, quality control, testing and inspection and production schedule.
- C. Using a small mockup assembly (about 12 inches square) of the flooring systems, demonstrate that the assembled flooring systems will finish level and flush with adjacent floor finishes at doorways, openings, and points of egress.

#### 1.5 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Provide data for materials and accessories; include standard construction details, material descriptions, dimensions of individual components, profiles, assemblies, and finishes.
- C. Shop Drawings: Indicate floor joint pattern and termination details.
  1. Indicate materials, layout, dimensions, installation details, moisture protection, methods of attachment in construction, relationships, and transitions to surrounding and adjacent construction, base and trim details, and floor boxes and devices.
  2. Indicate provisions for expansion and contraction, base, and base corner details.
  3. Indicate equipment inserts, floor boxes, sockets, and other devices within the flooring area.
- D. Samples for Initial Selection: Submit two sets of manufacturer's samples; 2 x 3 inches in size; illustrating full range of colors and finishes available; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit three samples for each selected color and finish; minimum 8 x 8 inches and fastened to wood substrate illustrating fastener applications as required in construction. Where finished panels involve normal color and texture variations, include sample sets showing the full range of variations expected.

- F. Installation Instructions: Indicate standard and special installation procedures. Include instructions for applying finishing system.
- G. Maintenance Data: Include maintenance procedures and recommended maintenance materials.

## 1.6 CLOSEOUT SUBMITTALS

- A. Section 01 77 00 - Closeout Procedures.
- B. Operation and Maintenance Data: Submit manufacturer's instructions for maintaining and refinishing of each flooring type installed.

## 1.7 QUALITY ASSURANCE

- A. Single Source Responsibility: Engage a single qualified Installer to provide the work of this Section.
  - 1. When the polymer panel flooring system of this Section interfaces with (abuts) a wood strip flooring system, both flooring systems are to be provided by the same Installer. Refer to the following Sections:
    - a. Section 09 65 95 - Polymer Panel Flooring (This Section).
    - b. Section 09 64 29 - Wood Strip and Plank Flooring.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section with minimum five (5) years documented experience.
- C. Installer Qualifications: Company specializing in performing work of the type specified and with at least three (3) years of documented experience.

## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Accept materials on site in manufacturer's original packaging. Inspect for damage.
- C. Store components and other materials in a dry, warm, well-ventilated, weathertight location, in a horizontal position, and protected from exposure to moisture.

## 1.9 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after Work.
- B. Do not install wood flooring until wet construction work is complete and permanent heat and air conditioning is installed and operating.
- C. Maintain room temperature between 65 degrees F and 75 degrees F and relative humidity between 35 to 40 percent for a period of seven (7) days prior to delivery of materials to installation area, during installation, and after installation.
- D. Acclimate flooring materials by storing materials in conditioned installation area prior to installation as follows:
  - 1. 7 days, minimum.

## 1.10 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Manufacturer's Warranty: Furnish two (2) year warranty against defects in materials and workmanship.
- C. Installer's Warranty: Furnish three (3) year warranty for materials, installation, and finish.

## 1.11 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
  - 1. Extra Flooring Material: Provide five (5) full size panels of each type installed.

## PART 2 PRODUCTS

### 2.1 SOLID POLYMER PANEL FLOORING

- A. Description: Floating system; solid polymer panels; over plywood subfloor; over wood sleepers with resilient pads; over vapor retarder; on concrete slab-on-grade.
- B. Components:
  - 1. Solid Polymer Panels.
    - a. Basis of Design: Productions Unlimited, Inc. - Polyonyx+ Performance Flooring Panels. ([www.productionsunlimitedinc.com](http://www.productionsunlimitedinc.com))
    - b. Non-Slip surface finish.
    - c. Dimension: 4 x 8 feet.
    - d. Thickness: 1/2 inch, unless indicated to be less on Drawings.
    - e. Sheet Weight: 67 pounds.
    - f. Color: Black.
    - g. Density: 0.85 grams per cubic centimeter.
    - h. Shore D Hardness: 98 per ASTM D785.
    - i. Water Absorption: None.
    - j. Compressive Strength: 1,123 psi (both directions) per ASTM C365/C365M.
    - k. Flexural Strength: 2,470 psi per ASTM D790-15e2.
    - l. Texture: Textured on one side and smooth on opposite side. Coordinate with Architect for selection of which side is to be exposed (top).
    - m. Screw Fasteners: Black and as recommended by panel manufacturer.
  - 2. Sheathing Paper: Plain building paper.
  - 3. Wood Subflooring: Plywood; APA Rated Sheathing, span rating of 40/20; C-D Exposure 1; preservative-treated.
    - a. Edges: Tongue and groove cut.
    - b. Thickness: Number of layers and thickness to be as indicated on Drawings, but initial layer on sleepers to be not less than 5/8 inch thick.
  - 4. Wood Sleepers and Shims: Standard grade, nominal 2 by 3 inches by 4 feet long, kiln dried Eastern hemlock, fir, pine, or spruce, waterborne pressure preservative-treated according to AWWA U1, Use Category UC2.
  - 5. Resilient Cushion Pads: Resilient pads, rubber material, unsealed air slots for resiliency; 2-1/4 x 3 inches size and 3/8 inch thick; factory applied to bottom of sleepers at 12 inches o.c. and each end.
  - 6. Vapor Retarder: ASTM D4397, black polyethylene sheet, 8 mil thick; 2 inch wide tape as recommended by vapor retarder manufacturer for continuous joint sealing.

### 2.2 ACCESSORIES

- A. Flooring System Fasteners: Non-corrosive type as recommended by flooring system manufacturer.
- B. Subflooring Fasteners: Screws of non-corrosive type; length as required to secure each subflooring layer into sleepers below.
- C. Perimeter Springs: Flat spring steel, leaf shaped, with attachment clips, 0.093 x 1 x 9 inches size.



- D. Transition Covers: Extruded aluminum, ADA compliant, top grooved parallel to length, factory countersunk anchor holes, and mill finished.
- E. Vented Wall Base: Molded rubber complying with ASTM F1861, Type TS, Group 1 (solid) Standard Specification for Resilient Wall Base.
  - 1. Pre-molded outside corners with minimum 3 inch returns. Pre-molded end caps.
  - 2. Size: 4 inches (10.16 cm) high by 5/16 inch (7.94 mm) thick coved profile with a 3 inch (7.62 cm) long by 3/8 inch (9.53 mm) thick toe.
  - 3. Venting: Back of vertical surface grooved with vertical semi-circular vents. 15 vents per 4 ft. length.
  - 4. Length: Minimum 4 foot lengths.
  - 5. Hardness: ASTM D2240 - Not less than 85 Shore A.
  - 6. Fire Resistance: Meets ASTM E648 - Class I.
  - 7. Comply with ASTM F1861 requirements for resistance to heat/light aging, chemicals, and dimensional stability.
  - 8. Color: To be selected by Architect from manufacturer's full range.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify compliance with the requirements in the PART 1, ENVIRONMENTAL REQUIREMENTS article.
- C. Verify that existing conditions are as required before starting work of the Section.
- D. Verify that the finish elevation of the depressed concrete is equal to the assembled and finished flooring system as required to achieve flush flooring transitions.
- E. Verify that the assembled and finished floor system of this Section will finish flush with floor boxes, inserts, devices, and adjacent finished floors. This flush transition requirement cannot be over emphasized. The transition joints must be tight and flush to eliminate trip hazards.
- F. Verify that floor boxes, inserts, utilities, and other floor devices are installed in correct locations.
- G. Verify that all adjacent work (including flooring by others) is completed and that overhead work trades have finished their work in the flooring areas.
- H. Verify that the building is dry, all openings are closed in, adequate ventilation is provided, and permanent heating and air conditioning is installed operating and providing the required conditioning of the air in the work area.
- I. Verify that surfaces are 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.
- J. Verify that the concrete finish has been steel troweled to a true level and finished smooth and straight to a tolerance of 1/4 inch in a 10 foot radius. High spots are to be ground level and low spots filled in with approved leveling compounds to achieve the required elevation and level flatness.
- K. 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 wall base material.

- L. Verify that the concrete substrate is dry in accordance with industry standard testing procedures, free of foreign materials, and broom cleaned.
- M. Cementitious Substrate Surfaces Testing: Verify that substrates are ready for flooring installation by testing for moisture and alkalinity (pH).
  - 1. Alkalinity (pH) Testing: ASTM F710. Measurement for pH range is to be not less than 7 pH and not more than 9 pH, unless written recommendations of flooring manufacturer or adhesive manufacturer are more stringent.
  - 2. Internal Relative Humidity Testing: ASTM F2170. Perform test using in situ probes. Humidity level of substrates is to measure no more than 75 percent relative humidity level unless written recommendations of flooring manufacturer or adhesive manufacturer are more stringent.
  - 3. Moisture Vapor Emission Testing: ASTM F1869. Perform anhydrous calcium chloride test. Moisture vapor emission rate (MVER) from the slab is to be less than or equal to 3 lbs of water per 1,000 sf in 24 hours unless written recommendations of flooring manufacturer or adhesive manufacturer are more stringent.
  - 4. Conduct tests by an independent testing agency acceptable to Owner.
- N. Do not proceed with installation work until noncompliant conditions have been corrected.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Comply with product manufacturer's site and material condition requirements for installation.
- D. Broom clean concrete subfloor.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Floor Boxes, Access Covers, and Other Floor Devices: Coordinate work of this Section with other contractors/installers of such devices and trim components.
- C. Install floor sockets and inserts to a depth sufficient to ensure flush top surface with floor surface.
- D. Cushioned Sleepers:
  - 1. Place vapor retarder over concrete subfloor surface, lapping edges and ends minimum 6 inches and tape for continuous seal; spot glue in place.
  - 2. Place cushioned sleepers over vapor retarder; end to end at right angles to the direction of the finish wood flooring panels. Stagger end joints 24 inches minimum. Space sleepers 12 inches on center. Do not secure to concrete subfloor. Maintain an expansion void at walls and all vertical obstructions; void size as recommended by manufacturer, but no less than 1-1/2 inches.
  - 3. Install shims as required for equal bearing on concrete substrate and to achieve level line of plus or minus 1/8 inch in a 10 feet radius.
- E. Wood Subflooring: Place plywood subflooring over sleepers.
  - 1. Lay plywood with the long edge perpendicular to the sleepers, with end joints over sleepers, and secure to sleepers with fasteners at 12 inches on center or closer if recommended by manufacturer.
  - 2. If two layers of subflooring are indicated, continue as follows:

- a. Place sheathing paper between subflooring layers, lapping edges and ends 2 inches, staple in place.
  - b. Lay the second layer in the same direction as first layer, with edge joints offset from first layer by 24 inches and end joints offset from first layer by one sleeper. Secure to sleepers with fasteners at 12 inches on center.
- F. Prepare wood subfloor to receive polymer panel flooring in accordance with manufacturer's recommendations.
- G. Broom clean wood subfloor.
- H. Sheathing Paper: Place between top of wood subfloor and bottom of finish wood flooring; lap edges and ends 2 inches, staple in place.
- I. Solid Polymer Panel Flooring:
1. Install in accordance with manufacturer's recommendations.
  2. Predrill and countersink holes for installation of screws to flush finish with panel finish surface.
  3. Lay flooring panels parallel to front of stage, beginning with full panel nearest the front of stage and progressing toward back of stage in running bond pattern. Verify alignment as work progresses.
  4. Install screws in pattern in accordance with panel manufacturer's recommendations.
  5. Terminate flooring at adjacent flooring, allowing expansion void, and install aluminum saddle type threshold of such width and thickness as to bridge the expansion void.
  6. Where divider strips and transition strips are required, provide such strips in accordance with flooring manufacturer's recommendations and as indicated.
  7. Install edge strips at unprotected or exposed edges, and where flooring terminates.
  8. Secure edge strips before installation of flooring with stainless steel screws.
  9. Install flooring tight to floor access covers, unless indicated otherwise by manufacturer's installation recommendations.
  10. Install flooring under movable partitions without interrupting floor pattern.
  11. Provide expansion requirements in field and space at fixed walls and other interruptions as needed for expansion and contraction.
  12. At cushioned sleepers, install springs in perimeter expansion space at 24 inches.
- J. Install wall base at floor perimeter to cover expansion space in accordance with manufacturer's instructions. Miter inside corners and install premolded outside corners.
- K. Install and finish wood trim and aprons as indicated on Drawings and specified in sections related to Finish Carpentry and Painting and Coating.

### 3.4 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work and comply with manufacturer's recommendations.
- B. Clean and polish floor surfaces in accordance with flooring and finishing manufacturers' recommended material, procedures, and instructions.

### 3.5 PROTECTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Prohibit traffic on floor finish for 48 hours after installation.
- C. Place protective coverings over finished floors; do not remove coverings until Substantial Completion inspection by Architect. Resume protection until final completion.

**END OF SECTION**

**SECTION 09 66 23**  
**RESINOUS MATRIX TERRAZZO FLOORING**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section includes resinous matrix terrazzo work and includes the following:
  - 1. Floors.
  - 2. Wall base.
- B. Related Requirements:
  - 1. Section 03 30 00 - Cast-In-Place Concrete: Concrete subfloor with broom finish.
  - 2. Section 07 90 00 - Joint Protection: Joint between terrazzo base and wall surface.
  - 3. Section 07 95 00 - Expansion Control: Building expansion joint covers.

**1.2 ALTERNATES**

- A. This Section is an Alternate as described in Section 01 23 00 - Alternates. This Section is applicable if the Alternate is accepted by Owner as part of the Contract Work.

**1.3 REFERENCE STANDARDS**

- A. National Terrazzo and Mosaic Association (NTMA):
  - 1. NTMA - Terrazzo Specifications; Current Edition.

**1.4 COORDINATION**

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate placement of terrazzo divider strips with locations of mechanical and electrical access covers, substrate control joints and expansion joints, and other items built into terrazzo.
- C. Coordinate concrete substrate placement, finishing, and curing to be compatible with and as required for application of the work of this Section. Terrazzo flooring system bond to concrete substrate is required and essential.

**1.5 PRE-INSTALLATION MEETINGS**

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

**1.6 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data for divider strips, control joint strips, and sealer.
- C. Shop Drawings: Indicate divider strip and control joint layout, flooring material transitions, color patterns, and details of adjacent components.
- D. Samples for Initial Selection: Two manufacturer's complete set of color samples illustrating the full range of available finishes, colors, chip size and variations, chip gradation, matrix color, and divider and control joint strips; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples to be same product material type

indicated for final Work; each sample 8 x 8 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.

- F. Warranty: Submit sample warranty.

### 1.7 CLOSEOUT SUBMITTALS

- A. Section 01 78 23 - Operation and Maintenance Data.
- B. Operation and Maintenance Data:
1. Submit installation testing and inspection reports.
  2. Submit procedures for stain removal, stripping, and sealing.
- C. Record Documentation of Substrate Cracks and Remedies:
1. Submit scaled drawings and photographs that record locations of all substrate cracks and remedial construction applied to eliminate detrimental effect of such cracks on terrazzo flooring system.
  2. Include drawings of all floor areas receiving terrazzo. For drawings sheets of areas without substrate cracks, indicate so on the respective sheet.
  3. Survey for Record Documentation to be conducted prior to installation of terrazzo.
  4. Record Documentation to be titled, "Record Documentation of Substrate Cracks and Remedies." Documentation to include dates and times of survey and remediation.
  5. Contractor's project manager to certify Record Documentation with signature and certification date.
  6. Include certified documentation in closeout submittals for 01 78 39 - Project Record Documents.

### 1.8 QUALITY ASSURANCE

- A. Perform work in accordance with NTMA current recommendations.

### 1.9 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five (5) five years documented experience.
- B. Installer: Company specializing in performing Work of this section with minimum five (5) years documented experience.

### 1.10 MOCKUP

- A. Section 01 40 00 - Quality Requirements: Requirements for mockup.
- B. Mockup - To Remain As Part Of Final Construction, If Accepted:
1. Construct mockup, 10 x 10 feet, illustrating finish work. Include terrazzo flooring work and base.
  2. Locate mockup as directed by Architect.
  3. Mockup work rejected by Architect is to be fully removed from site promptly.

### 1.11 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Store resin materials in dry, secure area.
- C. Maintain minimum temperature of 55 degrees F.
- D. Keep products away from fire or open flame.

## 1.12 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements.
- B. Do not install terrazzo when temperature is below 50 degrees F or above 90 degrees F.
- C. Maintain temperature within specified range 24 hours before, during, and 72 hours after installation of flooring.
- D. Provide ambient lighting level of 50 ft candles measured at floor surface.

## 1.13 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Special Warranty: Manufacturer and installer, jointly, agree to provide labor and material to repair and, if necessary, to replace components of terrazzo flooring system that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, loss of bond to substrate, cracks, and damage due to normal wear and tear.
  - 2. Failures do not include the following:
    - a. Damage due to bubbling or loss of adhesion due to moisture penetration through the substrate.
    - b. Acts of God or other elements beyond scope of protection of this system.
  - 3. Warranty Period: Fifteen (15) years from date of Substantial Completion.
  - 4. Limitations:
    - a. In case of warranty claim, Owner will provide written notice to terrazzo manufacturer and installer within 60 days of problem's discovery.
    - b. Remedies provided by epoxy terrazzo flooring manufacturer and installer are limited to removal and replacement of failed terrazzo flooring areas.

## PART 2 PRODUCTS

### 2.1 RESINOUS MATRIX TERRAZZO

- A. Manufacturers:
  - 1. Crossfield Products Corp.
  - 2. Doyle Dickerson Terrazzo, Inc.
  - 3. Fritz Industries Inc.
  - 4. Key Resin Company.
  - 5. Master Terrazzo Technologies.
  - 6. Sherwin-Williams High Performance Flooring.
  - 7. Terrazzo & Marble Supply Companies.
  - 8. Substitutions: Section 01 60 00 - Product Requirements.

### 2.2 COMPONENTS

- A. Floors: Epoxy matrix.
  - 1. Finished Matrix Thickness:
    - a. 3/8 inch thick.
  - 2. Matrix Color: To be selected by Architect from manufacturer's full range.
  - 3. Aggregate Color: To be selected by Architect from full range of domestic and imported chips.
  - 4. Aggregate Size: No. 0-1.
  - 5. Colors:
    - a. As selected by Architect from manufacturer's full range.

- B. Wall Base Type:
1. Terrazzo Precast Base Type: Precast units with thickness, height and profile as indicated on Drawings.
    - a. Top exposed edges, chamfered finish at one third the unit thickness.
    - b. Height: 4 inches unless indicated otherwise on Drawings.
    - c. Length: Longest practical length, but not less than 36 inches.
    - d. All exposed surfaces finished to specified grit finish.
    - e. Color, finish, matrix, and aggregate materials to match adjacent terrazzo flooring, unless selected otherwise by Architect from manufacturer's full range.
- C. Materials:
1. Epoxy Matrix: Two component resin and epoxy hardener with mineral filler and color pigment, non-volatile, thermo-setting.
  2. Aggregate: Crushed marble, size of standard gradation and uniform coloration.
- D. Mix Proportions: As required to achieve bond, performance, and appearance requirements.
- E. Grit Finish: 1800 grit finish.

### 2.3 ACCESSORIES

- A. All materials used are to be compatible with the terrazzo system indicated and is be approved by the terrazzo system manufacturer, supplier, and contractor. This requirement includes materials and methods used to correct non-conforming concrete substrate conditions that are detrimental to terrazzo system bonding to substrate and finished flatness requirements.
- B. Divider Strips: Configurations as indicated on Drawings.
1. Terrazzo Over Substrate-**With**-Joint: Substrate Control Joint types include expansion joints, contraction joints, and isolation joints.
    - a. Divider Strip:
      - 1) 1/8 inch exposed top.
    - b. Two divider strips required at each joint (one on each side of joint).
    - c. Where filler is required or indicated to fill void between joint divider strips, use neoprene type filler as recommended by terrazzo matrix manufacturer.
      - 1) Color to be as selected by Architect from manufacturer's full range.
  2. Terrazzo Over Substrate-**Without**-Joint:
    - a. Divider Strip at Change in Terrazzo Color:
      - 1) 1/8 inch exposed top.
    - b. Divider Strip at No Change in Terrazzo Color:
      - 1) 1/6 inch exposed top.
  3. Vertical Height: To suit thickness of terrazzo topping, with allowance for grinding.
  4. Material: Aluminum.
  5. Divider Strip Attachment: Epoxy adhesive material as recommended by terrazzo flooring manufacturer and installer for substrate type and condition; continuously adhered.
- C. Anti-Crack Membrane: Liquid applied with fiberglass applied reinforcing mesh. Type recommended by terrazzo flooring manufacturer and installer.
- D. Cleaner: Liquid type, pH of 7; as recommended and approved by terrazzo flooring manufacturer and installer.
- E. Subfloor Filler: Type and use as recommended and approved by terrazzo flooring manufacturer and installer.
- F. Terrazzo Sealer: Sealer to be slip-resistant and as recommended by terrazzo flooring manufacturer and installer.



**PART 3 EXECUTION****3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify substrate surfaces are ready to receive work.
- C. Verify that substrate flatness and levelness is as required to complete the terrazzo installation within the tolerances indicated in ERECTION TOLERANCES article in this Section.
- D. Do not begin terrazzo work until the following is achieved:
  - 1. Concrete substrate has cured 28 days, minimum, and has dried to a moisture content as recommended by the terrazzo system manufacturer, but in no case greater than 12 percent moisture content.
  - 2. All corrective substrate work has been completed.

**3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment used during installation.
- C. Clean substrate of foreign matter.
- D. Substrate Preparation:
  - 1. Prepare substrate in accordance with manufacturer's written recommendations.
- E. Collect and record data required, as specified in the CLOSEOUT SUBMITTALS article of this Section, for producing the "Record Documentation of Substrate Cracks and Remedies".
- F. Anti-Crack Membrane:
  - 1. At locations of existing cracks in floor substrate, apply anti-crack membrane with reinforcing mesh for full length of each crack.

**3.3 INSTALLATION**

- A. Install divider and control joint strips true to alignment and level at locations indicated on Drawings.
- B. Provide control joints in concrete substrate and terrazzo flooring per NTMA recommendations and as follows:
  - 1. Provide terrazzo divider strips at all contraction, expansion, and isolation joints in concrete slab.
  - 2. Provide terrazzo control joint strips at all corner locations.
  - 3. Provide divider and control joint strips in accordance with NTMA standards.
- C. Place terrazzo mix over prepared substrate to thickness indicated.
- D. Close area to allow undisturbed curing.
- E. Finishing:
  - 1. Finish terrazzo to NTMA requirements and as indicated in this Section.
  - 2. Produce terrazzo finish surface to match approved mock-up sample, with 70 percent chip exposed.
  - 3. Grind terrazzo surfaces with power disc machine; sequence with coarse to fine grit abrasive, using wet or dry method.
  - 4. Apply patch mix to match matrix over ground surface to fill honeycomb exposed during grinding.
  - 5. Remove patch coat by grinding, using fine grit abrasive.

- 6. Finish to specified grit finish.
- F. Install wall base.

### **3.4 FIELD QUALITY CONTROL**

- A. Section 01 40 00 - Quality Requirements: Monitor quality of installation, inspection, and testing.
- B. Test installed terrazzo flooring for secure bond to substrate. Remove and replace terrazzo found not to be bonded to include flooring with a hollow sound beneath.

### **3.5 MANUFACTURER'S FIELD SERVICES**

- A. Section 01 40 00 - Quality Requirements: Manufacturers' field services.
- B. Manufacturer to inspect work once during placement of flooring mixture onto prepared substrate and once at complete of installation. Manufacturer's inspector to provide inspection report that included observed deficiencies and required remedies. If flooring delamination remedial work is required after completion of installation inspection, manufacturer's inspector to reinspect remedial work and provide inspection report. Submit all inspection reports to Architect and Owner and include copies in Closeout Submittals.

### **3.6 ERECTION TOLERANCES**

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation from Flat Surface: 1/4 inch in 10 feet.
- C. Maximum Variation from Level (except slopes to drains): 1/8 inch.

### **3.7 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Scrub and clean terrazzo surfaces with cleaner and as recommended jointly by manufacturer and installer. Let dry.
- C. Immediately after terrazzo has dried, apply sealer in accordance with manufacturer's instructions.
- D. Polish surfaces in accordance with manufacturer's instructions.

### **3.8 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Do not permit traffic over finished terrazzo surfaces.

**END OF SECTION**

## SECTION 09 67 23

### RESINOUS FLOORING

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
  - 1. Seamless resinous flooring systems with integral cove base.
- B. Related Requirements:
  - 1. Section 03 30 00 - Cast-In-Place Concrete: Concrete subfloor.

##### 1.2 REFERENCES

- A. ASTM International (ASTM):
  - 1. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2022.
  - 2. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2023.
  - 3. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019a.
- B. International Concrete Repair Institute (ICRI):
  - 1. ICRI 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair; 2013.

##### 1.3 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate finishing of the concrete substrate with the requirements for the flooring system to be installed.
- C. Coordinate curing materials to be used during concrete substrate installation with requirements for flooring system materials. The intent is to prevent installation of curing materials that may inhibit the flooring system's bond/adhesion to concrete substrate.
- D. Coordinate slopes to floor drains during concrete substrate installation.

##### 1.4 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing Work of this Section.

##### 1.5 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on specified products describing physical and performance characteristics, and color, pattern, and texture options available.
- C. Shop Drawings: Submit scaled drawings indicating the following:
  - 1. Floor areas to receive the Work. Include the colors and patterns for each area.
  - 2. Indicate walls, floor drains, floor boxes, penetrations, and other surface interruptions.
  - 3. Indicate floor areas to be sloped and direction of slope.
  - 4. Indicate locations to receive waterproofing membrane.

5. Indicate locations of substrate expansion, isolation and control joints requiring joint treatment at interface with flooring system; indicate materials to be used at each such joint type.
  6. Section detail drawings indicating termination and transition edges at interface with other construction work, key cuts, cove base details, treatments at substrate various joint types and cracks (moving and non-moving), interface with floor drains and other obstructions.
- D. Samples for Initial Selection: Two manufacturer's complete sets of color samples illustrating the full range of available finishes, colors, chip and aggregate sizes/colors/blends, resin colors, trim, and accessories; submit for Architect's initial selections. Include sealant colors.
  - E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples to be same product material type indicated for final Work; each sample 8 x 8 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
  - F. Manufacturer's Certificate: Certify products meet or exceed specified requirements.
  - G. Manufacturer's Qualification Statement.
  - H. Installer's Qualification Statement.
  - I. Manufacturer's Installation Instructions: Include procedures for installing each flooring system component, special procedures and perimeter conditions requiring special attention.

## 1.6 CLOSEOUT SUBMITTALS

- A. Section 01 77 00 - Closeout Procedures.
- B. Operation and Maintenance Data: Include maintenance procedures, recommended maintenance materials, procedures for stain removal, repairing surface, and suggested schedule for cleaning.

## 1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section with minimum five (5) years documented experience.
- B. Installer Qualifications: Company specializing in performing the Work of this Section with minimum five (5) years of documented experience and approved by product manufacturer.
  1. Supervisor Qualifications: Trained by product manufacturer.
- C. Source Limitations: Obtain primary flooring system materials, including primers, resins, hardening agents, grouting coats, and topcoats, from single source from single manufacturer. Obtain secondary flooring system materials, including patching and fill material, joint sealant, and repair materials, of type and from manufacturer recommended in writing by manufacturer of primary materials.
- D. Flooring systems are to comply with applicable requirements of United States Department of Agriculture (USDA), Food and Drug Administration (FDA), and local Health Department.

## 1.8 MOCKUP

- A. Section 01 40 00 - Quality Requirements: Requirements for mockup.
- B. Locate where directed by Architect.
- C. Construct mockup, 10 x 10 feet, including flooring, base, and accessories to illustrate appearance of finished Work.

- D. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
- E. Subject to compliance with requirements, approved mockups may become part of the completed Work if undamaged at time of Final Completion.

## **1.9 DELIVERY, STORAGE, AND HANDLING**

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Store materials in accordance with manufacturer's recommendations but not less stringent than the following:
  - 1. Maintain minimum temperature in storage area of 55 degrees F (13 degrees C).
  - 2. Store materials in area of installation for minimum period of 24 hours prior to installation.
  - 3. Maintain ambient temperature required by manufacturer 72 hours prior to, during, and 24 hours after installation of materials.

## **1.10 ENVIRONMENTAL REQUIREMENTS**

- A. Section 01 60 00 - Product Requirements.
- B. Maintain ambient temperature required by manufacturer 72 hours prior to installation, during installation, and 24 hours after floor system has cured.
- C. Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application.
- D. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application.
- E. Close spaces to traffic during resinous flooring application and for 24 hours after application unless manufacturer recommends a longer period.

## **1.11 SPARE PARTS AND MAINTENANCE PRODUCTS**

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
- B. Furnish the following to Owner for each flooring system type, color, and finish installed. Materials are to be packaged and sealed by manufacturer in quantities required to produce floor systems matching those installed.
  - 1. Quantities of flooring system materials to fully install 30 square feet of floor area.
  - 2. Quantities of flooring system materials to fully install 10 linear feet of wall base.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Manufacturers:
  - 1. Dex-O-Tex.
  - 2. Dur-A-Flex, Inc.
  - 3. Sherwin-Williams.
  - 4. Sika.
  - 5. Stonhard, Inc.
  - 6. Substitutions: Section 01 60 00 - Product Requirements.

**2.2 RESINOUS FLOORING SYSTEMS**

- A. Resinous Flooring **Type RSF1**: Application locations as indicated on Drawings.
1. Basis of Design: Dur-A-Flex, Inc. - Hybri-Flex EC System.
  2. System Thickness: 3/16 inch thick.
  3. Components:
    - a. Primer: Polyurethane based. (Poly-Crete TF Plus)
    - b. Base Coat: Cementitious urethane based, with fine aggregate. (Poly-Crete SL)
      - 1) Broadcast:
        - a) Vinyl flakes.
          - (1) Size/color/blend to be selected by Architect from manufacturer's full range.
    - c. Broadcast Coat: Epoxy based. (Dur-A-Glaze #4)
      - 1) Broadcast:
        - a) Vinyl flakes.
          - (1) Size/color/blend to be selected by Architect from manufacturer's full range.
      - d. Grout Coat: Epoxy based. (Dur-A-Glaze #4)
        - 1) Slip Resistant Grit: 36 grit aluminum oxide, white. (Dur-A-Grit #36)
        - 2) Slip resistant grit to be applied only in the following area types:
          - a) Shower Areas.
          - b) Athletic Locker Rooms.
          - c) Restrooms and Toilets.
          - d) Other areas where indicated on Drawings.
      - e. Topcoat: Aliphatic urethane based. (Armor Top)
    4. Finish Appearance:
      - a. Color:
        - 1) To be selected by Architect from manufacturer's full range.
      - b. Sheen:
        - 1) To be selected by Architect from manufacturer's full range.
      - c. Texture:
        - 1) To be selected by Architect from manufacturer's full range.
    5. Resinous Base: Match resinous flooring; seamless with radius cove integral to resinous flooring material. No slip resistant grit required.
      - a. Base Height:
        - 1) 4 inches unless indicated otherwise on Drawings.
      - b. Base Top:
        - 1) Zinc metal angle trim sized for thickness of resinous base for termination and protection of top edge of resinous base. To be installed as integral part of resinous base.

B. Resinous Flooring **Type RSF2**: Application locations as indicated on Drawings.

    1. Basis of Design: Dur-A-Flex, Inc. - Poly-Crete SLB System.
    2. System Thickness: 3/16 inch thick.
    3. Components:
      - a. Primer: Polyurethane based. (Poly-Crete TF Plus)
      - b. Base Coat: Cementitious urethane based, with fine aggregate. (Poly-Crete SL)
        - 1) Broadcast:
          - a) Quartz aggregate. (Earthstone)
            - (1) Size/color/blend to be selected by Architect from manufacturer's full range.
        - c. Grout Coat: Polyurethane based. (Poly-Crete TF Plus)
        - d. Topcoat: Aliphatic urethane based. (Armor Top)
      4. Finish Appearance:

- a. Color:
    - 1) To be selected by Architect from manufacturer's full range.
  - b. Sheen:
    - 1) To be selected by Architect from manufacturer's full range.
  - c. Texture:
    - 1) To be selected by Architect from manufacturer's full range.
  - 5. Resinous Base: Match resinous flooring; seamless with radius cove integral to resinous flooring material.
    - a. Base Height:
      - 1) 4 inches unless indicated otherwise on Drawings.
    - b. Base Top:
      - 1) Zinc metal angle trim sized for thickness of resinous base for termination and protection of top edge of resinous base. To be installed as integral part of resinous base.
- C. Resinous Flooring **Type RSF3**: Application locations as indicated on Drawings.
- 1. Basis of Design: Dur-A-Flex, Inc. - Poly-Crete SLB System.
  - 2. System Thickness: 3/16 inch thick.
  - 3. Components:
    - a. Primer: Polyurethane based. (Poly-Crete TF Plus)
    - b. Base Coat: Cementitious urethane based, with fine aggregate. (Poly-Crete SL)
      - 1) Broadcast:
        - a) Quartz aggregate. (Earthstone)
          - (1) Size/color/blend to be selected by Architect from manufacturer's full range.
    - c. Grout Coat: Epoxy based. (Shop Floor)
    - d. Topcoat: Aliphatic urethane based. (Armor Top)
  - 4. Finish Appearance:
    - a. Color:
      - 1) To be selected by Architect from manufacturer's full range.
    - b. Sheen:
      - 1) To be selected by Architect from manufacturer's full range.
    - c. Texture:
      - 1) To be selected by Architect from manufacturer's full range.
  - 5. Resinous Base: Match resinous flooring; seamless with radius cove integral to resinous flooring material.
    - a. Base Height:
      - 1) 4 inches unless indicated otherwise on Drawings.
    - b. Base Top:
      - 1) Zinc metal angle trim sized for thickness of resinous base for termination and protection of top edge of resinous base. To be installed as integral part of resinous base.
- D. Resinous Flooring **Type RSF4**: Application locations as indicated on Drawings.
- 1. Basis of Design: Dur-A-Flex, Inc. - Hybri-Flex AC System.
  - 2. System Thickness: 3/16 inch thick.
  - 3. Components:
    - a. Primer: Polyurethane based. (Poly-Crete TF Plus)
    - b. Base Coat: Cementitious urethane based, with fine aggregate. (Poly-Crete SL)
      - 1) Broadcast:
        - a) Vinyl flakes.
          - (1) Size/color/blend to be selected by Architect from manufacturer's full range.
    - c. Broadcast Coat: Epoxy based. (Dur-A-Glaze #4)

- 1) Broadcast:
    - a) Vinyl flakes.
      - (1) Size/color/blend to be selected by Architect from manufacturer's full range.
    - d. Grout Coat: Urethane Polymer based. (Accelera)
    - e. Topcoat: Urethane Polymer based. (Accelera)
  - 4. Finish Appearance:
    - a. Color:
      - 1) To be selected by Architect from manufacturer's full range.
    - b. Sheen:
      - 1) To be selected by Architect from manufacturer's full range.
    - c. Texture:
      - 1) To be selected by Architect from manufacturer's full range.
  - 5. Resinous Base: Match resinous flooring; seamless with radius cove integral to resinous flooring material.
    - a. Base Height:
      - 1) 4 inches unless indicated otherwise on Drawings.
    - b. Base Top:
      - 1) Zinc metal angle trim sized for thickness of resinous base for termination and protection of top edge of resinous base. To be installed as integral part of resinous base.
- E. Accessories:
- 1. Waterproofing Membrane: Type recommended by resinous flooring system manufacturer for substrate and flooring system component materials to be installed.
  - 2. Reinforcing Membrane: Type recommended by resinous flooring system manufacturer for substrate and flooring system component materials to be installed.
  - 3. Subfloor Fillers: Types recommended by resinous flooring system manufacturer, specific to the filling, sloping or patching conditions.
  - 4. Primers and Adhesives: Waterproof types recommended by resinous flooring system manufacturer.
  - 5. Joint Sealant: Type recommended or produced by resinous flooring system manufacturer for type of flooring system finish performance, user traffic, service and joint condition indicated.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting Work.
- B. Verify existing conditions are as required before starting Work of the Section.
- C. Verify the installed and finished floor system of this Section will finish flush with the finished level of floor boxes, inserts, devices, and adjacent floors. This flush transition requirement cannot be over emphasized. The transition joints must be tight and flush to eliminate trip hazards.
- D. Verify floor boxes, inserts, utilities, and other floor devices are installed in correct locations.
- E. Verify floor drains are installed, properly aligned, and are at finish elevations to allow flooring application to slope to drains.
  - 1. If floor drains are rectangular in shape, verify that the sides are properly aligned with room features such as dominate walls unless otherwise indicated on Drawings.



- F. Verify all adjacent work, including flooring by others, is completed and that overhead work trades have finished their work in the flooring areas.
- G. Verify building is dry, all openings are closed in, adequate ventilation is provided, and permanent heating and air conditioning is installed operating and providing the required conditioning of the air in the work area.
- H. Verify substrates are 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.
- I. Verify concrete substrate finishes have been steel troweled to a true level and finished smooth and straight to a tolerance of 1/4 inch in a 10 foot radius. High spots are to be ground level and low spots filled in with approved leveling compounds to achieve the required elevation and level flatness.
  - 1. Sloped Concrete: Levelness is relative to slopes indicated including slopes to drains.
- J. Verify wall surfaces are flat within the tolerances specified for that type of work.
- K. Verify concrete substrates are dry in accordance with industry standard testing procedures.
- L. Verify substrates are free of dust, debris, and deleterious matter.
- M. Cementitious Substrate Surfaces Testing: Verify that substrates are ready for flooring installation by testing for moisture and alkalinity (pH).
  - 1. Alkalinity (pH) Testing: ASTM F710. Measurement for pH range is to be not less than 7 pH and not more than 9 pH, unless written recommendations of flooring manufacturer or adhesive manufacturer are more stringent.
  - 2. Internal Relative Humidity Testing: ASTM F2170. Perform test using in situ probes. Humidity level of substrates is to measure no more than 75 percent relative humidity level unless written recommendations of flooring manufacturer or adhesive manufacturer are more stringent.
  - 3. Moisture Vapor Emission Testing: ASTM F1869. Perform anhydrous calcium chloride test. Moisture vapor emission rate (MVER) from the slab is to be less than or equal to 3 lbs of water per 1,000 sf in 24 hours unless written recommendations of flooring manufacturer or adhesive manufacturer are more stringent.
  - 4. Conduct tests by an independent testing agency acceptable to Owner.
- N. Do not proceed with installation Work until noncompliant conditions have been corrected.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of Work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Concrete surfaces shall be free of oil, grease, curing compounds, loose particles, moss, algae growth, laitance, friable matter, dirt, and bituminous products.
- D. Mechanical Surface Preparation: Perform preparation on substrate as recommended by manufacturer and as follows.
  - 1. Shot blast all surfaces to receive flooring system with a mobile steel shot, dust recycling machine (Blastrac or equal). All surface and embedded accumulations of paint, toppings hardened concrete layers, laitance, power trowel finishes, and other similar surface characteristics shall be completely removed leaving a bare concrete surface having a minimum profile of CSP 4-5 in accordance with ICRI 310.2R.

2. Floor areas inaccessible to the mobile blast machines shall be mechanically abraded to the same degree of cleanliness, soundness and profile using diamond grinders, needle guns, bush hammers, or other suitable equipment.
  3. Where the perimeter of the substrate to be coated is not adjacent to a wall or curb, a minimum 1/4 inch key cut shall be made to properly seat the system, providing a smooth transition between areas. The detail cut shall also apply to drain perimeters and expansion joint edges.
  4. Remove substrate ridges and bumps.
  5. Treat non-moving cracks and joints to prevent cracks from reflecting through the flooring system. Perform treatments and repairs in accordance with flooring system manufacturer's recommendations.
- E. At spalled or worn areas, mechanically remove loose or delaminated concrete to a sound concrete and patch per manufactures recommendations.
- F. Apply subfloor filler in accordance with manufacturer's recommendations to fill depressions, minor holes, and to slope floors away from walls and toward floor drains if floor drains are present.
1. Apply, trowel, and float subfloor filler to achieve smooth, flat, hard surface. Grind irregularities above surface level. Prohibit traffic until filler is cured.
- G. Clean substrate.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.
1. Apply each coat of flooring system at thickness recommended by flooring system manufacturer.
  2. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.
  3. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
  4. Expansion, Isolation and Control Joint Treatment: At substrate expansion and isolation joints, comply with resinous flooring manufacturer's written instructions and details for each joint type and condition. Apply joint sealant to comply with manufacturer's written recommendations.
- C. Primer: Apply primer over prepared substrate at manufacturer's recommended spreading rate.
1. Coordinate use of primer with flooring system manufacturer recommendations at locations where waterproofing membrane and reinforcing membrane are installed.
- D. Waterproofing Membrane: At locations indicated, apply waterproofing membrane over entire substrate surface and including behind integral cove base. Comply with flooring system manufacturer's recommendations for application and thickness.
1. Locations: Elevated floors, shower areas, and other locations indicated on Drawings.
- E. Reinforcing Membrane:
1. Apply reinforcing membrane to non-moving cracks and joints.
- F. Integral Cove Base: Apply cove base mix to wall surfaces before applying flooring. Apply according to manufacturer's written instructions and details, including those for taping, mixing, priming, troweling, sanding, and topcoating of cove base. Round internal and external corners. Transitions in planes, terminations, abutments, and cove formed base are to be carefully crafted with accurate lines and smooth contouring.

**3.4 ERECTION TOLERANCES**

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation from Flat Surface: 1/4 inch in 10 feet.
- C. Maximum Variation from Level: 1/8 inch.
  - 1. Sloped Concrete: Levelness is relative to slopes indicated including slopes to drains.

**3.5 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed Work and comply with manufacturer's recommendations.
- B. Clean installed Work in accordance with manufacturer's recommended materials and procedures.

**3.6 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Prohibit traffic on floor finish until cured; barricade as required.
- C. Protect resinous flooring from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by resinous flooring system manufacturer.

**END OF SECTION**



**SECTION 09 68 13****TILE CARPETING****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Tile carpeting.
  - 2. Accessories.
- B. Related Requirements:
  - 1. Section 03 30 00 - Cast-In-Place Concrete: Flooring substrate.
  - 2. Section 09 65 00 - Resilient Flooring: Wall base.
  - 3. Section 09 68 16: Sheet Carpeting.

**1.2 REFERENCES**

- A. American Association of Textile Chemists and Colorists (AATCC):
  - 1. AATCC 134 - Test Method for Electrostatic Propensity of Carpets; 2019.
  - 2. AATCC 174 - Test Method for Antimicrobial Activity Assessment of New Carpets; 2022, Editorial Changes 2023.
- B. ASTM International (ASTM):
  - 1. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method; 2023.
  - 2. ASTM D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials; 2016, Reapproval 2021.
  - 3. ASTM D5116 - Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/Products; 2017.
  - 4. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2023.
  - 5. ASTM E662 - Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials; 2021a.
  - 6. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2022.
  - 7. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2023.
  - 8. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019a.
- C. Carpet and Rug Institute (CRI):
  - 1. CRI 104 - Standard for Installation of Commercial Carpet; 2015.
  - 2. CRI (GLP) - Green Label Plus Testing Program - Certified Products; Current Edition.
- D. National Fire Protection Association (NFPA):
  - 1. NFPA 253 - Standard Method of Test for Critical Radiant Flux for Floor Covering Systems Using a Radiant Heat Energy Source; 2023.

**1.3 PRE-INSTALLATION MEETINGS**

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this Section. Review the work requirements, application procedures, quality control, testing and inspection and production schedule.

**1.4 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.
- C. Shop Drawings: Indicate layout of joints, direction of carpet tiles, location of moldings and transition edge strips.
- D. Samples for Initial Selection: Two manufacturer's complete sets of color samples illustrating the full range of colors, textures and pattern designs available; submit for Architect's initial selections. Include 6 inches long samples of moldings and transition edge strips.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected colors, textures, and pattern designs; samples to be same product material type indicated for final Work; each sample 12 x 12 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Manufacturer's Installation Instructions: Submit special procedures, perimeter conditions requiring special attention.

**1.5 CLOSEOUT SUBMITTALS**

- A. Section 01 77 00 - Closeout Procedures.
- B. Operation and Maintenance Data: Submit maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

**1.6 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section with minimum five (5) years documented experience.
- B. Installer Qualifications: Company specializing in performing work of this Section with minimum three (3) years documented experience and approved by carpet manufacturer.
- C. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

**1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Store materials in compliance with the manufacturer's recommendations.

**1.8 ENVIRONMENTAL REQUIREMENTS**

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after Work.
- B. Do not install the work of this Section until wet construction work is complete and permanent heat and air conditioning is installed and operating.
- C. Maintain room temperature and humidity levels prior to installation in accordance with manufacturer's recommendations.
- D. Acclimate flooring materials by storing materials in conditioned installation area prior to installation for period recommended by manufacturer, but not less 48 hours.

## 1.9 WARRANTIES

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Carpet Tile: Provide manufacturer's warranties covering the following:
  - 1. Lifetime Commercial Limited Warranty: Includes coverage for Fiber Abrasive Wear, Fiber Static Protection, Fiber Stain Warranty, Fiber Colorfastness to Light and Fiber Atmospheric Contaminants.

## 1.10 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
  - 1. Supply 100 square feet of carpet tiles of each pattern and color installed.

## PART 2 PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Materials to comply with the following independently tested performance criteria:
  - 1. Surface Flammability Ignition: Pass ASTM D2859 (the "pill test").
  - 2. Critical Radiant Flux (CRF): In compliance with ASTM E648 or NFPA 253.
    - a. Class I, minimum 0.45 watt per square centimeter.
  - 3. Smoke Density: 450 or less in accordance with ASTM E662.
  - 4. Noise Reduction Coefficient: NRC Rating 0.30 (ASTM C423).
  - 5. Slip Resistance: Comply with ADA Guidelines.
  - 6. VOC: Carpet certified as passing the CRI (GLP) indoor air quality testing program.
  - 7. Dimensional Stability: 0.1 % or less change Stability (Aachen Method Din 54318)
  - 8. Static Generation:
    - a. 3.5 kV or less at 20% R.H. at 70° F (AATCC 134 w/ neolite).
  - 9. Antimicrobial: Broad spectrum antimicrobial; permanent application in backing. Application must pass AATCC 174.
  - 10. VOC Limits: Provide carpet tile that complies with the following limits for VOC content when tested according to ASTM D5116:
    - a. Total VOCs: 0.5 mg/sq. m x h.
    - b. 4-PC (4-Phenylcyclohexene): 0.05 mg/sq. m x h.
    - c. Formaldehyde: 0.05 mg/sq. m x h.
    - d. Styrene: 0.4 mg/sq. m x h.
  - 11. Adhesive: Comply with the following criteria unless the manufacturer's warranty requirements indicate otherwise.
    - a. Water-resistant, mildew-resistant, non-staining, pressure-sensitive type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet tile and is recommended by carpet tile manufacturer for releasable installation.
    - b. Adhesive VOC Limits: Provide adhesives that comply with the following limits for VOC content when tested according to ASTM D5116:
      - 1) Total VOCs: 10.00 mg/sq. m x h.
      - 2) Formaldehyde: 0.05 mg/sq. m x h.
      - 3) 2-Ethyl-1-Hexanol: 3.00 mg/sq. m x h.

### 2.2 CARPET TILE

- A. Carpet Tile **Type CPT**: Manufactured in one color dye lot; conforming to the following criteria:
  - 1. CPT1

- a. Basis of Design: Tarkett Flooring: Create Purpose Resourceful, 18x36 inches.
- b. Alternate 1- Mannington: Boucle Moderne, Azurite, 24x24 inches.
- c. Alternate 2- Patcraft: Infrastructure, Electric 00450, 24x24 inches.

### 2.3 WALL BASE

- A. Wall Base Type: As indicated in Section 09 65 00 - Resilient Flooring.
  1. Color: As selected by Architect from samples submitted under Section 09 65 00.

### 2.4 ACCESSORIES

- A. Sub-Floor Filler: Factory mixed latex type recommended by manufacturers of flooring and adhesive materials and compatible with substrate materials and conditions.
- B. Primers and Adhesives: Water-resistive type recommended by manufacturer of flooring material and compatible with substrate materials and conditions.
- C. Moldings, Transition, and Edge Strips:
  1. Rubber: Colors and profiles to be selected by Architect from manufacturer's full range.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify compliance with the requirements in the PART 1, ENVIRONMENTAL REQUIREMENTS article.
- C. Verify that existing conditions are as required before starting work of the Section.
- D. Verify that the assembled and finished floor system of this Section will finish flush with floor boxes, inserts, devices, and adjacent finished floors. This flush transition requirement cannot be over emphasized. The transition joints must be tight and flush to eliminate trip hazards.
- E. Verify that floor boxes, inserts, utilities, and other floor devices are installed in correct locations.
- F. Verify that overhead work trades have finished their work in the flooring areas.
- G. Verify that the building is dry, all openings are closed in, adequate ventilation is provided, and permanent heating and air conditioning is installed operating and providing the required conditioning of the air in the work area.
- H. Verify that surfaces are 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.
- I. Verify that the concrete finish has been steel troweled to a true level and finished smooth and straight to a tolerance of 1/4 inch in a 10 foot radius. High spots are to be ground level and low spots filled in with approved leveling compounds to achieve the required elevation and level flatness.
- J. 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 wall base material.
- K. Verify that the concrete substrate is dry in accordance with industry standard testing procedures, free of foreign materials, and broom cleaned.



- L. Cementitious Substrate Surfaces Testing: Verify that substrates are ready for flooring installation by testing for moisture and alkalinity (pH).
  - 1. Alkalinity (pH) Testing: ASTM F710. Measurement for pH range is to be not less than 7 pH and not more than 9 pH, unless written recommendations of flooring manufacturer or adhesive manufacturer are more stringent.
  - 2. Internal Relative Humidity Testing: ASTM F2170. Perform test using in situ probes. Humidity level of substrates is to measure no more than 75 percent relative humidity level, unless written recommendations of flooring manufacturer or adhesive manufacturer are more stringent.
  - 3. Moisture Vapor Emission Testing: ASTM F1869. Perform anhydrous calcium chloride test. Moisture vapor emission rate (MVER) from the slab is to be less than or equal to 3 lbs of water per 1,000 sf in 24 hours, unless written recommendations of flooring manufacturer or adhesive manufacturer are more stringent.
  - 4. Conduct tests by an independent testing agency acceptable to Owner.
- M. Do not proceed with installation work until noncompliant conditions have been corrected.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with sub-floor filler.
- D. Apply filler. Trowel and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.
- E. Clean substrate.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Comply with CRI 104 and manufacturer's recommendations.
- C. Do not mix carpet from different cartons unless from same dye lot.
- D. Cut carpet clean. Fit carpet tight to intersection with vertical surfaces without gaps.
- E. Locate change of color or pattern between rooms under door centerline.
- F. Fully adhere carpet tile to substrate using adhesives and instructions in accordance with carpet manufacturer's recommendations.
- G. Trim carpet neatly at walls and around interruptions.
- H. Complete installation of moldings and transition edge strips, concealing exposed edges.
- I. Install wall base.

### 3.4 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Remove excess adhesive from floor, base, and wall surfaces without damage.
- C. Clean and vacuum carpet surfaces.

**3.5 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed construction from damage and soiling.

**END OF SECTION**

**SECTION 09 68 16**  
**SHEET CARPETING**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Sheet carpeting.
  - 2. Accessories.
- B. Related Requirements:
  - 1. Section 03 30 00 - Cast-In-Place Concrete: Flooring substrate.
  - 2. Section 09 65 00 - Resilient Flooring: Wall base.
  - 3. Section 09 68 13 - Tile Carpeting.

**1.2 REFERENCES**

- A. Americans with Disabilities Act (ADA):
  - 1. ADA Standards - Standards for Accessible Design; Current Edition.
- B. American Association of Textile Chemists and Colorists (AATCC):
  - 1. AATCC 134 - Test Method for Electrostatic Propensity of Carpets; 2019.
  - 2. AATCC 174 - Test Method for Antimicrobial Activity Assessment of New Carpets; 2022, with Editorial Revision 2023.
- C. ASTM International (ASTM):
  - 1. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method; 2023.
  - 2. ASTM D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials; 2016, Reapproval 2021.
  - 3. ASTM D5116 - Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/Products; 2017.
  - 4. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2023.
  - 5. ASTM E662 - Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials; 2021a.
  - 6. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2022.
  - 7. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2023.
  - 8. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019a.
- D. Carpet and Rug Institute (CRI):
  - 1. CRI 104 - Standard for Installation of Commercial Carpet; 2015.
  - 2. CRI (GLP) - Green Label Plus Testing Program - Certified Products; Current Edition.
- E. Code of Federal Regulations (CFR):
  - 1. 16 CFR 1630 - Standard for the Surface Flammability of Carpets and Rugs; Current Edition.
- F. National Fire Protection Association (NFPA):
  - 1. NFPA 253 - Standard Method of Test for Critical Radiant Flux for Floor Covering Systems Using a Radiant Heat Energy Source; 2023.

**1.3 PRE-INSTALLATION MEETINGS**

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this Section. Review the work requirements, application procedures, quality control, testing and inspection and production schedule.

**1.4 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.
- C. Shop Drawings: Indicate layout of joints, direction of carpet pile, location of edge moldings.
- D. Samples for Initial Selection: Two manufacturer's complete sets of color samples illustrating the full range of colors, textures and pattern designs available; submit for Architect's initial selections. Include 6 inches long samples of moldings and transition edge strips.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected colors, textures, and pattern designs; samples to be same product material type indicated for final Work; each sample 12 x 12 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Manufacturer's Installation Instructions: Submit special procedures, perimeter conditions requiring special attention.

**1.5 CLOSEOUT SUBMITTALS**

- A. Section 01 77 00 - Closeout Procedures.
- B. Operation and Maintenance Data: Submit maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

**1.6 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section with minimum five (5) years documented experience.
- B. Installer Qualifications: Company specializing in performing work of this Section with minimum three (3) years documented experience and approved by carpet manufacturer.
- C. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

**1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Store materials in compliance with the manufacturer's recommendations.

**1.8 ENVIRONMENTAL REQUIREMENTS**

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after Work.
- B. Do not install the work of this Section until wet construction work is complete and permanent heat and air conditioning is installed and operating.

- C. Maintain room temperature and humidity levels prior to installation in accordance with manufacturer's recommendations.
- D. Acclimate flooring materials by storing materials in conditioned installation area prior to installation for period recommended by manufacturer, but not less 48 hours.

## 1.9 WARRANTY

- A. Section 01 70 00 - Execution and Closeout Requirements: Product warranties and product bonds.
- B. Furnish Flooring Contractor's ten (10) year warranty for defects in materials and workmanship.
- C. Furnish manufacturer's standard warranties covering the following:
  - 1. Lifetime Limited Warranty: Includes coverage for Face Wear, Moisture Barrier, Wick-Back, Delamination, Tuft Bind, Unraveling, and Static Protection.
  - 2. Fifteen (15) Year Limited Warranty Against Color Loss from Bleach Spills.
  - 3. Fifteen (15) Year Limited Warranty Against Staining.

## 1.10 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
  - 1. Supply two (2) percent of each carpet color and pattern selected for the project.

## PART 2 PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Materials to comply with the following independently tested performance criteria:
  - 1. Surface Flammability Ignition: Pass ASTM D2859 (the "pill test") or 16 CFR 1630.
  - 2. Critical Radiant Flux (CRF): In compliance with ASTM E648 or NFPA 253.
    - a. Class I, minimum 0.45 watt per square centimeter.
  - 3. Smoke Density: 450 or less in accordance with ASTM E662.
  - 4. Slip Resistance: Comply with ADA Guidelines.
  - 5. VOC: Carpet certified as passing the CRI (GLP) indoor air quality testing program.
  - 6. Dimensional Stability: 0.1 % or less change Stability (Aachen Method Din 54318)
  - 7. Static Generation:
    - a. 3.0 kV or less at 20% R.H. at 70° F (AATCC 134 w/ neolite).
  - 8. Antimicrobial: Broad spectrum antimicrobial; permanent application in backing. Application must pass AATCC 174.
  - 9. VOC Limits: Provide carpet tile that complies with the following limits for VOC content when tested according to ASTM D5116:
    - a. Total VOCs: 0.5 mg/sq. m x h.
    - b. 4-PC (4-Phenylcyclohexene): 0.05 mg/sq. m x h.
    - c. Formaldehyde: 0.05 mg/sq. m x h.
    - d. Styrene: 0.4 mg/sq. m x h.
  - 10. Adhesive: Comply with the following criteria unless the manufacturer's warranty requirements indicate otherwise.
    - a. Water-resistant, mildew-resistant, non-staining, pressure-sensitive type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet tile and is recommended by carpet tile manufacturer for releasable installation.

- b. Adhesive VOC Limits: Provide adhesives that comply with the following limits for VOC content when tested according to ASTM D5116:
  - 1) Total VOCs: 10.00 mg/sq. m x h.
  - 2) Formaldehyde: 0.05 mg/sq. m x h.
  - 3) 2-Ethyl-1-Hexanol: 3.00 mg/sq. m x h.

## 2.2 SHEET CARPET

- A. Sheet Carpet (CPS1):
  - 1. CPS1
    - a. Basis of Design: Tarkett Flooring, Create Purpose Resourceful, 72" roll width
    - b. Alternate 1- Mannington, Boucle Moderne, Azurite
    - c. Alternate 2- Patcraft, Infrastructure Electric 00450

## 2.3 ACCESSORIES

- A. Sub-Floor Filler: Factory mixed latex type recommended by manufacturers of flooring and adhesive materials and compatible with substrate materials and conditions.
- B. Primers and Adhesives: Water-resistive type recommended by manufacturer of flooring material and compatible with substrate materials and conditions.
- C. Moldings, Transition, and Edge Strips:
  - 1. Extruded Aluminum: Mechanically fastened to the sub floor. Glue-down strips are not allowed.
    - a. Colors and profiles to be selected by Architect from manufacturer's full range.
- D. Provide banding for all exposed carpet edges.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify compliance with the requirements indicated in ENVIRONMENTAL REQUIREMENTS article.
- C. Verify that existing conditions are as required before starting work of the Section.
- D. Verify that the assembled and finished floor system of this Section will finish flush with floor boxes, inserts, devices, and adjacent finished floors. This flush transition requirement cannot be over emphasized. The transition joints must be tight and flush to eliminate trip hazards.
- E. Verify that floor boxes, inserts, utilities, and other floor devices are installed in correct locations.
- F. Verify that overhead work trades have finished their work in the flooring areas.
- G. Verify that the building is dry, all openings are closed in, adequate ventilation is provided, and permanent heating and air conditioning is installed operating and providing the required conditioning of the air in the work area.
- H. Verify that surfaces are 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.
- I. Verify that the concrete finish has been steel troweled to a true level and finished smooth and straight to a tolerance of 1/4 inch in a radius of 10 feet. High spots are to be ground

- level and low spots filled in with approved leveling compounds to achieve the required elevation and level flatness.
- J. 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 wall base material.
  - K. Verify that the concrete substrate is dry in accordance with industry standard testing procedures, free of foreign materials, and broom cleaned.
  - L. Cementitious Substrate Surfaces Testing: Verify that substrates are ready for flooring installation by testing for moisture and alkalinity (pH).
    - 1. Alkalinity (pH) Testing: ASTM F710. Measurement for pH range is to be not less than 7 pH and not more than 9 pH, unless written recommendations of flooring manufacturer or adhesive manufacturer are more stringent.
    - 2. Internal Relative Humidity Testing: ASTM F2170. Perform test using in situ probes. Humidity level of substrates is to measure no more than 75 percent relative humidity level, unless written recommendations of flooring manufacturer or adhesive manufacturer are more stringent.
    - 3. Moisture Vapor Emission Testing: ASTM F1869. Perform anhydrous calcium chloride test. Moisture vapor emission rate (MVER) from the slab is to be less than or equal to 3 lbs of water per 1,000 sf in 24 hours, unless written recommendations of flooring manufacturer or adhesive manufacturer are more stringent.
    - 4. Conduct tests by an independent testing agency acceptable to Owner.
  - M. Do not proceed with installation work until noncompliant conditions have been corrected.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with sub-floor filler.
- D. Filler is to be applied, troweled, and floated to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.
- E. Clean substrate.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install carpet tile in accordance with CRI 104 and carpet manufacturer.
- C. Verify carpet match before cutting to ensure minimal variation between dye lots.
- D. Lay out carpet and locate seams in accordance with CRI 104 section 7.2 shop drawings:
  - 1. Locate seams in area of least traffic, out of areas of pivoting traffic, and parallel to main traffic.
  - 2. Do not locate seams perpendicular through door openings.
  - 3. Align run of pile in same direction as anticipated traffic and in same direction on adjacent pieces.
  - 4. Provide monolithic color, pattern, and texture match within each contiguous area.
- E. Install carpet tight and flat on subfloor, well fastened at edges, with uniform appearance.
- F. Double cut carpet seams, with accurate pattern match. Make cuts straight, true, and unfrayed. Apply seam adhesive to cut edges of woven carpet immediately.

1. Seam sealer is required at all seams.
- G. Direct Glue-Down Installation: CRI 104 Section 8.
  1. Apply contact adhesive to floor uniformly at rate recommended by manufacturer. After sufficient open time, press carpet into adhesive.
  2. Apply seam adhesive. Lay adjoining piece with seam straight, not overlapped or peaked, and free of gaps.
  3. Roll with appropriate roller for complete contact of adhesive to carpet backing.
- H. Trim carpet neatly at walls and around interruptions.
  1. No saddle or T-seams shall be allowed in doorways or high traffic areas.
- I. Complete installation of moldings and transition edge strips, concealing exposed edges.
- J. Install wall base.
- K. Complete installation of edge strips, concealing exposed edges.

### **3.4 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work in accordance with manufacturer's recommendations including cleaning procedures and materials.
- B. Remove excess adhesive from floor, base, and wall surfaces without damage.
- C. Clean and vacuum carpet surfaces.

### **3.5 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Ventilate thoroughly all carpeted areas during and after installation, prior to occupancy.
- C. Protect the work against damage from construction operations and placement of equipment.

**END OF SECTION**



**SECTION 09 72 00**  
**WALL COVERINGS**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Surface preparation and prime painting.
  - 2. Wall covering and borders.
- B. Related Requirements:
  - 1. Division 09 - Finishes: Sections related to interior painting. Preparation and priming of substrate surfaces.

**1.2 REFERENCE STANDARDS**

- A. ASTM International (ASTM):
  - 1. ASTM D1308 - Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Coating Systems; 2020.
  - 2. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
  - 3. ASTM F793/F793M - Standard Classification of Wall Coverings by Use Characteristics; 2020.

**1.3 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Provide data on wall covering and adhesive.
- C. Shop Drawings: Indicate wall elevations with seaming layout.
- D. Samples for Initial Selection: Two manufacturer's complete sets of color samples illustrating the full range of finishes, textures, and colors available; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples to be same product material type indicated for final Work; each sample 8 x 8 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Test Reports: Indicate verification of flame and smoke ratings, when tested by UL.
- G. Maintenance Data: Submit data on cleaning, touch-up, and repair of covered surfaces.
- H. Manufacturer's Qualification Statement.
- I. Installer's Qualification Statement.

**1.4 SPARE PARTS AND MAINTENANCE PRODUCTS**

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
- B. Extra Wall Covering Materials: 25 linear feet (8 linear m) of each color and pattern of wall covering. Store where directed by Owner.
  - 1. Package and label each roll by manufacturer, color and pattern, and destination room number. Store where directed by Owner.

## 1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section with minimum five (5) years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least five (5) years of documented experience.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Inspect roll materials upon arrival on site, to verify acceptability.
- C. Protect packaged adhesive from temperature cycling and cold temperatures.
- D. Do not store roll goods on end.

## 1.7 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Requirements before, during, and after the work.
- B. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the adhesive or wall covering product manufacturer.
- C. Maintain these conditions 24 hours before, during, and after installation of adhesive and wall covering.
- D. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surfaces.

## PART 2 PRODUCTS

### 2.1 WALL COVERINGS

- A. Performance Requirements:
  - 1. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/450, maximum, when tested in accordance with ASTM E84.
  - 2. Chemical and Stain Resistance: No visible staining or discoloration and no damage to surface texture when tested in accordance with ASTM D1308.
- B. Wall Covering - **Type** \_\_\_\_: Fabric-backed vinyl roll stock.
  - 1. Comply with ASTM F793/F793M, Category V, Type II.
  - 2. Total Thickness:
    - a. \_\_\_\_ mil (\_\_\_\_ inch) (\_\_\_\_ mm).
  - 3. Total Weight:
    - a. \_\_\_\_ oz/sq yd (\_\_\_\_ g/sq m).
  - 4. Roll Width:
    - a. \_\_\_\_ inches (\_\_\_\_ mm).
  - 5. Backing:
    - a. Woven, osnaburg fabric.
  - 6. Color:
    - a. As indicated on Drawings.
  - 7. Pattern:
    - a. As indicated on Drawings.
  - 8. Pattern Match:
    - a. As indicated on Drawings.
  - 9. Repeat:
    - a. As indicated on Drawings.

10. Surface Texture:
    - a. As indicated on Drawings.
  11. Overcoating:
    - a. Manufacturer's standard coating for stain resistance.
  12. Manufacturers:
    - a. Designtex.
    - b. Koroseal/RJF International.
    - c. MDC Interior Solutions.
    - d. Takeform.
    - e. Wolf-Gordon.
    - f. Substitutions: See Section 01 60 00 - Product Requirements.
  13. Basis of Design:
    - a. As indicated on Drawings.
- C. Adhesive: Type recommended by wall covering manufacturer to suit application to substrate.
- D. Termination Trim: Extruded plastic.
  1. Color:
    - a. Clear.
- E. Substrate Filler: As recommended by adhesive and wall covering manufacturers and compatible with substrate.
- F. Substrate Primer and Sealer: Alkyd enamel type as recommended by wall covering manufacturer and compatible with substrate.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that substrate surfaces are prime painted and ready to receive work and comply with requirements of wall covering manufacturer.
- C. Measure moisture content of surfaces using an electronic moisture meter. Do not apply wall coverings if moisture content of substrate exceeds level recommended by adhesive or wall covering manufacturer.
- D. Verify flatness tolerance of surfaces does not vary more than 1/8 inch in 10 feet (3 mm in 3 m) nor vary at a rate greater than 1/16 inch/ft (1.5 mm/300 mm).

### **3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of Work of this Section.
- B. Fill cracks in substrate and smooth irregularities with filler; sand smooth.
- C. Wash impervious surfaces with tetra-sodium phosphate, rinse and neutralize; wipe dry.
- D. Surface Appurtenances: Remove, without damage, electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.
- E. Surfaces: Correct defects and clean surfaces that affect work of this Section. Remove existing coatings that exhibit loose surface defects.
- F. Marks: Seal with shellac those that may bleed through surface finishes.

- G. Apply one coat of primer sealer to substrate surfaces. Allow to dry. Lightly sand smooth.
- H. Vacuum clean surfaces free of loose particles.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Apply adhesive and wall covering in accordance with manufacturer's instructions.
- C. Apply adhesive to wall surface immediately prior to application of wall covering.
- D. Use wall covering in pattern sequence to maintain consistent pattern continuation.
- E. Razor trim edges on flat worktable. Do not razor cut on gypsum board surfaces.
- F. Apply wall covering smooth and without wrinkles, gaps, or overlaps. Eliminate air pockets and ensure full bond to substrate surface.
- G. Butt edges tightly.
- H. Do not seam within 2 inches (50 mm) of internal corners or within 6 inches (150 mm) of external corners.
- I. Install wall covering before installation of bases, cabinets, and hardware and items attached to or spaced slightly from 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, above doors, in pattern sequence from roll.
- L. Where wall covering tucks into reveals, or metal wallboard or plaster stops, apply with contact adhesive within 6 inches (150 mm) of wall covering termination. Ensure full contact bond.
- M. Install termination trim.
- N. With each application of a wall covering sheet, remove excess adhesive while wet and without damaging finish before proceeding to next wall covering sheet.

### 3.4 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed Work in accordance with manufacturer's recommendations including cleaning procedures and materials.
- B. Clean wall coverings of excess adhesive, dust, dirt, and other contaminants.
- C. Reinstall wall plates and accessories removed prior to work of this Section.

### 3.5 PROTECTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Do not permit construction activities at or near finished wall covering areas.

**END OF SECTION**

**SECTION 09 72 14**  
**TACKABLE WALL COVERINGS**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section includes resilient tackable wall coverings and related work.
- B. Related Sections:
  - 1. Section 04 20 00 - Unit Masonry: Wall substrate.
  - 2. Section 09 21 16 - Gypsum Board Assemblies: Wall substrate.
  - 3. Section 09 90 00 - Painting and Coatings.

**1.2 REFERENCES**

- A. American National Standards Institute (ANSI):
  - 1. ANSI A135.4 - Basic Hardboard; 2012, Reapproval 2020.
- B. ASTM International (ASTM):
  - 1. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- C. California Department of Public Health (CDPH):
  - 1. CDPH Standard Method VOC V1.2 - Standard Method For The Testing And Evaluation Of Volatile Organic Chemical Emissions From Indoor Sources Using Environmental Chambers - Version 1.2; 2017.

**1.3 PRE-INSTALLATION MEETINGS**

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

**1.4 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit data for products indicated in this Section.
- C. Samples for Initial Selection: Two manufacturer's complete set of color samples illustrating the full range of finishes and colors available; include full range of available trim options; submit for Architect's initial selections.
- D. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples to be same product material type indicated for final Work; each wall covering sample 8 x 8 inches; each trim sample 4 foot length. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- E. Manufacturer's Installation Instructions: Submit manufacturer's instructions for direct to wall applications.
- F. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

**1.5 CLOSEOUT SUBMITTALS**

- A. Section 01 77 00 - Closeout Procedures.
- B. Operation and Maintenance Data: Submit cleaning and maintenance requirements.

**1.6 QUALIFICATIONS**

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three (3) years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum three (3) years documented experience.

**1.7 QUALITY ASSURANCE**

- A. Single Source Responsibility: Obtain tackable wall covering system components from a single source.

**1.8 MOCKUP**

- A. Section 01 40 00 - Quality Requirements: Requirements for mockup.
- B. Construct mockup, 8 feet wide x full height, including one joint.
- C. Locate where directed by Architect.
- D. Incorporate accepted mockup as part of Work.

**1.9 DELIVERY, STORAGE, AND HANDLING**

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Accept materials on site in original factory wrappings and containers, clearly labeled with manufacturer, brand name, and fire hazard classification. Inspect for damage. Store in accordance with the manufacturer's recommendations.

**1.10 ENVIRONMENTAL REQUIREMENTS**

- A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.
- B. Maintain uniform temperature of minimum 70 degrees F, and maximum humidity of 40 percent 72 hours prior to, during, and after installation.

**1.11 WARRANTY**

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Furnish five (5) year manufacturer's warranty.

**1.12 SPARE PARTS AND MAINTENANCE PRODUCTS**

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
  - 1. Furnish five (5) percent of each wall covering color, pattern, and texture installed.

**PART 2 PRODUCTS****2.1 TACKABLE WALL COVERINGS**

- A. Manufacturers:
  - 1. Koroseal Interior Products.
- B. Basis of Design:
  - 1. Koroseal Interior Products: Walltalkers Tac-Wall.

## 2.2 COMPONENTS

- A. Tackable Wall Covering: Uni-color, resilient linoleum, homogeneous through color, tackable surface consisting of linseed oil, granulated cork, rosin binders and dry pigments calendared onto a natural burlap backing.
  - 1. Locations: As indicated on Drawings.
  - 2. Size: As indicated on Drawings.
  - 3. Gauge: 1/4 inch.
  - 4. Backing: Jute.
  - 5. Roll Width: 48 inches.
  - 6. Roll Length: 90 feet.
  - 7. Flexibility: Capable of application to minimum 3 inch diameter curved surface without cracking or breaking.
  - 8. Joint type:
    - a. Butted.
  - 9. Color:
    - a. As selected by Architect from full range of colors.
- B. Fire Performance Characteristics: Flame Spread Index of 75 maximum and Smoke Development Index of 450 maximum (Class 2/B), in accordance with ASTM E84 testing. Label components indicating compliance.

## 2.3 ACCESSORIES

- A. Backing Board: ANSI A135.4 hardboard; of pressed wood fiber with resin binder, tempered grade, 1/4 inch thick, smooth on one side.
  - 1. For installation of tackable wall covering over concrete masonry units.
- B. Primer: To be in accordance with wall covering manufacturer's recommendations.
- C. Adhesive: Solvent free, SBR type linoleum adhesive complying with wall covering manufacturer's recommendations.
  - 1. Interior Adhesives: Maximum volatile organic compound content to comply with CDPH Standard Method VOC V1.2.
- D. Caulk: Color match to color of wall covering installed. Type to be in accordance with wall covering manufacturer's recommendations.
- E. Trim:
  - 1. Metal Trim:
    - a. Extruded Aluminum: "H" and "J" trim; 1/4 inch profile; clear satin anodized aluminum finish.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify substrate is ready to receive work of this Section.
- C. Verify that finish coats applied to substrate are compatible with adhesive provided for installation of work in this Section.
- D. Do not proceed with installations until satisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Clean surfaces to receive work of this Section to allow proper adhesion of wall coverings.
- C. Remove hardware, accessories, plates, and similar items to allow wall covering to be installed.
- D. Plaster surface: Remove surface chalk. In new work, use moisture meter to determine moisture content. Do not begin installation when moisture content is greater than five percent.
- E. Gypsum board surface: Recess nails and screws. Repair irregular tape joints, sand and remove dust.
- F. Painted surface: Remove loose paint or scale. Sand surface of enamel or gloss paint and wipe clean with damp cloth.
- G. Ensure gypsum wallboard surfaces scheduled to receive wall covering are properly primed with an acrylic wall covering primer under Section 09 90 00.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install in accordance with manufacturer's written instructions.
- C. Installation Over Concrete Masonry Units:
  - 1. Install backing board on concrete masonry units using adhesive or non-corrosive fasteners as indicated on Drawings or as recommended by backing board manufacturer for substrate conditions. Backing board to be full size panels to eliminate joints. Joints are allowed only if required by size of wall covering area.
  - 2. Recess and finish fastener heads, and joints if any, to prevent fasteners and joints from telegraphing visibly to surface of finished tackable wall covering.
- D. Prime substrate as recommended by wall covering manufacturer.
- E. Cut sheets to size including 2 to 3 inches of overage. Allow sheets to lay flat for at least 24 hours prior to the application. Mark roll direct on the backside of each sheet. Hang sheets in sequence as cut from the roll, do not reverse every other sheet.
- F. Maintain air temperature and humidity levels in accordance with manufacturer's recommendations for at least 72 hours prior to, during, and after the installation.
- G. Back roll each sheet prior to the installation to release curl memory.
- H. For seamed applications, using a seam and strip cutter, remove the factory edge of one sheet. Using the same tool, overlap and trace cut the mating edge of the second sheet. Repeat this step for as many sheets as required for the job.
- I. Scribe, cut, and fit material to butt tightly to adjacent surfaces, built-in casework, and permanent fixtures and pipes.
- J. Apply adhesive (only enough to hang one sheet at a time) with a 1/16 inch trowel to the area to receive the sheet.
- K. Work from top to bottom then side to side. Roll sheet firmly into adhesive for positive contact and to remove air bubbles.
- L. Remove adhesive residue immediately.



- M. If adjacent or surrounding work by others is marred or damaged, coordinate remedial work with the installer of the damaged work.
- N. Install continuous edge trim around edges of installed work. Unless otherwise indicated on Drawings, edge trim is required even if wall covering edge abuts adjacent wall, ceiling, floor, or other construction.

### **3.4 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work and comply with manufacturer's recommendations.
- B. Clean wall covering using a sponge with a neutral pH cleaning solution. Do not use abrasive cleaners. Rinse thoroughly with water and let dry before using.

### **3.5 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed product and finish surfaces from damage during construction. Cover with protective, breathable covering.

**END OF SECTION**



**SECTION 09 78 00**  
**INTERIOR WALL PANELING**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Pre-manufactured panel systems including mounting hardware and accessories.
- B. Related Requirements:
  - 1. Section 06 10 53 - Miscellaneous Rough Carpentry.
  - 2. Section 09 21 16 - Gypsum Board Assemblies.

**1.2 REFERENCE STANDARDS**

- A. Architectural Woodwork Institute (AWI) Quality Standards.
- B. ASTM International (ASTM):
  - 1. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023a.
- C. National Electrical Manufacturer's Association (NEMA).
  - 1. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

**1.3 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
  - 2. Coordinate requirements for anchoring and attaching the work to substrate framing with appropriate strength backing and metal strapping installed directly to metal stud framing prior to installation of gypsum wallboard. Refer to PART 3, INSTALLATION article in this Section.
- B. Pre-Installation Meetings:
  - 1. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
  - 2. Convene minimum one week prior to commencing work of this Section. Review the work requirements, application procedures, quality control, testing and inspection and production schedule.

**1.4 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Provide data on each product and include the following:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
  - 4. Manufacturer's Safety Data Sheets (MSDS).
- C. Shop Drawings: Shop drawings in sufficient detail to show fabrication, installation, anchorage, and interface of the work of this Section with adjacent work.
- D. Selection Samples: For each finish product specified, one complete set of color samples representing manufacturer's full range of available colors and patterns.

## 1.5 QUALIFICATIONS

- A. Manufacturer Qualifications: Company specializing in manufacturing Products specified in this Section with minimum seven (7) years documented experience.
- B. Installer Qualifications: Company specializing in performing work of this Section and with minimum five (5) years documented experience.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Do not deliver wall system until painting, wet work, grinding, and similar operations that could damage, soil, or deteriorate wall system have been completed in installation areas as specified by AWI 1700-G-3.
- C. If panels are stored prior to installation, store them flat in completely enclosed areas, out of the weather. If panels must be stored in other than installation areas, store only in areas where environmental conditions comply with manufacturers recommendations. Do not expose panels to continuous direct sunlight, nor to extremes in temperature and humidity. Store products in manufacturer's packaging until ready for installation.
- D. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

## 1.7 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Requirements before, during, and after the work.
- B. Do not deliver or install wall system until building is enclosed, wet work is complete and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period as specified by AWI 1700-G-3.
- C. Do not install wall system until normal lighting conditions exist. Normal lighting conditions are described as those in place when the project is finished. This includes, but not limited to, design lighting (wall washers, spotlights and flood lights, and similar fixtures) and natural lighting.
- D. Wall, ceilings, floors, and openings must be level, plumb, straight, in-line and square as specified by AWI 1700-G-3.
- E. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results, both during installation and subsequent occupancy. Do not install products under environmental conditions outside manufacturer's absolute limits. Panels shall be conditioned in the environment in which they will be installed for a minimum of 72 hours prior to installation. The recommended environment is 60 - 80 degrees F and 35% to 55% relative humidity.

## 1.8 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Manufacturer warrants any product it has manufactured and sold against defects in materials or workmanship for a period of one (1) year from the date of Substantial Completion. This warranty extends to products assembled / installed and used in the manner intended and does not cover damage or failure caused by misuse, abuse or accidents, exposure to extreme temperature, improper installation, improper maintenance, and exposure to water or excessive humidity or excessive moisture.

**PART 2 PRODUCTS****2.1 PRODUCT ITEM**

- A. Manufacturers:
  - 1. Panel Specialists, Inc. (PSI)
  - 2. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design: Panel Specialists, Inc. - Panel System #314.

**2.2 PANEL SYSTEM**

- A. Provide prefinished decorative panels where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Comply with applicable requirements of "Architectural Woodwork Quality Standards" in the production and installation of the wall panel system as published by the Architectural Woodwork Institute (AWI) unless otherwise indicated.
- C. Panel system with an exposed divider molding creating a 1/4 inch (6 mm) concave radiused reveal horizontally and vertically between edge banded panels. Recommended for vertical and horizontal interior installations. Maximum panel length for horizontal installations is 96 inches (2438 mm).
  - 1. Panel Thickness: 7/16 inch (11.1 mm).
  - 2. Reveals:
    - a. Horizontal Reveal: 1/4 inch (6 mm) wide concave reveal between panels.
    - b. Vertical Reveal: 1/4 inch (6 mm) wide concave reveal between panels.
  - 3. Panel Edge Finish: Panel edges to be finished with .018 inch (0.5 mm) PVC edge banding or wood veneer, except as noted in material specifications.
  - 4. Panel Finish: As indicated on Drawings.
  - 5. Main Laminated Panel Fire Rating:
    - a. ASTM E84, Class B, Flame Spread 26-75, Smoke Developed 450 or less.
  - 6. Molding: All moldings to be 0.062 inch thick (at structural areas) 6063 alloy aluminum with T5 temper.
    - a. Divider Moldings:
      - 1) #314; 1/4 inch wide concave divider molding.
      - 2) #410; H divider molding available for use with marker boards, resilient tack board, and other specialty panels.
    - b. 1/2 inch Wide Edge Trims and 1 inch Corners:
      - 1) #304; 1/2 inch edge trim molding.
    - c. 3/8 inch Wide Edge Trims and 3/8 inch Wide Stepped Corners:
      - 1) #604; 3/8 inch edge trim molding.
    - d. #404C Chair Rail Top Trim:
      - 1) Include #412RI flat or #312RI concave reveal insert for use in wainscot height installations.
  - 7. Finishes:
    - a. Panel Face:
      - 1) Finish #1: To match PL2 finish indicated on Drawings.
      - 2) Finish #2: To match PL4 finish indicated on Drawings.
    - b. Panel Face Pattern Direction:
      - 1) Horizontal.
    - c. Panel Edge Banding:
      - 1) 0.5 mm PVC Platinum
    - d. Aluminum Molding Finish:
      - 1) Clear Anodized.

## 2.3 MATERIALS

- A. High Pressure Decorative Laminates:
  - 1. High Pressure Laminate (VGS, VGF.) and non-decorative backers (BKV) used to surface wall panels systems shall be manufactured to meet or exceed NEMA LD3 for thickness, performance properties and appearance.
- B. Wood Veneer Panels:
  - 1. Veneers from manufacturer's full range of veneer species to be HPVA Architectural Grade A or better.
  - 2. Veneer leaves to be balanced matched on the panel.
  - 3. Panels to be finished on the edge with matching veneer edge banding.
  - 4. Finish to be durable UV coating with finish as follows:
    - a. Gloss (50%).
    - b. Satin (20%).
  - 5. Finish to be as follows:
    - a. Clear.
    - b. Custom Stained.
  - 6. Panels to be matched on the wall as follows:
    - a. Random Matched.
    - b. Vertically Sequenced Matched.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that continuous metal strapping is installed directly to face of metal studs prior to installation of gypsum wallboard. Spacing and direction of metal strapping is to be as recommended by manufacturer of panel system.
- C. Verify that substrates have been properly prepared according to manufacturer's recommendation and AWI 1700-G-3.
- D. Where wall system is indicated to be fitted to other constructions, check actual dimensions of other constructions by accurate field measurements before manufacturing wall system. Show recorded measurements on final shop drawings. Coordinate manufacturing schedule with construction progress to avoid delay of work.
- E. Examine products to be installed for damage and other conditions detrimental to completion of the Work.
- F. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of Work of this Section.
- B. Panels must be acclimated to ambient temperature and humidity conditions in accordance with manufacturer's specifications prior to installation. Comply with manufacturer's recommendation for handling, storage, and acclimation procedures.
- C. Clean surfaces thoroughly prior to installation.
- D. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

- E. Prepare materials to be installed and equipment to be used during installation.

### **3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install in accordance with manufacturer's instructions.
- C. When interior paneling is on an exterior wall or in a wet area, provide a barrier sheet of plastic film between the outside wall and the panels to prevent condensation affecting the stability of the panels.
- D. Field cutting of all wall systems should be accomplished using carbide tools. All face penetrations and cutouts are to have minimum 1/8 inch (3 mm) radius corners in accordance with NEMA LD3.
- E. All wall systems should receive an "S" bead of panel mastic on the back of the panel during installation.
- F. Wall paneling systems are to be mechanically fastened to continuous metal furring strapping, installed in direction as recommended by manufacturer of panel system and spaced a minimum of 24 inches (610 mm) o.c. Furring straps to be no less than 18 ga and 3-1/2 inches (89 mm) wide, continuously. Metal strapping to be installed to the drywall studs prior to the application of the gypsum board.

### **3.4 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures.
- B. Clean installed Work in accordance with manufacturer's recommendations including cleaning procedures and materials.

### **3.5 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed construction from damage and unauthorized tampering.

**END OF SECTION**





**SECTION 09 84 00**  
**ACOUSTIC ROOM COMPONENTS**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Wall mounted acoustical panels.
  - 2. Ceiling mounted acoustical panels.
- B. Related Requirements:
  - 1. Section 09 51 13 - Acoustical Panel Ceilings: General purpose acoustical ceiling panels and grids serving as supports for ceiling mounted acoustical panels specified in this Section.
  - 2. Section 09 77 23 - Fabric Wrapped Panels: General purpose sound absorptive panels.
  - 3. Section 09 90 00 - Painting and Coating: Field painting of acoustical diffuser panels.

**1.2 REFERENCES**

- A. American Society of Civil Engineers (ASCE):
  - 1. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- B. ASTM International (ASTM):
  - 1. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method; 2023.
  - 2. ASTM C612 - Specification for Mineral Fiber Block and Board Thermal Insulation; 2014, Reapproval 2019.
  - 3. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2021.
  - 4. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
  - 5. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2023.
  - 6. ASTM E336 - Standard Test Method for Measurement of Airborne Sound Attenuation between Rooms in Buildings; 2023.
  - 7. ASTM E413 - Classification for Rating Sound Insulation; 2022.
  - 8. ASTM E795 - Practices for Mounting Test Specimens During Sound Absorption Tests; 2023.
  - 9. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2023.
- C. Underwriters Laboratories, Inc. (UL):
  - 1. UL 723 - UL Standard for Safety Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

**1.3 COORDINATION**

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate requirements for blocking and support with substrate construction to receive the Work of this Section.
- C. Coordinate requirements for ceiling mounted acoustical panels with substrate and framing members of ceiling type to which acoustical panels are to be installed. Coordinate to ensure proper fit and mounting of panels without gaps or uneven alignment.

- D. Coordinate work with locations of electrical, fire, and safety devices to avoid conflicts.

#### 1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal requirements.
- B. Product Data: Manufacturer's data sheets, installation instructions, and maintenance recommendations for each type of acoustical panel.
  - 1. Include data indicating coefficients of absorption and Sabines per unit for each type of panel used in the analysis and proposed design layout.
- C. Shop Drawings: Prepared by manufacturer. Include elevations showing acoustic room components sizes, arrangements, and details of each condition of installation. Show fabrication and installation details.
- D. Samples for Initial Selection: Two manufacturer's complete set of color charts illustrating the full range of finishes and colors available; include 12 x 12 inches typical panel with mounting hardware; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each finish and color; each sample to be 12 x 12 inches illustrating actual panel construction with mounting hardware. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Product Test Reports: Indicating compliance of products with requirements, from a qualified independent testing agency.

#### 1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five (5) years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum three (3) years documented experience.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Comply with recommendations of the manufacturers of the products to be used for the Work of this Section.
- C. Deliver, store, and handle acoustic panels in accordance with product manufacturer's recommendations. Ship to jobsite only after roughing-in, painting work, and other related finish work has been completed, installation areas are ready to accept units, and manufacturers' recommended temperature and humidity levels will be maintained during the remainder of construction.

#### 1.7 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Submit Manufacturer's written warranty for repair or replacement of acoustical panels that fail in materials or workmanship within five (5) years from date of Substantial Completion. Failures are defined to include, but are not limited to, the following:
  - 1. Fracturing or breaking of unit components which results from normal wear and tear and normal use other than vandalism.
  - 2. Delamination or other failures of glue bond of components.
  - 3. Warping of components not resulting from leaks, flooding, or other uncontrolled moisture or humidity.

4. Failure of unit to perform acoustically in accordance with manufacturer's published data.
- C. Special Warranty:
1. Cementitious Wood Fiber Panels Warranty: Submit manufacturer executed written warranty agreeing to repair or replace panels that fail within the warranty period.
    - a. Failures include, but are not limited to the following:
      - 1) Defects in materials or factory workmanship.
    - b. Warranty Period: Thirty (30) years from date of substantial completion.
    - c. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

## 1.8 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
- B. Furnish the following to Owner for each panel size, color, and pattern installed. Include full set of mounting hardware for each panel furnished. Hardware to be same as was used for installed panels.
  1. Panels equal to five percent (5%), but not less than one (1) each.

## PART 2 PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire Performance Characteristics:
  1. Comply with ASTM E84 or UL 723, unless otherwise indicated.
    - a. Flame Spread Index: 25 or less.
    - b. Smoke Developed Index: 450 or less.
  2. Identify products with appropriate UL labeling.
- B. Seismic Performance:
  1. Comply with ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 9, "Earthquake Loads" based upon seismic design criteria indicated.
- C. Provide a system of sound absorbing and sound diffusing panels to reduce excess sound energy levels and improve sound distribution throughout the space:
  1. Provide an acoustically engineered system of sound absorbing and sound diffusing panels in a configuration designed to reduce excess sound energy levels and improve sound distribution throughout the space.
    - a. Airborne Noise Reduction: Provide acoustical absorber and diffuser panels in layout designed by computer simulation based on Fitzroy formulas to provide the following sound reduction:
      - 1) Band Rehearsal: \_\_\_dB +/- 0.5dB.
      - 2) Choral Rehearsal: \_\_\_dB +/- 0.5dB.
    - b. Reverberation Time: Provide acoustical absorber and diffuser panels in layout designed by computer simulation based on Fitzroy formulas to provide the following reverberation times:
      - 1) Instrumental Music: +/- 0.2 seconds.
      - 2) Choral Music: +/- 0.2 seconds.

**2.2 MANUFACTURERS**

- A. Manufacturers:
1. AVL Systems, Inc.
  2. Carnegie Fabrics, LLC.
  3. Decoustics.
  4. Novawall Systems Inc.
  5. RPG Acoustical Systems.
  6. Sound Seal.
  7. Wenger Corporation.
  8. Cementitious Wood Fiber Panels:
    - a. Acoustic Sonic, Inc.
    - b. ASI Architectural.
    - c. Tectum by Armstrong World Industries, Inc.
  9. Substitutions: Section 01 60 00 - Product Requirements.

**2.3 MATERIALS**

- A. Glass Fiber Board: ASTM C612, Type 1A, 6 lbs/cu. ft. (96 kg/cu. m) density molded rigid board, flame spread index 25 maximum, and smoke-developed index 450 maximum.
- B. Thermoplastic Sheet: PVC acrylic plastic sheet, flame spread index 25 maximum, and smoke-developed index 450 maximum.
- C. Fabric Covering Material: Fabric wrapped, coverings, and finishes to be 100 percent woven plain weave polyester 2-ply, with the following characteristics:
1. Light Fastness: AATCC 16, Option 3: 40 hours.
  2. Fastness to Crocking: AATCC 8: #4 Wet & Dry.
  3. Flammability: ASTM E84, Class A or 1.

**2.4 ACOUSTICAL PANELS**

- A. Wall and Ceiling Absorber Panels: Fabric covering finish laminated to rigid glass-fiber board. Glass-fiber board to have chemically hardened edges.
1. Basis of Design:
    - a. AVL Systems Inc. - Acoustech Panels.
  2. Panel Size:
    - a. 3 inches (80 mm) thick; width and length indicated on Drawings.
  3. Fabrics and Colors:
    - a. As selected by Architect from manufacturer's full range.
  4. Wall Panel Mounting Method: Metal wall bracket with panel-mounted Z-bracket.
  5. Ceiling Panel Mounting Method: Lay-in ceiling grid clip.
  6. Acoustical Performance, One-third Octave Band Center Frequency, Hz, for 48 by 48 inch (1220 by 1220 mm) unit:

Panel Thickness / Mount Type	Sound Absorption Coefficient at Hz Indicated (Tested ASTM C423)						
	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	NRC
3/4 Inch Thick / Mount A	0.08	0.26	0.71	0.98	1.01	1.03	0.75
1 Inch Thick / Mount A	0.07	0.45	0.95	1.07	1.07	1.18	0.90
1-1/2 inches Thick / Mount A	0.29	0.73	1.13	1.16	1.10	1.18	1.05
2 Inches Thick / Mount A	0.38	1.96	1.16	1.16	1.11	1.28	1.10
3 Inches Thick / Mount A	0.49	1.12	1.23	1.07	1.01	1.05	1.10
4 Inches Thick / Mount A	0.67	1.16	1.37	1.21	1.19	1.22	1.15

- B. Wall and Ceiling Absorber Panels: Fabric covering finish laminated to rigid glass-fiber board. Glass-fiber board to have chemically hardened edges.
1. Basis of Design: Wenger - Wall Absorber Panel and Ceiling Absorber Panel.
  2. Panel Size:
    - a. 3 inches (80 mm) thick; width and length indicated on Drawings.
  3. Fabrics and Colors:
    - a. As selected by Architect from manufacturer's full range.
  4. Wall Panel Mounting Method: Metal wall bracket with panel-mounted Z-bracket.
  5. Ceiling Panel Mounting Method: Lay-in ceiling grid clip.
  6. Acoustical Performance, One-third Octave Band Center Frequency, Hz, for 48 by 48 inch (1220 by 1220 mm) unit:

Panel Thickness / Mount Type	Sound Absorption Coefficient at Hz Indicated					
	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz
2 Inches Thick / Mount F6	0.50	0.96	1.27	1.27	1.23	1.18
3 Inches Thick / Mount F6	0.65	1.10	1.31	1.23	1.20	1.09
4 Inches Thick / Mount F6	0.84	1.17	1.34	1.32	1.25	1.20

- C. Wall Diffuser Panels: Fabric wrap laminated to acoustically configured molded thermoplastic panel 0.125 inch (3 mm) thick.
1. Basis of Design:
    - a. Wenger - Convex Wall Diffuser Panel, Type I (without sound attenuation board adhered to internal surface of panel).
    - b. Wenger - Pyramidal Wall Diffuser Panel, Type I (without sound attenuation board adhered to internal surface of panel).
  2. Panel Size: Width and length indicated on Drawings.
  3. Fabrics and Colors:
    - a. As selected by Architect from manufacturer's full range.
  4. Wall Panel Mounting Method: Metal wall bracket with panel-mounted Z-bracket.
  5. Sound Transmission Class (STC): 23, in accordance with ASTM E90 and ASTM E413.
  6. Acoustical Performance, One-third Octave Band Center Frequency, Hz, for 48 by 48 inch (1220 by 1220 mm) unit:

Panel Shape / Mount Type	Sound Absorption Coefficient at Hz Indicated					
	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz
Convex / Mount A	0.18	0.18	0.13	0.1	0.12	0.16
Convex / Mount F7	0.25	0.14	0.11	0.1	0.13	0.16
Pyramidal / Mount A	0.23	0.18	0.13	0.12	0.14	0.11
Pyramidal / Mount F7	0.22	0.18	0.12	0.12	0.17	0.20

- D. Wall Diffuser/Absorber Panels: Fabric wrap laminated to acoustically configured selectively sound-absorptive polycylindrical convex molded thermoplastic panel 0.125 inch (3 mm) thick, and with sound attenuation board adhered to internal surface of panel.
1. Basis of Design: Wenger - Convex Wall Diffuser/Absorber Panel, Type II (with sound attenuation board adhered to internal surface of panel).
  2. Panel Size: Width and length indicated on Drawings.
  3. Fabrics and Colors:
    - a. As selected by Architect from manufacturer's full range.
  4. Wall Panel Mounting Method: Metal wall bracket with panel-mounted grooved button.

5. Sound Transmission Class (STC): 23, in accordance with ASTM E90 and ASTM E413.
6. Acoustical Performance, One-third Octave Band Center Frequency, Hz, for 48 by 96 inch (1220 by 2440 mm) unit:

Mount Type	Sound Absorption Coefficient at Hz Indicated					
	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz
Mount A	0.34	0.27	0.14	0.11	0.11	0.19
Mount F7	0.28	0.29	0.19	0.13	0.13	0.20

- E. Ceiling Diffuser Panels: Acoustically configured polycylindrical convex molded thermoplastic panel 0.125 inch (3 mm) thick.
1. Basis of Design: Wenger - Convex Ceiling Diffuser Panel Type I (without sound attenuation board adhered to internal surface of panel).
  2. Panel Size: Width and length indicated on Drawings.
  3. Finish: Manufacturer's standard textured white.
  4. Ceiling Panel Mounting Method: Lay-in ceiling grid clip.
  5. Acoustical Performance, One-third Octave Band Center Frequency, Hz, for 48 by 96 inch (1220 by 2440 mm) unit:

Mount Type	Sound Absorption Coefficient at Hz Indicated					
	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz
Mount A	0.49	0.16	0.10	0.04	0.03	0.05
Mount E400	0.21	0.16	0.16	0.15	0.14	0.26

- F. Cementitious Wood Fiber Panels: Provide panels fabricated of excelsior wood fibers bonded with water resistant inorganic hydraulic cement.
1. Basis of Design:
    - a. As indicated on Drawings.
  2. Dimensional Stability/Mold Resistance: No significant mold growth when tested in accordance with ASTM D3273.
  3. Surface Burn Characteristics: Acoustical assemblies to be designed and tested to provide the following surface burning characteristics in accordance with the following:
    - a. ASTM E84:
      - 1) Flame Spread: 0.
      - 2) Smoke Developed: 0.
    - b. Ceiling Panels: UL Classified Flame Spread.
      - 1) ASTM E1264; Class A.
  4. Provide UL labeling indicating panel Surface Burning Characteristics.
  5. Provide UL Classified Acoustical Material labeling indicating panel Noise Reduction Coefficient (NRC).
  6. Noise Reduction Coefficient (NRC) and Mounting Type: Acoustical panel systems to be manufactured, fabricated, and installed to provide Noise Reduction Coefficient (NRC) rating and Mounting type in accordance with ASTM E795 when tested in accordance with ASTM C423:
    - a. As indicated in the following table:

Panel Thickness	Noise Reduction Coefficient				
	Mount A	Mount D20	Mount C20	Mount C40	Mount E400
1 inch	NRC 0.40	NRC 0.45	NRC 0.80	NRC 0.85	NRC 0.85
1-3/8 inch	NRC 0.55	NRC 0.60	NRC 0.85	NRC 0.90	NRC 0.90
1-5/8 inch composite**	NRC 0.85	N/A	N/A	N/A	N/A
2 inch	NRC 0.60	NRC 0.70	NRC 0.90	NRC 0.95	NRC 0.95

\*\*The 1-5/8 inch thickness is a unique composite panel design that creates single panels for Mount Type A application:

Face Panel: 5/8 inch thick wood fiber panel.

Attached Backing: 1 inch thick acoustic absorption material with continuous perimeter closure of 1 inch thick by 2 inch wide wood fiber strip (finished to match Face Panel).

This composite panel design simulates a 1 inch panel thickness, Mount C40, total 2-5/8 inch thickness; or a 1-3/8 inch panel thickness, Mount C20, total 2-3/16 inch thickness.

7. Panel applications include the following surface types:
  - a. Panels for Wall Surfaces.
  - b. Panels for Ceiling Surfaces.
8. Panels:
  - a. Material: Aspen wood fibers bonded with inorganic hydraulic cement.
  - b. Panel Thickness:
    - 1) As indicated on Drawings.
  - c. Panel Edge Profiles:
    - 1) Beveled.
  - d. Panel Sizes:
    - 1) As indicated on Drawings.
  - e. Panel Surface Texture: Coarse.
  - f. Paint:
    - 1) Factory Applied.
      - a) Color:
        - (1) As selected by Architect from full range of manufacturer's options.
    - 2) Field Applied.
      - a) Paint manufacturer, type, and application method to match that used for factory applied coatings.
      - b) 3 coats to be painted over factory applied coats.
      - c) Color:
        - (1) Multiple colors as indicated on Drawings. Selection of colors to be by Architect.
  - g. Surface finished appearance to be uniform from panel to panel.
  - h. Mounting Types:
    - 1) As indicated on Drawings.
9. Supports, Fasteners, and Anchors: To be corrosion resistant and as approved by manufacturer.
10. Touch-Up Paint: Paint manufacturer, type, color, application, and appearance to match finish indicated.
  - a. Apply to field cut conditions.
  - b. Apply to exposed fasteners. Use paint products compatible with fastener material and finish for adhesion.



## 2.5 ACCESSORIES

- A. Provide accessories as required to complete Work in accordance with the Drawings and as recommended by the manufacturer for application conditions.
- B. Mounting Devices and Anchors:
  - 1. As required to complete Work in accordance with the Drawings and as recommended by manufacturer.
  - 2. Designed and installed to anchor and withstand loads imposed by installed components.
  - 3. Wall Brackets: Galvanized steel rail configured to accept grooved epoxy buttons or Z-brackets attached to panel corners on concealed side.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Examine acoustical panels installation substrates, supports and surroundings for compliance with requirements for installation securement, tolerances, required overhead clearances, and other existing conditions affecting installation and performance of acoustical panels. Proceed with unit installation upon correction of unsatisfactory conditions.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install units plumb, level, and true.
- C. Install units in accordance with the Drawings, manufacturer's recommendations, and as indicated regarding brackets, supports, anchors, and fasteners.
- D. Install wall-mounted acoustical panels utilizing corner mounting Z-brackets or grooved buttons and concealed wall brackets. Where indicated, secure units to wall with fasteners along top of unit.
- E. Install ceiling-mounted acoustical panels utilizing integral corner mounting brackets and mounting methods applicable to the design requirements.
  - 1. Ceiling Grid Mounted: Mount and fasten panels to grid using grid clips.
  - 2. Direct Mounted: Attach directly to substrate using back-mounted clip and exposed fastener.
  - 3. Suspended: Hang panels plumb and free from structural members. Use carrying channels where structural members cannot be used. Use post-installed anchors in concrete slabs.
- F. Install seismic bracing and fastening in accordance with applicable code requirements and as indicated in this Section.



**3.4 FIELD QUALITY CONTROL**

- A. Section 01 40 00 - Quality Requirements: Monitor quality of installation, inspection, and testing.
- B. Should completed installation fail to meet requirements, Contractor shall make modifications necessary to correct performance and retest room as directed by Architect to indicate compliance, at Contractor's expense.

**3.5 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Repair or replace defective Work in a manner acceptable to Architect.
- C. Clean unit surfaces. Touch up, refinish, or replace damaged components in a manner acceptable to Architect.

**END OF SECTION**



**SECTION 09 84 16**  
**FIXED SOUND-REFLECTIVE PANELS**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Acoustical cloud system.
- B. Related Sections:
  - 1. Division 05 - Metals: Sections indicating Structural Steel and Steel Joist for structural supports for acoustical clouds system.

**1.2 REFERENCES**

- A. American National Standards Institute (ANSI):
  - 1. ANSI A135.4 - Basic Hardboard; 2012, Reaffirmed 2020.
- B. American Society of Civil Engineers (ASCE):
  - 1. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- C. Architectural Woodwork Institute/Architectural Woodwork Manufacturers Association Of Canada/Woodwork Institute (AWI/AWMAC/WI):
  - 1. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, Errata 2016.
- D. ASTM International (ASTM):
  - 1. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
  - 2. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
  - 3. ASTM E413 - Classification for Rating Sound Insulation; 2022.
- E. National Electrical Manufacturers Association (NEMA):
  - 1. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.
- F. Underwriters Laboratories, Inc. (UL):
  - 1. UL 723 - Test For Surface Burning Characteristics of Building Materials.

**1.3 PRE-INSTALLATION MEETINGS**

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this Section. Review the work requirements, application procedures, quality control, testing and inspection and production schedule.

**1.4 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Manufacturer's data sheets for acoustical cloud.
  - 1. Provide test results by certified independent testing laboratory indicating compliance with requirements of Performance Requirements article.
  - 2. Include installation instructions for acoustical clouds.

- C. Shop Drawings: Prepared by manufacturer. Include dimensioned plans and sections, and elevations showing acoustical cloud component sizes, arrangements, and details of each condition of installation. Show fabrication and installation details.
  - 1. Indicate special fabrication details required to accommodate other work components that penetrate or adjoin acoustical clouds such as lights.
  - 2. Indicate coordination with related overhead components, including structural elements, rigging, catwalks, lighting, ductwork, piping, and sprinklers.
  - 3. Include engineering data and drawings indicating structural design and requirements. Data and drawings are to be designed and sealed by a licensed professional Engineer.
- D. Samples for Initial Selection: For products with factory-applied finishes, submit two manufacturer's color charts illustrating the full range of finishes, colors, and sheens available. For products receiving field-applied finishes, submit color charts illustrating a full range of finishes, colors, and sheens. Submit to Architect for initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare two samples for each selected finish and color; on same product material type indicated for final Work; each 8 x 10 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.

## 1.5 QUALITY ASSURANCE

- A. Designer Qualifications: Design of structural requirements for the work included in this Section are to be designed and sealed by a licensed Professional Engineer, experienced in design of work of this type and licensed in the State in which the Project is located. Engineer is to certify that all applicable code requirements have been met. Engineer may be in the employ of the manufacturer of the covering systems, provided Engineer is compliant with the above registration requirement.
- B. Manufacturer: Company specializing in manufacturing Products specified in this Section with minimum five (5) years documented experience.
- C. Installer: Company specializing in performing work of this Section and with minimum five (5) years documented experience.
- D. Source Limitations: Obtain acoustical cloud system and components through one source from a single approved manufacturer.
- E. Field Measurements: Verify layout and the dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Deliver, store, and handle acoustical cloud components in accordance with component manufacturers' recommendations. Ship to jobsite only after roughing-in, painting work, and other related finish work has been completed and installation areas are ready to accept units and recommended temperature and humidity levels will be maintained during the remainder of construction.

## 1.7 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordination Conference: Prior to fabrication of acoustical clouds, conduct conference at project site to verify coordination requirements with work of related trades. Review acoustical cloud shop drawings, related rigging, adjacent or integral fire protection,

plumbing, HVAC, electrical power, lighting, communication, and structural and architectural features.

1. Coordinate requirements for structural supports or pipe battens furnished under other sections and used to support acoustical cloud.

## 1.8 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Special Warranty: Manufacturer's written warranty indicating manufacturer's intent to repair or replace acoustical cloud components that fail in materials or workmanship within five (5) years from date of Substantial Completion. Failures are defined to include, but are not limited to, the following:
  1. Fracturing or breaking of unit components which results from normal wear and tear and normal use other than vandalism.
  2. Delamination or other failures of glue bond of components.
  3. Warping of components not resulting from leaks, flooding, or other uncontrolled moisture or humidity.
  4. Failure of unit to perform acoustically in accordance with manufacturer's published data.

## PART 2 PRODUCTS

### 2.1 DESIGN REQUIREMENTS

- A. Design acoustical clouds and suspension system, including supplemental framing, under direct supervision of Professional Engineer experienced in design of this Work and licensed in the State in which the Project is constructed.
  1. Design is to include the following.
    - a. Suspended loads are to be securely anchored to building structural components capable of supporting the loads.
    - b. Seismic Loads: Design and size components to withstand seismic loads and sway displacement as calculated by, and in compliance with ASCE 7, Section 9 - Earthquake Loads, and based upon seismic design criteria indicated.

### 2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics per ASTM E84 or UL 723.
  1. Flame Spread Index: 25 or less.
  2. Smoke Developed Index: 450 or less.
- B. Acoustical Panel Sound Transmission: Provide acoustical cloud comprised of acoustical cloud panels having the following sound transmission requirements:
  1. Sound Transmission Class (STC): Minimum 50 per ASTM E413.

### 2.3 ACOUSTICAL CLOUDS

- A. Manufacturers:
  1. Wenger Corporation - Diva Acoustical Cloud System. (Basis of Design)
  2. Architectural Components Group, Inc.
  3. AVL Systems, Inc.
  4. Kinetics.
  5. Substitutions: Section 01 60 00 - Product Requirements.
- B. Overhead sound reflecting acoustical cloud consisting of fixed acoustical cloud panels suspended directly from building structure support overhead.

1. Cloud Panel Radius: As indicated.
  2. Cloud Panel Size and Configuration: As indicated.
  3. Cloud Panel Face Finish: No exposed fasteners.
    - a. Painted Hardboard: Opaque, 100 percent acrylic latex, three (3) coats, eggshell finish; color as selected by Architect from full range of options.
  4. Cloud Edge Framing: Panel edges to be reinforced with extruded aluminum edge frame; color as selected by Architect from full range of options.
- C. Cloud Assembly Suspension: Chain and shackle from each of four corners to overhead supports.
1. Shackles: Rated screw pin shackles.
  2. Chain: 3/16 inch (4 mm) Grade 30 proof coil black oxide steel chain.
- D. Miscellaneous Supports: Battens, channels, and other miscellaneous supports are part of the work of Division 05 Section "Metal Fabrications."

## 2.4 MATERIALS

- A. Aluminum Extruded Bars, Profiles, and Tubes: ASTM B221, 6063T alloy.
- B. Hardboard: ANSI A135.4, Class 1 Tempered, Urea Formaldehyde free.
- C. Supplemental Framing: Steel, schedule 40 pipe.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that field measurements are as required.
- C. Verify that surfaces, overhead clearances, building structural support elements and other conditions are ready to accept the work of this Section.
- D. Examine products to be installed for damage and other conditions detrimental to completion of the Work.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install acoustical cloud units plumb, level, and true, in accordance with manufacturer's recommendations and approved submittals. Suspend from overhead building structure using specified installation accessories.

### 3.4 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work in accordance with manufacturer's recommendations including cleaning procedures and materials.

- B. Clean exposed surfaces of acoustical clouds. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.
- C. Repair or replace defective work as directed by Architect upon inspection.

**3.5 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.

**END OF SECTION**





**SECTION 09 90 00**  
**PAINTING AND COATING**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Section includes surface preparation and field application of painting and coating systems.
- B. Related Requirements:
  - 1. Sections including work indicated to receive painting and coating.

**1.2 REFERENCES**

- A. ASTM International (ASTM):
  - 1. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2024.
  - 2. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials; 2020.
- B. California Department of Public Health (CDPH):
  - 1. CDPH Standard Method VOC v1.2 - Standard Method For The Testing And Evaluation Of Volatile Organic Chemical Emissions From Indoor Sources Using Environmental Chambers - Version 1.2; 2017.
- C. GreenSeal, Inc. (GS):
  - 1. GreenSeal GS-11 - Standard For Paints, Coatings, Stains, and Sealers; 2021.
- D. Painting and Decorating Contractors of America (PDCA):
  - 1. PDCA - Architectural Painting Specification Manual; Current Edition.
- E. Society for Protective Coatings (SSPC):
  - 1. SSPC V1 (PM1) - Good Painting Practice: Painting Manual Volume 1; 2016.
  - 2. SSPC V2 (PM2) - Systems and Specifications: Steel Structures Painting Manual Volume 2; 2021.
  - 3. SSPC SP 13 - Surface Preparation of Concrete; 2018.

**1.3 DEFINITIONS**

- A. Conform to ASTM D16 for interpretation of terms used in this Section.

**1.4 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on all finishing products.
- C. Samples for Initial Selection: Submit two paper chip samples; 2 x 3 inches in size; illustrating range of colors, sheens, and textures available for each surface finishing product indicated; submit for Architect's initial selections.
  - 1. For clear top coats on stained wood, samples to illustrate range of colors and sheens available as applied to wood species required in construction.
  - 2. For clear top coats on non-stained wood, samples to illustrate sheens available as applied to wood species required in construction.
- D. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected color, sheen, and texture. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.

1. For opaque paint samples, submit each on tempered hardboard; minimum 8 x 8 inches.
  2. For clear top coats on stained and non-stained wood; submit each on finished wood species required in construction; minimum 8 x 8 inches.
- E. Manufacturer's Installation Instructions: Submit special surface preparation procedures and substrate conditions requiring special attention.

### **1.5 CLOSEOUT SUBMITTALS**

- A. Section 01 77 00 - Closeout Procedures.
- B. Operation and Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.

### **1.6 QUALIFICATIONS**

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five (5) years documented experience.
- B. Applicator: Company specializing in performing work of this section with minimum ten (10) years documented experience.

### **1.7 MOCKUP**

- A. Section 01 40 00 - Quality Requirements: Mock-up requirements.
- B. Construct mockup, in one room, illustrating coating color, sheen, texture, and finish.
- C. Locate where directed by Architect.
- D. Incorporate accepted mockup as part of Work.

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

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- C. 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.
- D. Paint Materials: Store at minimum ambient temperature of 45 degrees F and maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

### **1.9 ENVIRONMENTAL REQUIREMENTS**

- A. Section 01 60 00 - Product Requirements.
- B. Do not apply materials when surface and ambient temperatures are outside temperature ranges required by paint product manufacturer.
- C. Do not apply exterior coatings during rain or snow when relative humidity is outside humidity ranges, or moisture content of surfaces exceed those required by paint product manufacturer.
- D. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior, unless required otherwise by manufacturer's instructions.
- E. Minimum Application Temperature for Varnish Finishes: 65 degrees F for interior and exterior, unless required otherwise by manufacturer's instructions.

- F. Provide lighting level of 80 ft candle measured mid-height at substrate surface.

### 1.10 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Furnish five (5) year manufacturer warranty for paints and coatings.
- C. Contractor to provide a one (1) year warranty on all defects.
- D. Installer to provide a two (2) year warranty on all materials and workmanship.

### 1.11 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
  - 1. Supply 1 gallon of each color, sheen, type, and surface texture; store as directed by Owner.
  - 2. Label each container with color, sheen, type, surface texture and room locations, in addition to manufacturer's label.

## PART 2 PRODUCTS

### 2.1 PAINTS AND COATINGS

- A. Manufacturers:
  - 1. Benjamin Moore (BM).
  - 2. PPG Paints (PPG).
  - 3. Sherwin-Williams Company (SW).
  - 4. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design Manufacturer (BOD):
  - 1. Sherwin-Williams Company (SW) unless indicated otherwise as follows:
    - a. Comply with SCHEDULE article in PART 3 of this Section if BOD is indicated other than that indicated above.
    - b. Comply with Drawings if BOD is indicated other than that indicated in this Section.
    - c. Manufacturer, product, and finish sheen to be as indicated in SCHEDULE article in this Section unless indicated otherwise on Drawings.
- C. Provide paints and finishes from the same manufacturer to the greatest extent possible.
  - 1. If a single manufacturer cannot provide specified products, minor exceptions will be permitted provided approval by Architect is obtained using the specified procedures for substitutions.

### 2.2 COMPONENTS

- A. Conditioners, primers, and other undercoating products are to be of same manufacturer as top coat manufacturer unless top coat manufacturer recommends otherwise in writing.
- B. All materials and paints shall be lead and mercury free and shall have low VOC content where possible.
- C. Coatings: Ready mixed, except field catalyzed coatings. Prepare coatings:
  - 1. Prepare coatings to soft paste consistency, capable of being readily and uniformly dispersed to homogeneous coating.
  - 2. Prepare coatings for consistent flow and brushing properties.
  - 3. Prepare coatings capable of drying and curing free of streaks or sags.

4. Interior Flat and Non-Flat Paints:
    - a. Maximum volatile organic compound content in accordance with CDPH Standard Method VOC v1.2.
  5. Interior Anti-Corrosive Paints:
    - a. Maximum volatile organic compound content in accordance with CDPH Standard Method VOC v1.2.
  6. Interior Clear Wood Finishes: Maximum volatile organic compound content in accordance with CDPH Standard Method VOC v1.2.
- D. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve finishes specified; commercial quality.
1. Interior Clear Wood Finishes: Maximum volatile organic compound content in accordance with CDPH Standard Method VOC v1.2.
- E. Patching Materials: To be compatible with the substrate and paint/coating materials; use latex patching materials where compatible with substrate and paint/coating materials; use tinted or stainable patch materials where wood substrates are indicated to be stained.
- F. Recessed Fastener Head Filler Materials: To be compatible with the substrate and paint/coating materials; use latex filler materials where compatible with substrate and paint/coating materials; use tinted or stainable patch materials where wood substrates are indicated to be stained.

### 2.3 COLORS, SHEENS, AND LOCATIONS FOR APPLICATION

- A. Drawings and Schedules on Drawings provide additional information regarding Colors, Sheens, Basis of Design (BOD), and Locations.
1. Other Colors and Locations to be as selected by Architect from manufacturer's full range.
- B. Sheen designation indicated on Drawings supersedes sheen designations indicated in this Section.
1. In such case, provide manufacturer and named products indicated in this Section, but with sheen indicated on Drawings.
- C. Indicated color codes in this Section and on Drawings are only for the purpose of color matching and does not alter requirements for products, manufacturers, or named products.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify surfaces are ready to receive Work as instructed by product manufacturer.
- C. Examine surfaces indicated to be finished prior to commencement of work. Report conditions capable of negatively affecting proper application or finished appearance of the work.
- D. Test shop applied primer for compatibility with subsequent cover materials.
- E. Measure moisture content of surfaces using electronic moisture meter. Do not apply finishes unless moisture content of surfaces is in accordance with the coating manufacturer's recommendations and is below the following maximums:
1. Gypsum Wallboard: 12 percent.
  2. Masonry, Concrete and Concrete Unit Masonry: 12 percent.
  3. Interior Wood: 15 percent, measured in accordance with ASTM D4442.

4. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.
5. Concrete Floors and Traffic Surfaces: 8 percent.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section. Prepare materials to be installed and equipment used during installation.
- B. Preparations to be executed with methods and materials compatible with paints and coatings to be applied.
- C. Surface Appurtenances: Remove electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.
- D. Surfaces: Correct defects and clean surfaces thoroughly prior to applications.
- E. Seal marks and surfaces that might cause bleed-through or staining of top coat.
- F. Remove marks and foreign matter from substrates indicated for transparent or semi-transparent coatings.
- G. Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- H. Aluminum Surfaces Indicated for Paint Finish: Remove surface contamination by steam or high pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.
- I. Insulated Coverings: Remove dirt, grease, and oil from canvas and cotton.
- J. Gypsum Board Surfaces: Must be clean and dry. All nail heads must be set and spackled. Joints must be taped and covered with a joint compound. Spackled fastener heads and tape joints must be sanded smooth, and all dust removed prior to painting. Exterior surfaces must be spackled with exterior grade compounds. Fill minor defects with filler compound. Spot prime defects after repair.
- K. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
- L. Concrete: Remove release agents, curing compounds, efflorescence, irregular surfacing, foreign matter, stains, chalk, and laitance. Prepare surface as recommended by finishes manufacturer and according to SSPC SP 13. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds the lesser of that permitted in manufacturer's written instructions and that indicated in this Section. Remove stains caused by weathering of corroding metals with solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
- M. Concrete Floors Requiring Sealed Finish (Does not include Polished Concrete Floor Finishing; refer to Division 3):
  1. Use preparation procedures and products as recommended by manufacturer of sealer finish for concrete floors.
- N. Masonry Surfaces Indicated to Receive Paint Finish: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.

- O. Plaster and Parged Surfaces: Fill hairline cracks, small holes, and imperfections with patching material compatible with the plaster and the indicated coatings. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.
- P. Uncoated Steel and Iron Surfaces: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand power tool wire brushing or sandblasting; clean by washing with solvent. Apply treatment of phosphoric acid solution, ensuring welded joints, bolts, and nuts are similarly cleaned. Spot prime paint after repairs.
- Q. Shop Primed Steel 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.
- R. Surfaces Indicated to Receive Fire-Retardant Intumescent Paint: Use preparation procedures and products as recommended by manufacturer of Intumescent Paint system.
- S. Metal Doors and Frames Indicated for Painting: Prime metal door top and bottom edge surfaces.
- T. Wood Surfaces:
  - 1. 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. Prime filled areas, sanding between coats. For exterior applications, back prime concealed surfaces of material before installation.
  - 2. Transparent Finish: Wipe off dust and grit prior to application of finishing materials. Fill nail holes and cracks with stainable filler or filler tinted to match the intended final wood appearance. For exterior applications, prime concealed surfaces with indicated finish material.
- U. Glue-Laminated Wood Beams Indicated for Field Applied Finishing: Prior to finishing, wash surfaces with solvent, remove grease and dirt.
- V. Floor and Roof Concrete Planks: Where underside of planks is exposed to view, install continuous joint sealant materials to seal joints including joints between planks, around perimeters and voids.
- W. PVC, Vinyl and Architectural Plastic: Clean and lightly sand surfaces to be coated. Use preparation procedures and products as recommended by substrate manufacturer and manufacturer of coating system.

### 3.3 APPLICATION

- A. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- B. Apply each coat to uniform appearance. Apply each coat of paint slightly darker than preceding coat unless specified otherwise.
- C. For concrete masonry units and other porous masonry and cementitious materials indicated to receive painting/coating, apply the primer coating as needed to fill all pinholes prior to applying finish top coats.
- D. Sand surfaces lightly between coats to achieve required finish.
- E. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- F. Where clear finishes are required, tint fillers to match wood and apply to match wood texture. Remove excess from surface.
- G. Prime concealed surfaces of interior woodwork with primer paint.

- H. Finishing Mechanical and Electrical Equipment:
1. Paint shop primed equipment. Paint shop finished items occurring at interior areas.
  2. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately. Reinstall after paint is cured.
  3. Prime and paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, except where items are shop finished.
  4. Paint interior surfaces of air ducts visible through grilles and louvers with one coat of flat black paint to visible surfaces. Paint dampers exposed behind louvers, grilles, to match face panels.
  5. Paint exposed conduit and electrical equipment occurring in finished areas.
  6. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.
  7. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.
- I. Finishing Overhead Construction Indicated as Open To Structure (exposed to view):
1. This provision includes finishing of overhead construction above suspended ceilings and clouds that do not extend to wall. This condition allows overhead construction to be seen above and over the suspended ceiling or cloud. Therefore, such overhead construction must be painted to eliminate unsightly overhead conditions that are visible.
  2. This provision does not include mechanical and electrical utility rooms, unless indicated otherwise on Drawings.
  3. Apply fast-drying, flat interior dry-fall type alkyd to all overhead construction Work and surfaces. Such surfaces include, but are not limited to, roof decking, structural steel, bracing and supports, and mechanical and electrical work.
    - a. Dry-Fall application does not apply to the following:
      - 1) Items with manufacturer's fully prefinished final coatings such as light fixtures, life safety devices and required warning postings.
      - 2) Surfaces scheduled to receive manufacturer's fully prefinished final coatings or field applied coatings other than Dry-Fall. Such surfaces may include wood laminated beams and underside of wood plank ceilings.

### 3.4 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Collect waste material which may constitute fire hazard, place in closed metal containers, and remove daily from site.

### 3.5 SCHEDULE - EXTERIOR SURFACES

- A. Exterior Steel - Unprimed:
1. One coat of alkyd primer.
    - a. BM - Super Spec HP Alkyd Metal Primer P06.
    - b. PPG - Pitt-Tech Plus 4020 PF DTM Acrylic Primer.
    - c. SW - All Surface Enamel Interior-Exterior Alkyd Primer.
  2. Two top coats of alkyd enamel finish.
    - a. BM - Advance Waterborne Interior-Exterior Alkyd High Gloss N794.
    - b. PPG - Pitt-Tech Plus EP DTM Acrylic Gloss.
    - c. SW - SWP Exterior Oil Base Gloss.
- B. Exterior Steel - Primed:
1. One coat of alkyd primer.
    - a. BM - Super Spec HP Alkyd Metal Primer P06.



- b. PPG - Pitt-Tech Plus 4020 PF DTM Acrylic Primer.
    - c. SW - All Surface Enamel Interior-Exterior Alkyd Primer.
  - 2. Two top coats of alkyd enamel finish.
    - a. BM - Advance Waterborne Interior-Exterior Alkyd High Gloss N794.
    - b. PPG - Pitt-Tech Plus EP DTM Acrylic Gloss.
    - c. SW - SWP Exterior Oil Base Gloss.
- C. Exterior Steel - Primed (Epoxy Coating):
  - 1. One coat of epoxy primer.
    - a. BM - Corotech Surface Tolerent Epoxy Mastic V160.
    - b. PPG - Amerlock 600 Polyamide Epoxy Coating.
    - c. SW - Macropoxy 646 Fast Cure Epoxy Mastic Semi-Gloss.
  - 2. One coat of epoxy body coat.
    - a. BM - Corotech Surface Tolerent Epoxy Mastic V160.
    - b. PPG - Amerlock 600 Polyamide Epoxy Coating.
    - c. SW - Macropoxy 646 Fast Cure Epoxy Mastic Semi-Gloss.
  - 3. One top coat of urethane finish.
    - a. BM - Corotech Aliphatic Acrylic Urethane Gloss V500.
    - b. PPG - Pitthane Ultra Acrylic Aliphatic Urethane Gloss 95-812 Series.
    - c. SW - Hi-Solids Polyurethane Gloss B65-300.
- D. Exterior Steel - Galvanized:
  - 1. One coat of alkyd primer.
    - a. BM - Ultra Spec HP Acrylic Metal Primer HP04.
    - b. PPG - Pitt-Tech Plus 4020 PF DTM Acrylic Primer.
    - c. SW - Galvite HS Alkyd Modified Acrylic Primer.
  - 2. Two top coats of alkyd enamel finish.
    - a. BM - Advance Waterborne Interior-Exterior Alkyd High Gloss N794.
    - b. PPG - Pitt-Tech Plus EP DTM Acrylic Gloss.
    - c. SW - SWP Exterior Oil Base Gloss.
- E. Exterior Aluminum - Mill Finished:
  - 1. One coat of alkyd primer.
    - a. BM - Ultra Spec HP Acrylic Metal Primer HP04.
    - b. PPG - Pitt-Tech Plus 4020 PF DTM Acrylic Primer.
    - c. SW - Galvite HS Alkyd Modified Acrylic Primer.
  - 2. Two top coats of alkyd enamel finish.
    - a. BM - Advance Waterborne Interior-Exterior Alkyd High Gloss N794.
    - b. PPG - Pitt-Tech Plus EP DTM Acrylic Gloss.
    - c. SW - SWP Exterior Oil Base Gloss.
- F. Exterior Concrete Masonry Units:
  - 1. Two coats of block filler.
    - a. BM - Ultra Spec Hi-Build Masonry Block Filler 571.
    - b. PPG - Speedhide Interior-Exterior Masonry Hi Fill Latex Block Filler.
    - c. SW - Loxon Acrylic Block Surfacer A24/LX01 Series.
  - 2. Two top coats of latex finish.
    - a. BM - Ultra Spec EXT Finish Satin N448.
    - b. PPG - Speedhide Exterior Acrylic Flat.
    - c. SW - SuperPaint Exterior Acrylic Latex Flat.
- G. Exterior PVC, Vinyl, and Architectural Plastic:
  - 1. One coat of primer.
    - a. BM - INSL-X Stix Waterborne Bonding Primer.
    - b. PPG - Rust-Oleum XIM UMA Advanced Technology Primer Sealer Bonder.
    - c. SW - Extreme Bond Interior-Exterior Bonding Primer.



2. Two top coats of acrylic finish.
  - a. BM - Command Waterborne Acrylic Urethane Satin.
  - b. PPG - Break-Through 50 Interior-Exterior Acrylic Satin.
  - c. SW - A-100 Exterior Latex Flat.

### 3.6 SCHEDULE - INTERIOR SURFACES

- A. Interior Concrete Masonry Units:
  1. Two coats of block filler unless indicated otherwise.
    - a. BM - Ultra Spec Hi-Build Masonry Block Filler 571.
    - b. PPG - Speedhide Interior-Exterior Masonry Hi Fill Latex Block Filler.
    - c. SW - PrepRite Interior-Exterior Latex Block Filler.
  2. Two top coats of latex finish.
    - a. BM - Ultra Spec 500 Interior Acrylic Finish Semi-Gloss T546.
    - b. PPG - Speedhide Zero VOC Interior Latex Semi-Gloss.
    - c. SW - ProMar 200 Zero VOC Interior Latex Semi-Gloss.
  3. Special Requirement:
    - a. Three coats block filler.
    - b. Two top coats finish.
    - c. Locations:
      - 1) Lobby Areas.
      - 2) Corridors.
      - 3) Stair Areas.
- B. Interior Concrete Masonry Units (Epoxy Coating):
  1. Two coats of epoxy block filler, unless otherwise indicated.
    - a. BM - Corotech Acrylic Block Filler V114.
    - b. PPG - Speedhide Interior-Exterior Masonry Hi Fill Latex Block Filler 6-15XI.
    - c. SW - Pro Industrial Heavy Duty Block Filler.
  2. Two top coats of acrylic epoxy finish.
    - a. BM - Corotech Pre-Catalyzed Waterborne Epoxy Semi-Gloss.
    - b. PPG - Pitt-Glaze WB1 Interior Pre-Catalyzed Acrylic Epoxy Semi-Gloss.
    - c. SW - Pro Industrial Pre-Catalyzed Waterbased Epoxy Semi-Gloss.
  3. Special Requirement:
    - a. Three coats minimum, block filler.
    - b. Two top coats, minimum, finish.
    - c. Locations:
      - 1) Food Preparation and Dining Areas such as:
        - a) Kitchen Areas.
        - b) Food Serving Areas.
        - c) Dishwashing Areas.
        - d) Food Storage Areas.
        - e) Kitchen Office Areas.
        - f) Kitchen Toilet and Adjacent Locker Room Areas.
        - g) Dining Areas.
        - h) Cafeterias.
      - 2) Toilets and Janitor Closets.
      - 3) Gymnasium Locker Rooms.
    - d. Apply additional coats as required to achieve even surface finish acceptable to the local Health Department having jurisdiction.
    - e. All surfaces must be acceptable to Health Department officials and pass the "ketchup test" requirements.
- C. Interior Parge Finished Masonry (Epoxy Coating):
  1. One coat, minimum of epoxy block filler.

- a. BM - Corotech Acrylic Block Filler V114.
  - b. PPG - Speedhide Interior-Exterior Masonry Hi Fill Latex Block Filler 6-15XI.
  - c. SW - Pro Industrial Heavy Duty Block Filler.
  2. Two top coats, minimum of acrylic epoxy finish.
    - a. BM - Corotech Pre-Catalyzed Waterborne Epoxy Semi-Gloss.
    - b. PPG - Pitt-Glaze WB1 Interior Pre-Catalyzed Acrylic Epoxy Semi-Gloss.
    - c. SW - Pro Industrial Pre-Catalyzed Waterbased Epoxy Semi-Gloss.
  3. Apply additional coats as required to achieve even surface finish acceptable to the local Health Department having jurisdiction.
  4. All surfaces must be acceptable to Health Department officials and pass the “ketchup test” requirements.
- D. Interior Concrete Floors Requiring Sealed Finish: This provision is only for concrete floors indicated to have Sealed Concrete Finish. It is not intended for Stained and Polished Concrete Floors that would be indicated in Section 03 35 43 - Polished Concrete Finishing.
1. One coat Liquid Densifier: Penetrating lithium silicate sealer, hardener, and densifier.
    - a. Prosoco - Consolideck LS Hardener/Densifier. (Basis of Design)
    - b. Convergent Concrete Technologies - Pentra-Sil (HD).
    - c. Ameripolish - Ameripolish 3D HS.
    - d. Substitutions: Section 01 60 00 - Product Requirements.
  2. Two coats Protective Treatment: Penetrating lithium silicate protective treatment.
    - a. Prosoco - Consolideck PolishGuard Finish. (Basis of Design)
    - b. Convergent Concrete Technologies - Pentra-Finish (HG).
    - c. Ameripolish - Ameripolish SR2.
    - d. Substitutions: Section 01 60 00 - Product Requirements.
- E. Interior Steel - Unprimed:
1. One coat of acrylic primer.
    - a. BM - Corotech Acrylic Metal Primer V110.
    - b. PPG - Pitt-Tech Plus 4020 PF DTM Acrylic Primer.
    - c. SW - Pro Industrial Pro-Cryl Universal Primer.
  2. Two top coats of acrylic enamel finish.
    - a. BM - Corotech Acrylic DTM Enamel Semi-Gloss V331.
    - b. PPG - Pitt-Tech Plus EP DTM Acrylic Semi-Gloss.
    - c. SW - Pro Industrial Waterbased Alkyd Urethane Enamel Semi-Gloss.
- F. Interior Steel - Primed:
1. One coat of acrylic primer.
    - a. BM - Corotech Acrylic Metal Primer V110.
    - b. PPG - Pitt-Tech Plus 4020 PF DTM Acrylic Primer.
    - c. SW - Pro Industrial Pro-Cryl Universal Primer.
  2. Two top coats of acrylic enamel finish.
    - a. BM - Corotech Acrylic DTM Enamel Semi-Gloss V331.
    - b. PPG - Pitt-Tech Plus EP DTM Acrylic Semi-Gloss.
    - c. SW - Pro Industrial Waterbased Alkyd Urethane Enamel Semi-Gloss.
- G. Interior Steel - Galvanized:
1. One coat acrylic primer.
    - a. BM - Ultra Spec HP Acrylic Metal Primer HP04.
    - b. PPG - Pitt-Tech Plus 4020 PF DTM Acrylic Primer.
    - c. SW - Pro Industrial Pro-Cryl Universal Primer.
  2. Two top coats of acrylic enamel finish.
    - a. BM - Advance Waterborne Interior Alkyd Semi-Gloss.
    - b. PPG - Pitt-Tech Plus EP DTM Acrylic Semi-Gloss.
    - c. SW - Pro Industrial Waterbased Alkyd Urethane Enamel Semi-Gloss.

- H. Interior Aluminum - Mill Finished:
  - 1. One coat acrylic primer.
    - a. BM - Ultra Spec HP Acrylic Metal Primer HP04.
    - b. PPG - Pitt-Tech Plus 4020 PF DTM Acrylic Primer.
    - c. SW - Pro Industrial Pro-Cryl Universal Primer.
  - 2. Two top coats of acrylic enamel finish.
    - a. BM - Advance Waterborne Interior Alkyd Semi-Gloss.
    - b. PPG - Pitt-Tech Plus EP DTM Acrylic Semi-Gloss.
    - c. SW - Pro Industrial Waterbased Alkyd Urethane Enamel Semi-Gloss.
- I. Interior Gypsum Board - Walls:
  - 1. One coat latex primer sealer.
    - a. BM - Ultra Spec 500 Interior Latex Primer.
    - b. PPG - Pure Performance Interior Acrylic Primer.
    - c. SW - ProMar 200 Zero VOC Interior Latex Primer.
  - 2. Two top coats of latex finish.
    - a. BM - Ultra Spec 500 Interior Latex Finish Eggshell
    - b. PPG - Speedhide Zero VOC Interior Latex Eggshell.
    - c. SW - ProMar 200 Zero VOC Interior Latex Eg-Shel.
- J. Interior Gypsum Board - Walls (Epoxy Coating):
  - 1. One coat of epoxy primer sealer.
    - a. BM - INSL-X Aqua Lock Plus.
    - b. PPG - Pure Performance Interior Acrylic Primer.
    - c. SW - ProMar 200 Zero VOC Interior Latex Primer.
  - 2. Two top coats of acrylic epoxy finish.
    - a. BM - Corotech Pre-Catalyzed Waterborne Epoxy Semi-Gloss.
    - b. PPG - Pitt-Glaze WB1 Interior Pre-Catalyzed Acrylic Epoxy Semi-Gloss.
    - c. SW - Pro Industrial Pre-Catalyzed Waterbased Epoxy Semi-Gloss.
  - 3. Locations Include:
    - a. Food Preparation and Dining Areas such as:
      - 1) Kitchen Areas.
      - 2) Food Serving Areas.
      - 3) Dishwashing Areas.
      - 4) Food Storage Areas.
      - 5) Kitchen Office Areas.
      - 6) Kitchen Toilet and Adjacent Locker Areas.
      - 7) Dining Areas.
      - 8) Cafeterias.
    - b. Toilets and Janitor Closets.
    - c. Gymnasium Locker Rooms.
- K. Interior Gypsum Board - Ceilings and Bulkheads:
  - 1. One coat latex primer sealer.
    - a. BM - Ultra Spec 500 Interior Latex Primer.
    - b. PPG - Pure Performance Interior Acrylic Primer.
    - c. SW - ProMar 200 Zero VOC Interior Latex Primer.
  - 2. Two top coats of latex finish.
    - a. BM - Ultra Spec 500 Interior Latex Finish Flat.
    - b. PPG - Speedhide Zero VOC Interior Latex Flat.
    - c. SW - ProMar 200 Zero VOC Interior Latex Flat.
- L. Interior Insulated Coverings - Canvas and Cotton:
  - 1. One coat of latex primer sealer.
    - a. Same as Gypsum Board - Ceilings and Bulkheads.

2. Two top coats of latex finish.
  - a. Same as Gypsum Board - Ceilings and Bulkheads.
    - 1) Sheen: Flat.
- M. Interior Dry Fall (Dry Fog):
  1. One coat of primer sealer.
    - a. Product recommended by top coat manufacturer for each substrate type.
  2. Two top coats of acrylic finish.
    - a. BM - Coronado Super Kote 5000 Dry Fall Acrylic Latex Flat.
    - b. PPG - Speedhide Super Tech WB Interior Dry Fog Flat.
    - c. SW - Pro Industrial Waterborne Acrylic Dryfall Flat.
- N. Interior Wood (Paint Coating):
  1. One coat of primer sealer.
    - a. BM - Ultra Spec 500 Interior Latex Primer.
    - b. PPG - Pure Performance Interior Acrylic Primer.
    - c. SW - PrepRite ProBlock Interior-Exterior Latex Primer.
  2. Two top coats of latex finish.
    - a. BM - Ultra Spec 500 Interior Semi-Gloss
    - b. PPG - Speedhide Interior Latex Semi-Gloss
    - c. SW - ProMar 200 Zero VOC Interior Latex Semi-Gloss.
- O. Interior Wood (Stain):
  1. Stain:
    - a. BM - Product recommended by top coat manufacturer for substrate type.
    - b. PPG - DEFT Interior Oil Based Stain.
    - c. SW - Minwax Performance Series Tintable Interior Wood Stain.
  2. Three top coats finish:
    - a. Refer to Wood - Transparent Top Coat on Stained below.
- P. Interior Wood (Transparent Top Coat on Stained Wood and Non-Stained Wood):
  1. One coat sealer.
    - a. Product recommended by top coat manufacturer for substrate type.
  2. Three top coats of transparent acrylic coating.
    - a. BM - Lenmar Aqua-Plastic Acrylic Urethane Clear Semi-Gloss.
    - b. PPG - DEFT Interior Polyurethane Water Based Acrylic Semi-Gloss.
    - c. SW - Minwax Water-Based Oil-Modified Polyurethane Clear Semi-Gloss.

**END OF SECTION**

**SECTION 10 11 00**  
**VISUAL DISPLAY UNITS**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Porcelain Marker Board Units.
  - 2. Tack Board Units.
  - 3. Map Rails.
- B. Related Requirements:
  - 1. Section 04 20 00 - Unit Masonry: Substrate construction.
  - 2. Section 09 21 16 - Gypsum Board Assemblies: Substrate construction.

**1.2 REFERENCES**

- A. American Architectural Manufacturers Association (AAMA):
  - 1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2020.
  - 2. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
- B. American National Standards Institute (ANSI):
  - 1. ANSI A135.4 - Basic Hardboard; 2012, Reapproval 2020.
  - 2. ANSI A208.1 - Particleboard; 2022.
  - 3. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015, Reapproval 2020.
- C. ASTM International (ASTM):
  - 1. ASTM A424/A424M - Standard Specification for Steel, Sheet, for Porcelain Enameling; 2018.
  - 2. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
  - 3. ASTM C208 - Standard Specification for Cellulosic Fiber Insulating Board; 2022.
  - 4. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2019.
  - 5. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
  - 6. ASTM F793/F793M - Standard Classification of Wall Coverings by Use Characteristics; 2020.
- D. The Engineered Wood Association (APA):
  - 1. APA PS 1 - Structural Plywood; 2022, Revised 2023.
- E. California Department of Public Health (CDPH):
  - 1. CDPH Standard Method VOC V1.2 - Standard Method For The Testing And Evaluation Of Volatile Organic Chemical Emissions From Indoor Sources Using Environmental Chambers - Version 1.2; 2017.
- F. Code of Federal Regulations (CFR):
  - 1. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Current Edition.

**1.3 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

- B. Product Data: Provide data for each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, finishes, and accessories for visual display units.
- C. Shop Drawings: Provide dimensioned drawings for each visual display unit.
  - 1. Include plans, elevations, sections, and attachment/anchor details per substrate type.
  - 2. Include schedule of unit descriptions sorted by room numbers from Drawings.
  - 3. Show locations and details of factory-assembled joints. Show locations of field-assembled joints for factory-fabricated units too large to ship in one piece.
  - 4. Show locations and layout of graphics indicated.
  - 5. Include sections of typical trim members.
- D. Samples for Initial Selection: Two manufacturer's complete sets of color samples illustrating the full range of finishes, colors, and patterns available for products. Submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selection; samples to be same product material type indicated for final Work; each sample 12 x 12 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Section 01 77 00 - Closeout Procedures.
- B. Operation and Maintenance Data: Manufacturer recommendations to include:
  - 1. Care and maintenance instructions.
  - 2. Installation instructions.
  - 3. Specifications for recommended surface markers and erasers.
  - 4. Replacement parts data and optional accessories data.

#### 1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three (3) years documented experience.

#### 1.6 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Warranty period is to begin on the project's date of Substantial Completion.
- C. General: Provide warranty for visual display units not indicated otherwise.
  - 1. Provide five (5) year manufacturer's warranty for visual display surfaces in which manufacturer agrees to replace defective materials or installation.
- D. Porcelain Marker Boards: Provide fifty (50) year manufacturer's warranty in which manufacturer agrees to replace marker boards that exhibit any of the following defects:
  - 1. Defects in materials or workmanship.
  - 2. Discoloration, staining, ghosting or excessive fading of color.
  - 3. Crazeing, cracking, or flaking.
  - 4. Warranty does not cover the cost of removal or reinstallation.

#### 1.7 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
  - 1. Dry Erase Markers and Erasers: Provide the following for each porcelain marker board and each glass marker board installed.

- a. One (1) pack of color markers; black, red, blue, and green colors.
- b. One (1) block type dry eraser.
- c. One (1) cloth type dry eraser.

## **PART 2 PRODUCTS**

### **2.1 PERFORMANCE REQUIREMENTS**

- A. Visual display units to be manufactured and factory assembled units.
- B. Laminated components are to be factory laminated, not field laminated.
- C. Surface-Burning Characteristics: Comply with ASTM E 84.
  1. Flame-Spread Index: 25 or less.
  2. Smoke-Developed Index: 50 or less.

### **2.2 MANUFACTURERS**

- A. Manufacturers:
  1. AJW Architectural Products.
  2. ASI Visual Display Products.
  3. Clarus.
  4. Claridge Products and Equipment.
  5. Dreamwalls by Gardner Glass Products.
  6. Egan Visual Corporation.
  7. Ghent Manufacturing Inc.
  8. Marsh by Polyvision.
  9. Nelson Adams NACO.
  10. Substitutions: Section 01 60 00 - Product Requirements.

### **2.3 PORCELAIN MARKER BOARD UNITS**

- A. Porcelain Marker Boards:
  1. Outer Face Sheet: Porcelain enameled steel sheet.
    - a. Colors: As selected by Architect from manufacturer's full range.
  2. Core: Particle board, 1/2 inch thick.
  3. Vapor Barrier Backing: Aluminum sheet backing laminated to panel back.
  4. Sizes and Configurations:
    - a. As indicated on Drawings.
  5. Splice Joints: Used only as indicated on Drawings or otherwise approved by Architect.
    - a. Concealed Splice Joint: Extruded aluminum to be factory applied. Finished joint is to be hairline tight with flush aligned face planes of joined panels.
      - 1) Continuous metal spline type.
  6. Graphics Application: Factory fused-on graphics to be applied only to marker boards indicated on Drawings to have graphics. Painted-on graphics are not acceptable.
    - a. Graphics are to be as follows unless indicated otherwise on Drawings:
      - 1) Music Staff Lines:
        - a) Each Staff: Five (5) lines.
        - b) Line Spacing: 1 inch between each line.
        - c) Space Between Each Staff (equal spaces): 3 to 5 inches.
        - d) Border at Top & Bottom: 5 inches.
        - e) Line Thickness: 1/16 inch.
        - f) Length of Lines: As indicated on Drawings.
      - 2) Other graphics as may be indicated on Drawings.



7. Edge Treatment:
  - a. Frame: Extruded aluminum; 3/4 inch width.
8. Divider Joint: Extruded aluminum; continuous along full length of joint.
  - a. Style:
    - 1) H-style bar with flat face and integral wall anchor flange on back.
    - 2)
  - b. Exposed Finish:
    - 1) Match frame.
9. Mount: Anchor marker board to support construction.
  - a. Concealed continuous cleat anchor Z-rails.
  - b. Concealed continuous anchor flange integral to extruded frame assembly.
10. Marker Tray: Extruded aluminum, one-piece full length of marker board, concealed fasteners, and cast aluminum end caps.
  - a. Profile:
    - 1) Shape to be one piece triangular box profile.
  - b. In physical activity spaces such as weightlifting rooms, dance studios, gyms, and multi-purpose rooms, do not provide protruding marker trays. Provide recessed type marker trays.
11. Map Rail: Provide at top and full length of each marker board.
  - a. Provide as indicated in Map Rail article of this Section.
12. Cleaning Instruction Plate: Provide instructions for marker board cleaning on metal plate fastened to perimeter frame near marker tray.
13. Accessories: As recommended by marker board manufacturer.
  - a. Dry Erase Markers: Provide for each marker board.
    - 1) One (1) pack of color markers; black, red, blue, and green colors.
  - b. Dry Erase Marker Erasers: Provide for each marker board.
    - 1) Two (2) cloth type or microfiber shag type erasers.
    - 2) Two (2) block type erasers.
  - c. Magnetic Pins: Provide for each marker board.
    - 1) Formed shape to provide firm finger-grip pull function.
    - 2) Colors: Black, red, blue, and green; equal quantities.
    - 3) Quantity: Eight (8) magnetic pins.
  - d. Magnetic Caddy: Provide for each marker board.
    - 1) Formed to hold markers and erasers with double compartment.
    - 2) Size: 7 W x 5 H x 3-1/2 D inches with open top.
    - 3) Wire mesh sides, bottom, and compartment divider; open top.
    - 4) Finish: Powder coat finish; black color.
    - 5) Quantity: One (1) magnetic caddy.

## 2.4 TACK BOARD UNITS

- A. Laminated Components:
  1. 1/4 inch composition cork; 1/4 inch hardboard; aluminum foil backing.
- B. Board Sizes and Configurations:
  1. As indicated on Drawings.
- C. Edge Treatment:
  1. Frame: Extruded aluminum; 3/4 inch width.
- D. Corner Style:
  1. Square; mitered joint.
- E. Divider Joint: Extruded aluminum; continuous along full length of joint.
  1. Style:
    - a. H-style bar with flat face and integral wall anchor flange on back.



2. Exposed Finish:
  - a. Match frame.
- F. Colors and Patterns: As selected by Architect from manufacturer's full range.
- G. Mount: Anchor tack board to support construction.
  1. Concealed continuous cleat anchor Z-rails.
  2. Concealed continuous anchor flange integral to extruded frame assembly.
- H. Map Rail: Provide at top and full length of each tack board.
  1. Provide as indicated in Map Rail article of this Section.

## 2.5 MAP RAILS

- A. Map Rails: Extruded aluminum rails; tackable insert; top and bottom track flanges for mounting map rail accessories; concealed fasteners; end caps.
  1. Size: Length as indicated in this Section, unless indicated otherwise on Drawings.
    - a. 1 inch wide.
  2. Tackable Insert: Applied to full length of rail.
    - a. Composition cork.
  3. Map Rail Accessories: Aluminum and sized to securely fit and slide along rail size indicated. Provide the following for each map rail.
    - a. 1 flag holder, and 1 for each additional 20 linear feet of rail.
    - b. 1 pair of map hooks, and 1 pair for each additional 10 linear feet of rail.
    - c. 1 pair of roller brackets, and 1 pair for each additional 10 linear feet of rail.
  4. Colors: As selected by Architect from manufacturer's full range.

## 2.6 MATERIALS

- A. Porcelain Enameled Steel Sheet: ASTM A424/A424M, Type I, Commercial Steel, with fired-on porcelain enamel finish.
  1. Steel Sheet Thickness:
    - a. 24 gauge (0.024 inch) (0.61 mm).
  2. Porcelain Enameling System: Coat faces and edges with three coat porcelain enameling system consisting of primer, ground coat, and color cover coat. Total thickness of coating system to be not less than 4 mil (0.10 mm) thick.
    - a. System to be fusion bonded to steel sheet at suitable temperature as to reduce steel and porcelain stresses, and to achieve superior enamel bond and hardness.
    - b. Writing surface is to be non-porous, provide magnetic function, is to be uniform in hardness, color, and texture, and is to wipe clean with dry eraser or cloth without staining or ghosting.
- B. Wood Composite Materials: Sanded smooth on all sides. Maximum volatile organic content to comply with CDPH Standard Method VOC V1.2.
  1. Hardboard: ANSI A135.4, Class 1 - Tempered.
  2. Fiber Board: ASTM C208, cellulosic fiber insulating board.
  3. MDF Board: ANSI A208.2, Grade 130 minimum.
  4. Particleboard: ANSI A208.1, Grade M-1, wood chips, with waterproof resin binder.
  5. Plywood:
    - a. APA PS 1 Grade A-B, softwood.
- C. Aluminum Foil Backing: 0.005 inch (0.13 mm) thick minimum.
- D. Aluminum Sheet Backing: 27 gauge (0.014 inch) (0.36 mm) thick minimum.
- E. Steel Sheet Backing: 28 gauge (0.015 inch) (0.38 mm) thick minimum, galvanized.

- F. Cork Materials: Seamless application. Colors as selected by Architect from manufacturer's full range.
  - 1. Composition Cork: Formulation of finely ground cork, oxidized linseed oils, rosin binders, and pigments forming a solid uniform colored composition cork; 1/4 inch thick and burlap back reinforcing.
  - 2. Natural Cork: Fine grain natural cork, homogeneous composition. 1/4 inch thick.
- G. Fabric Materials: Seamless application. Colors and patterns as selected by Architect from manufacturer's full range.
  - 1. Vinyl Coated Fabric: Vinyl coated fabric complying with ASTM F793 Category VI.
  - 2. Woven Fabric: 100 percent polyester; weighing not less than 15 oz/sq yd.
- H. Extruded Aluminum: Comply with ASTM B221, 6063 alloy, T5 temper. Free of extruding draw marks and surface scratches.
  - 1. Extruded Aluminum Frames, Trim, and Components: Sizes and shapes as indicated and to suit use and installation type; factory applied to visual display units; single length extrusions when possible; keep joints to a minimum; concealed fasteners; mitered corners to an aligned and hairline closure and without sharp edges.
    - a. Extrusion Wall Thickness:
      - 1) 0.062 inch thick minimum.
    - b. Color:
      - 1) As selected by Architect from manufacturer's full range, unless indicated otherwise.
- I. Adhesives: Products recommended by manufacturer of visual display item for substrate to which item is to be adhered. Maximum volatile organic compound content in accordance with CDPH Standard Method VOC V1.2.
- J. Temporary Protective Cover: 8 mil polyethylene protective sheet factory applied to finish surfaces of products. Cover to be removable without damage to finishes.
- K. Magnetized Devices and Accessories: Magnets to be of magnetic alloy of rare earth elements. Functions to affix devices to marker boards that include steel sheet material.

## 2.7 ALUMINUM FINISHES

- A. Class II Natural Anodized Finish: AAMA 611 AA-M12C22A31 Clear anodic coating not less than 0.4 mils (0.01 mm) thick.
- B. Class II Color Anodized Finish: AAMA 611 AA-M12C22A32 integrally colored or AA - M12C22A34 electrolytically deposited colored anodic coating not less than 0.4 mil (0.01 mm) thick.
- C. Baked-Enamel or Powder-Coat Finish: AAMA 2603, except with a minimum dry film thickness of 1.5 mil (0.04 mm). Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting Work.
- B. Verify that surfaces and conditions are ready to accept the Work of this Section. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Verify substrate support construction and required internal support blocking are sufficient and ready to receive Work.

- D. Verify that positioning dimensions are as indicated on Drawings and that substrates are free of obstructions.
- E. Examine products to be installed for damage and other conditions detrimental to completion of the Work.

### **3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.

### **3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install visual display units at locations and heights indicated on Drawings.
- C. Install visual display units level and plumb with concealed fastening hardware and anchor securely to support construction.
- D. Panels indicated to be joined with concealed spline are to be butted tightly. Finished joint is to be hairline tight with flush aligned face planes of joined panels.

### **3.4 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Cover visual display unit surfaces with protective cover. Protective cover to be removable without damage to surfaces.
- C. Remove temporary protective cover at Final Inspection.

### **3.5 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed construction from damage.

**END OF SECTION**



**SECTION 10 14 00****SIGNAGE****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Room Identification Signs.
  - 2. Applied Vinyl Graphics.
  - 3. Dimensional Letter Signs.
  - 4. Notification Signs.
  - 5. Fire Protection Signs.
  - 6. Warning Stencils.
  - 7. Dedication Plaque.
  - 8. LED Screen Marquee Signs: For digital information display.
- B. Related Requirements:
  - 1. Sections related to identification of Plumbing, HVAC, and Electrical work.
  - 2. Sections related to Civil and Site work.

**1.2 REFERENCES**

- A. American National Standards Institute (ANSI):
  - 1. ANSI Z97.1 - Safety Glazing Materials Used In Buildings - Safety Performance Specifications And Methods Of Test; 2015, Reaffirmed 2020.
- B. Americans with Disabilities Act (ADA):
  - 1. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; Current Edition.
- C. ASTM International (ASTM):
  - 1. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
  - 2. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
  - 3. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2019.
- D. Code of Federal Regulations (CFR):
  - 1. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; Current Edition.
- E. International Code Council (ICC):
  - 1. ICC A117.1 - Accessible and Usable Building and Facilities; 2017.
- F. International Electrotechnical Commission (IEC):
  - 1. IEC 60529 - Degrees of Protection Provided by Enclosures (IP Code); 1989, With Amendments Through 2013.
- G. UL Standards (UL):
  - 1. UL 48 - Electric Signs; Edition 15, 2011, With Revisions Through 2023.
  - 2. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.

### 1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data describing the material, fabrication standards and characteristics of the sign systems indicated in the Section and other Contract Documents.
- C. Shop Drawings: Indicate sign types, styles, lettering font, copy, graphics, features, foreground and background colors, locations, overall dimensions of each sign and attachment method.
  - 1. Indicate connection locations for signage requiring electrical or communication wiring.
- D. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of finishes and colors available for each sign type; include color options for backgrounds, graphics, and copy; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples on same product material type indicated for final Work; each sample 6 x 8 inches illustrating sign type, sign features, graphics, and method of attachment. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Manufacturer's Installation Instructions: Submit installation template and attachment devices.

### 1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum five (5) years documented experience.

### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Package signs, labeled in name groups.
- C. Store adhesive attachment tape at ambient room temperatures.

### 1.6 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.
- B. Do not install signs when ambient temperature is lower than recommended by manufacturer.
- C. Maintain this minimum temperature during and after installation of signs.

### 1.7 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. LED Marquee Signs: Provide warranties indicated in the description of the LED Marquee Sign in this Section.

## PART 2 PRODUCTS

### 2.1 PERFORMANCE AND DESIGN REQUIREMENTS

- A. Conform to current local and state building codes; ADA Standards; 36 CFR 1191; and ICC A117.1 guidelines for manufacture and installation of interior identification signs.

- B. Conform to current International Fire Code requirements.

## 2.2 MANUFACTURERS

- A. Manufacturers:
1. Acorn Sign Graphics.
  2. APCO Graphics.
  3. ASI Sign Systems.
  4. Bayuk Graphic Systems, Inc.
  5. Best Sign Systems.
  6. Gemini, Inc.
  7. Interface Architectural Signage, Inc.
  8. InPro Corporation (Signscape).
  9. Mohawk Sign Systems.
  10. Rowmark, LLC.
  11. Scott Sign Systems, Inc.
  12. Signage Industries Corporation.
  13. Substitutions: Section 01 60 00 - Product Requirements.

## 2.3 ROOM IDENTIFICATION SIGNS

- A. Includes signs for rooms and area identification, fire extinguishers and fire extinguisher cabinets, unlighted exit signs, room capacity signs, areas of refuge, and elevators and stairs related signs as indicated on Drawings.
1. Photopolymer face fused to phenolic sheet; 0.145 inch total thickness; matte finish.
  2. "Tactile" signage, with copy raised minimum 1/32 inch above sign surface using photopolymer bonded process and with Grade II Braille located below copy.
  3. Clear Window Insertion Slots: As indicated on Drawings.
  4. Copy and graphics to be uniformly opaque.
  5. Copy Font: Helvetica Medium, uppercase.
  6. Copy Height: As indicated on Drawings.
  7. Braille Height: As indicated on Drawings.
  8. Symbol Size: As indicated on Drawings.
  9. Total Thickness: As indicated on Drawings, but not less than 0.145 inch.
  10. Size and Configuration: As indicated on Drawings.
  11. Corners: 1/2 inch radius unless indicated otherwise on Drawings.
  12. Edges: Beveled and smooth.
  13. Graphic Style: International type.
  14. Colors:
    - a. Background: As selected by Architect from submitted samples.
    - b. Copy:
      - 1) As selected by Architect from submitted samples.
    - c. Symbols and Graphics:
      - 1) As selected by Architect from submitted samples.
  15. Room Identification Sign Types:
    - a. Drawings indicate Sign Type Designations, Size, Copy, Symbols, and Insert Window requirements.
    - b. Signs required at all door openings and spaces and as indicated on Drawings.
    - c. Refer to Signage Schedule, Elevations, and Details on Drawings.
    - d. Include twelve (12) additional identification signs with graphics to be determined during construction. Type to be the type with insert window.
    - e. Back Cover Plate: Where sign must be secured to glass, acquire Architect approval prior to fabrication and installation of a Backing Cover (blank solid sign) on the opposite side of the glass. The backing cover material shall match

the size, shape, base color, thickness, and finish of the sign. The intent is to hide the unsightly back view of the sign when viewed on the opposite side of the glass. (Back Cover Plate, also referenced in ACCESSORIES, and INSTALLATION articles in this Section.)

## 2.4 APPLIED VINYL GRAPHICS

- A. Vinyl film, die-cut characters; 2 inches high, 3 mils thick.
  - 1. Adhesive backing to be pressure-sensitive and exterior application grade type.
- B. Provide door graphics for each of the following:
  - 1. Copy: **VISITORS REPORT TO MAIN OFFICE** (24 signs required)
  - 2. Copy: **TOBACCO FREE PROPERTY** (24 signs required)
  - 3. Copy: **DELIVERIES ONLY** (3 signs required)
  - 4. Copy: **TBD** (1 sign required: Building address)

## 2.5 DIMENSIONAL LETTER SIGNS

- A. Exterior Metal Letters: Architectural grade aluminum.
  - 1. Copy Style: Helvetica Medium, unless indicated otherwise on Drawings.
  - 2. Finish: Brushed.
  - 3. Copy and Locations: Characters to be designated by Architect.
    - a. Building Face - Address Identification (AHJ requirement):
      - 1) Copy text, height, and location on building exterior to be as required and designated by the local Fire Marshal and IBC 501.2 code.
    - b. Building Face - Building Name.
      - 1) Location: Mounted on building wall; height and location as follows:
        - a) To be designated by Architect:
      - 2) Character Thickness:
        - a) 1 inch.
      - 3) Characters:
        - a) 35 upper case, 18 inches high. (35 total characters)
    - c. Primary Monumental Site Sign.
      - 1) Location: Mounted on two sides of Primary Monumental Site Sign.
        - a) Character Thickness:
          - (1) 1 inch.
        - b) Characters:
          - (1) 9 upper case, 36 inches high. (18 total characters)
          - (2) 12 upper case, 12 inches high. (24 total characters)
      - d. Fieldhouse Building.
        - 1) Location: Mounted over overhead door opening. Refer to drawings.
          - a) Character Thickness:
            - (1) 1 inch.
          - b) Characters:
            - (1) 18 upper case, 8 inches high. (18 total characters)
    - B. Interior Metal Letters: Architectural grade aluminum.
      - 1. Copy Style: Helvetica Medium, unless indicated otherwise on Drawings.
      - 2. Finish:
        - a. Painted: Manufacturer's standard finish paint system; color to be as selected by Architect from manufacturer's full range.
      - 3. Character Thickness:
        - a. 1 inch.
      - 4. Character Height:
        - a. 8 inches, unless indicated otherwise on Drawings.



5. Copy:
  - a. Copy: **CAFETERIA** (2 signs required)
  - b. Copy: **DISH RETURN** (1 signs required)
  - c. Copy: **SERVING LINE 1** (1 signs required)
  - d. Copy: **SERVING LINE 2** (1 signs required)
  - e. Copy: **ADMINISTRATION** (1 signs required)
  - f. Copy: **GUIDANCE** (1 signs required)
  - g. Copy: **MEDIA CENTER** (1 signs required)
  - h. Copy: **GYMNASIUM** (4 signs required)
  - i. Copy: **CONCESSIONS** (1 signs required)
  - j. Copy: **XXX CLASSROOM WING** (3 signs required; XXX is to be a 3 digit prefix number as determined by Architect)
  - k. Copy: **GIRLS** (5 signs required)
  - l. Copy: **BOYS** (5 signs required)
  - m. Copy: **MUSIC** (1 sign required)
  - n. Copy: **DRAMA** (1 sign required)
  - o. Copy: **ART** (1 sign required)
  - p. Copy: **ELEVATOR** (2 signs required)
  - q. Copy: **AUDITORIUM** (2 signs required)
  - r. Provide 25 additional upper case characters; copy to be provided by Owner.

## 2.6 NOTIFICATION SIGNS

- A. Material: Plastic with radius corners.
  1. Size: 1/8 inch thick; H x W to be as required for Copy.
  2. Color: White background.
  3. Letters: 2 inch high black letters.
  4. Copy: **DELIVERIES ONLY** (1 sign required)

## 2.7 FIRE PROTECTIONS SIGNS

- A. Engineering Grade (Type I) Reflective Aluminum: Red reflective lettering on white background, unless indicated otherwise on Drawings.
- B. Comply with requirements of International Fire Code requirements.
- C. Size: As indicated on Drawings.
- D. Characters: Style and copy as required by NCBC 2018 standards.
- E. Sign Types: Sign and Copy sizes vary; refer to Drawings.
  1. Fire Department Connection Sign with directional arrows as required. (2 signs required)
    - a. Copy: **FDC**
  2. Fire Sprinkler Riser Room Sign. (2 signs required)
    - a. Copy: **FIRE SPRINKLER RISER ROOM**
  3. Fire Alarm Control Panel Sign. (2 signs required).
    - a. Copy: **FACP**
  4. Fire Hose Valve Connection Sign. (4 signs required; locations and final copy to be determined).
    - a. Copy: **FIRE HOSE VALVE CONNECTION**

## 2.8 WARNING STENCILS

- A. Reusable stencils for painting warning on both sides of rated walls, above hung ceiling.
  1. Copy: **X-HOUR RATED WALL - PROTECT ALL OPENINGS** (X is to be the actual numeral that represents the wall fire rated time designation.

2. Letter Color: Red.
3. Letter Size: 3 inches tall.
4. Spacing: Apply at 15 feet o.c. at all rated walls above ceilings on both sides of walls.
5. Quantity: Since stencils are reusable, quantity is determined by Contractor.

## 2.9 DEDICATION PLAQUE

- A. Dedication Plaque:
1. Material: Cast bronze.
  2. Quantity: One.
  3. Size:
    - a. 18 x 24 inches.
  4. Border:
    - a. Single line type.
  5. Finish: Pebble texture, oxidized finish.
  6. Letter Finish: Satin polish.
  7. Mounting: Standard concealed mounting to comply with the manufacturer's written instructions for type of wall surface indicated.
  8. Characters: Style and copy to be selected by Architect and Owner from manufacturer's full range of options.
    - a. Plaque to include the following information:
      - 1) Project Name. To be determined by Architect and Owner.
      - 2) Date of Construction.
      - 3) School System Information:
        - a) Names and Title of all the Board of Education Members.
        - b) Name and Title of the School System Superintendent.
      - 4) Architect's Name and Location.
      - 5) General Contractor's Name.

## 2.10 LED SCREEN MARQUEE SIGNS

- A. Provide exterior type sign system; exposed to weather.
1. Manufacturers:
    - a. Daktronic - LED GS6 Series.
    - b. Entech Signs - Alpha LED.
    - c. ThinkSIGN, Inc. - LED Extreme 16 Series.
    - d. Substitutions: Section 01 60 00 - Product Requirements.
  2. Basis of Design:
    - a. Entech Signs - Alpha LED: Excite.
  3. Viewable Display Screens:
    - a. Two (2) display screens.
  4. Location:
    - a. To be installed at front of property, adjacent to public roadway. Refer to civil drawings for location.
  5. Design Requirements:
    - a. Sign System Includes:
      - 1) Sign, housing, seals, anchorage, and all components for operational sign system assembly.
      - 2) Pedestal and concrete foundation for free-standing sign systems.
    - b. Sign System Design: To be designed and sealed by a licensed Professional Engineer experienced in design of work of this type and licensed in the State in which the project is located. The engineer is to certify that all applicable code requirements have been met. The engineer may be in the employ of the

- manufacturer of the sign system, provided the Engineer is compliant with the above registration requirement.
- 1) Design sign system to safely withstand wind loads as indicated on Drawings for the Structural Design Criteria and in compliance with the current State Building Code for the State in which the project is located.
  - 2) Comply with the design requirements on the Drawings regarding sign system size and configuration.
  - 3) Include engineered sign system design in the Shop Drawings submittals.
6. LED Digital Sign: Configuration to be as indicated on Drawings and as follows.
- a. LED Screen Display: Full color.
    - 1) LED Pixel Pitch: 16mm (0.63 inch).
    - 2) LED Pixel Color: 1 Red/1 Green/1 Blue LED per pixel.
    - 3) LED Color: PureColor, 16.7 million colors.
    - 4) Viewability & Intensity: 160 degrees horizontal/60 degrees vertical; 6500 nits.
    - 5) Digital Display Size:
      - a) Height: 30.24 inches (48 pixel rows @ 0.63 inch per row).
      - b) Width: 91.72 inches (144 pixel columns @ 0.63 inch per column).
      - c) Digital Display Matrix: 48 pixels high x 144 pixels wide.
  - b. Video Frame Rate:
    - 1) Video marquee version: 60 fps, functions as a video monitor display.
  - c. Dimming: 10 percent to 100 percent; automatic light sensor.
  - d. Screen Display Case:
    - 1) Material: Mill finish aluminum.
    - 2) Depth: 10.2 inches deep (including metal angle for mounting).
    - 3) IP (ingress protection) Code Rated: IP24 minimum rating in accordance with IEC 60529.
    - 4) UL Listed: UL 50 type 3R.
  - e. Programming Software and Hardware: Provide current version of Ooh!Media Pro Version software, hardware and all wiring connections required for fully operational sign system.
  - f. Controller: Embedded PC, DVI link to the sign monitor.
  - g. Connectivity to Controller: Wired Ethernet with optional wireless and DSL modem (phone company requirement).
  - h. Operating Temperature: -22 degrees to 122 degrees F (-30 degrees to 50 degrees C).
  - i. Service Access: Front-serviceable components. Display drivers (16 x 16) are to be removable without opening the front access door.
  - j. Mounting Components: Stainless steel mounting components and fasteners to be used for anchoring sign system to superstructure and foundation.
  - k. Miscellaneous Fasteners: Stainless steel.
  - l. Agency Approvals: UL 48.
  - m. Special Features Required:
    - 1) Industry standard 1GB compact flash memory for message storage.
    - 2) External temperature probe.
    - 3) DVI monitor capability.
    - 4) Protector Case: Ventless enclosure designed to reflect solar radiation and sealed against intrusion by rain, salt, fog, fumes, and dust.
    - 5) Automatic thermal protection for all electronics.
    - 6) Thermostatically controlled fans for each module/case for internal air mixing.
  - n. Warranty:

- 1) Sign System Warranty: Provide manufacturer's five (5) year limited warranty.
- 2) Programming Software and Hardware Warranty: Provide manufacturer's standard warranty; not less than one (1) year duration.
7. LED Digital Sign Pedestal: Size and configuration to be as indicated on Drawings.
  - a. Superstructure: Hot dipped galvanized steel members sized and joined per the required engineer's design.
  - b. Sheet Metal: Pre-finished aluminum; ASTM B209/209M, 3003 or 3005 alloy, H12 or H14 temper.
    - 1) Thickness: Base metal thickness unless indicated otherwise on Drawings or required engineer's design.
      - a) 14 gauge, (0.064 inch) (1.63 mm) minimum.
    - 2) Superior Performance Organic Coating System: AAMA 2605, shop applied multiple coats, thermally cured polyvinylidene fluoride (PVDF) resin system.
      - a) Three-Coat Fluoropolymer: AAMA 2605, fluoropolymer finish containing not less than 70 percent PVDF resin by weight in each color coat and clear topcoat. Prepare, pre-treat, and apply coatings.
      - b) Color: As selected by Architect from full range of options.
    - 3) Sheet Metal Joinery: Joined and sealed to provide weathertight enclosure. Sealant to match metal finish.
    - 4) Fasteners and anchors to be stainless steel and unexposed except for service access.

## 2.11 MARQUEE SIGN CABINETS

- A. Manufactured enclosure unit with interchangeable message letters.
  1. Location: Install at site-located masonry Monumental Sign.
  2. Materials:
    - a. Extruded Aluminum: ASTM B221; 6063 alloy, T5 temper.
    - b. Sheet Aluminum: ASTM B209/B209M, 5005 alloy, H15 or H34 temper.
    - c. Laminated Glass: Float glass laminated in accordance with ASTM C1172.
      - 1) Laminated Safety Glass: ANSI Z97.1 and 16 CFR 1201, Category II.
      - 2) Two layers of 1/8 inch heat strengthened glass with plastic interlayer.
      - 3) Interlayer: Polyvinyl Butyral (PVB); 0.030 inch thick, minimum.
    - d. Fasteners and Hardware: Stainless steel, Type 304.
    - e. Self-Adhering Flashing: SBS Type; composite sheet total 40 mils thickness; 38 mils thick self-adhering rubberized asphalt bonded to 2 mils thick high density polyethylene film.
  3. Unit Size:
    - a. H x W x D to be as indicated on Drawings.
  4. Unit Frame: Rectangular extruded aluminum with integral stop for weathertight seal at door frame. Back panel to be aluminum sheet, sealed to frame watertight.
    - a. Finish:
      - 1) Satin aluminum.
      - 2) As selected by Architect from submitted samples.
  5. Door Frame: Single door; extruded aluminum with integral glazing channel suitable for glass panel; weathertight seal to unit frame stops; two (2) cylinder type locks; glass to be laminated glass sealed weathertight in door frame; hinge to be continuous aluminum or stainless steel. If door is hinged at top, provide folding hold-open arms on each side of door to hold door up and open when letters are changed by end-user.
    - a. Finish:
      - 1) Satin aluminum.
      - 2) As selected by Architect from submitted samples.

6. Unit Interior Lighting: None.
7. Display Background: Acrylic; flat surface; white.
8. Copy Rows: Upper and lower letter holders to be channel type with color to match display background.
  - a. Number of copy rows to be as indicated on Drawings.
  - b. 4 rows.
  - c. 8 rows.
9. Removable Letters: Clear polycarbonate medium with black characters. Provide 500 assorted characters.
10. Installation:
  - a. Install and anchor unit to substrate construction as indicated on Drawings and as further indicated here.
    - 1) If Unit Is to be Installed Recessed Into Wall Construction: Prior to insertion into wall, fully cover the unit sides and back with self-adhering flashing sheet with 2 inch overlapping joints to shed water. Hold back front edge of flashing sheet 1/4 inch from view as to allow for sealant backer and sealant application around unit perimeter. Install perimeter sealant backer and sealant; color to be selected by Architect from submitted samples.
    - 2) If Unit Is to be Surface Mounted: Prior to mounting, cover unit back with self-adhering flashing sheet to separate dissimilar materials. Hold back perimeter edges of flashing sheet 1/2 inch from view at perimeter of unit.
  - b. Install unit plumb and square and ensure that door operates and seals without binding or warping.

## 2.12 ACCESSORIES

- A. Mounting Hardware: Screws; stainless steel; countersunk phillips flat head screws.
- B. Tape Adhesive: Double sided foam tape; permanent adhesive.
- C. Back Cover Plate: Where sign must be secured to glass, acquire Architect approval prior to fabrication and installation of a Backing Cover (blank solid sign) on the opposite side of the glass. The backing cover material shall match the size, shape, base color, thickness, and finish of the sign. The intent is to hide the unsightly back view of the sign when viewed on the opposite side of the glass. (Back Cover Plate, also referenced in ROOM IDENTIFICATION SIGNS and INSTALLATION articles in this Section.)

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify substrate if finished to include finish coating(s).
- C. Verify adequate blocking and supports to structure are installed and ready to receive work.
- D. Verify that electrical and communications wiring requirements are provided for connectivity.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install work at locations indicated on Drawings. Install signs level and plumb unless indicated otherwise.
- C. Room Identification Signs: Mount with double sided foam tape and countersunk phillips flat head screws. Screw head is to finish flush with sign surface. Finish of screw heads is to match the color and finish of the portion of the sign that the screw is seated into.
  - 1. Position of Room Identification Signs:
    - a. Signage mounting heights must conform to ADA accessibility requirements including the height of Braille notations. Mount center of sign 9 inches from strike side of door and top of sign at 60 inches from floor.
  - 2. Where sign must be secured to glass, acquire Architect approval prior to fabrication and installation of a Backing Cover (blank solid sign) on the opposite side of the glass. The backing cover material shall match the size, shape, base color, thickness, and finish of the sign. The intent is to hide the unsightly back view of the sign when viewed on the opposite side of the glass. (Back Cover Plate, also referenced in ROOM IDENTIFICATION SIGNS and ACCESSORIES articles in this Section.)
- D. Applied Vinyl Graphics: Mount on exterior of glass doors.
- E. Dimensional Letter Signs: Mount with stainless steel threaded rods into expansion shields held off of the wall with 3/4" pegs. All hardware shall be stainless steel.
- F. Mount fire protection system signage in accordance with International Fire Code requirements.
- G. Dedication Plaque: Mount with stainless steel threaded rods into expansion shields.
- H. LED Marquee Sign: Construct and install sign system, including programming software and hardware, in compliance with the engineer's design, manufacturer's recommendations and the Drawings.

### 3.4 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work and comply with manufacturer's recommendations.

### 3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.

### 3.6 DEMONSTRATION AND TRAINING

- A. Section 01 79 00 - Demonstration and Training: Provide demonstration and training to the Owner regarding operation and maintenance of components of the installed Work.
- B. LED Screen Marquee Sign:
  - 1. Demonstrate programming and operation of signage to Owner.

**END OF SECTION**

**SECTION 10 21 13.19**  
**PLASTIC TOILET COMPARTMENTS**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Section includes solid plastic toilet compartments and urinal screens.
- B. Related Requirements:
  - 1. Section 10 28 13 - Toilet Accessories.

**1.2 REFERENCES**

- A. ASTM International (ASTM):
  - 1. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.
  - 2. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- B. International Code Council (ICC).
- C. National Fire Protection Association (NFPA):
  - 1. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2024.

**1.3 COORDINATION**

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate Work with placement of support framing and anchors in wall.

**1.4 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on panel construction, hardware, and accessories.
- C. Shop Drawings: Indicate partition plans, door swings, elevation views, dimensions, details of wall and floor supports.
- D. Samples for Initial Selection: Two manufacturer's complete sets of color samples illustrating the full range of finishes and colors available. Submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples to be same product material type indicated for final Work; each sample 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Manufacturer's Installation Instructions: Include special procedures and perimeter conditions requiring special attention.

**PART 2 PRODUCTS**

**2.1 PERFORMANCE REQUIREMENTS:**

- A. Fire Resistance: Partition materials shall comply with the following requirements, when tested in accordance with ASTM E84:



1. Class A: 25 maximum flame spread index; 450 maximum smoke developed index.
- B. Material Fire Ratings:
1. NFPA 286: Pass.
  2. International Code Council (ICC): Class B.

## 2.2 SOLID PLASTIC TOILET COMPARTMENTS

- A. Manufacturers:
1. All American Metal Corp - AAMCO.
  2. ASI Accurate Partitions.
  3. Metpar Corporation.
  4. Partition Systems International of South Carolina (PSiSC).
  5. Scranton Products.
  6. Substitutions: Section 01 60 00 - Product Requirements.

## 2.3 COMPONENTS

- A. Toilet Compartments: Solid, molded thermoset, and waterproof; high-density polyethylene (HDPE) plastic panels, doors, and pilasters. Dimensions to be as indicated unless indicated otherwise on Drawings.
1. Panels:
    - a. Thickness: 1 inch.
    - b. Width: As indicated on Drawings.
    - c. Height:
      - 1) As indicated on Drawings.
  2. Doors:
    - a. Thickness: 1 inch.
    - b. Width: Opening clearance as follows unless indicated otherwise on Drawings.
      - 1) Accessible (H/C) Compartment Doors: Out-swinging with opening clearance complying with ADA standards.
      - 2) Standard Compartment Doors: 28 inches.
    - c. Height:
      - 1) Match compartment panels.
  3. Urinal Screens:
    - a. Thickness: 1 inch.
    - b. Width: Total projection from wall to be 23 inches. Dimension includes pilaster assembly where pilaster is indicated on Drawings.
    - c. Height:
      - 1) As indicated on Drawings.
  4. Pilasters:
    - a. Thickness: 1 inch.
    - b. Widths: As required to fit space and not less than 3 inches.
    - c. Height:
      - 1) As indicated on Drawings.
  5. Color:
    - a. As selected by Architect from manufacturer's full range.

## 2.4 ACCESSORIES

- A. All finish metal components and accessories to be as follows, unless otherwise indicated:
1. Satin Finish.
- B. Pilaster Shoe: Formed ASTM A666 Type 304 stainless steel, 3 inches high, concealing floor mounting and adjustment hardware. Provide adjustment for floor variations with screw jack



- through steel saddles integral with pilaster. All metal mounting and adjustment hardware to be stainless steel.
- C. Head Rails: Extruded aluminum tube, color clear anodized 1 x 1-5/8 inch size, with anti-grip profiles and cast socket wall brackets. Maximum lengths practical. Head Rails to extend to wall and be anchored securely to wall frame blocking.
  - D. Vertical Brackets: Double flange type.
    - 1. Extruded aluminum; color clear anodized.
      - a. Continuous length.
  - E. Attachments, Screws, and Bolts: Stainless steel, tamper proof type.
    - 1. Attaching panels and pilasters to brackets: Binding Post through-bolts and nuts.
    - 2. Attaching hardware: Binding Post through-bolts and nuts; tamper proof.
  - F. Hardware:
    - 1. Material:
      - a. Stainless steel.
    - 2. Hinges:
      - a. Continuous hinges, self-closing.
    - 3. Door Latch: Slide type with exterior emergency access feature.
    - 4. Door Strike and Keeper: Include rubber bumper; mounted on pilaster in alignment with door latch.
    - 5. Door Stop: Provide door stop for each door, mounted on door face to prevent door assembly from hitting wall or other finishes. Door stop design to be coat hook type, rubber tip, four (4) screw mounting base, and finish to match other door hardware.
    - 6. Door Pulls: Provide ADA compliant door pull on each side of door for out-swinging doors.
    - 7. Provide metal heat sink at bottom of doors and partitions.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify field measurements are as indicated.
- C. Verify correct spacing of and between plumbing fixtures.
- D. Verify correct location and adequate support of built-in framing, anchorage, and bracing.

### **3.2 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install work level and plumb.
- C. Attach panel brackets securely to support framing and anchor points using anchor devices.
- D. Attach panels and pilasters to brackets.
- E. Locate head rail joints at pilaster center lines.
- F. Adjust pilaster shoe leveling screws to produce level and plumb panel construction on sloped floors.

### **3.3 ERECTION TOLERANCES**

- A. Section 01 40 00 - Quality Requirements: Tolerances.

- B. Maximum Variation from Indicated Position: 1/4 inch.
- C. Maximum Variation from Plumb: 1/8 inch.

### **3.4 ADJUSTING**

- A. Section 01 73 00 - Execution: Adjusting.
- B. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch.
- C. Adjust hinges to position in-swinging doors in partial open position (about 3 inches open) when unlatched. Return out-swinging doors to closed position.
- D. Adjust adjacent components for consistency of line or plane.

### **3.5 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work and comply with manufacturer's recommendations.
- B. Clean installed work in accordance with manufacturer's recommended materials and procedures.

### **3.6 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.

**END OF SECTION**

## SECTION 10 26 23.14

### WALL PROTECTION

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
  - 1. Wall Corner Guards.

##### 1.2 REFERENCE STANDARDS

- A. ASTM International (ASTM):
  - 1. ASTM D256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics; 2023, Editorial Revision 2023.
  - 2. ASTM D543 - Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents; 2021.
  - 3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
  - 4. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, Editorial Revision 2021.

##### 1.3 ADMINISTRATIVE REQUIREMENTS

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate installation of appropriate strength concealed blocking with the anchoring requirements for attaching the work of this Section to substrate.
- C. Coordinate installation of wall coating and wall cover finishes to be complete prior to installation of the work of this Section.

##### 1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on unit construction, sizes, configuration, jointing methods and locations when applicable, and attachment method.
- C. Shop Drawings: Submit shop drawings including profiles, elevations, locations, attachment to substrate, and accessories.
- D. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of finishes and colors available for products with factory-applied color finishes; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples on same product material type indicated for final Work; each sample 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Manufacturer's Installation Instructions: Indicate special installation criteria and interface with adjacent components.

##### 1.5 QUALITY ASSURANCE

- A. Provide protection systems of each type from a single source and manufacturer.

## 1.6 QUALIFICATIONS

- A. Manufacturer Qualifications: Company specializing in manufacturing Products specified in this Section with minimum seven (7) years documented experience.
- B. Installer Qualifications: Company specializing in performing work of this Section and with minimum five (5) years documented experience.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Deliver products in manufacturer's original packaging. Store materials in a dry, protected, well-vented area. Inspect product upon receipt and report damaged material immediately to delivering carrier and note such damage on the carrier's freight bill of lading.

## PART 2 PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Comply with the following unless otherwise indicated:
  - 1. Impact Strength: Applicable provisions of ASTM D256.
  - 2. Lateral Impact: Resists lateral impact force of 100 lbs (445 N) at any point without damage or permanent set.
  - 3. 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.
  - 4. Chemical and Stain Resistance: Applicable provisions of ASTM D543.
  - 5. Fungal Resistance: Passes ASTM G21 testing.

### 2.2 WALL CORNER GUARDS

- A. Non-Metal Wall Corner Guards.
  - 1. Manufacturers:
    - a. Construction Specialties, Inc.
    - b. Inpro.
    - c. Koroseal Interior Products.
    - d. Wallprotex.
    - e. Substitutions: Section 01 60 00 - Product Requirements.
  - 2. Corner Guard Material:
    - a. Polyethylene terephthalate (PET or PETG): PVC-free and high impact type.
  - 3. Attachment:
    - a. Retainer Bracket: Full height of guard; anchored with non-corrosive screws.
      - 1) Extruded aluminum.
  - 4. End Caps: Factory premolded and finished to match corner guard.
  - 5. Lengths: One piece.
    - a. 4 feet.
  - 6. Width of Wings:
    - a. 2 inches.
  - 7. Corners:
    - a. 1/8 inch radius.
  - 8. Finish and Color:
    - a. As selected by Architect from manufacturer's full range.
  - 9. Application Locations:
    - a. As indicated on Drawings.

**2.3 ACCESSORIES**

- A. Accessories are to be appropriate to component, substrate and as indicated in this Section.
  - 1. Mounting Brackets and Attachment Hardware: As recommended by manufacturer.

**2.4 FABRICATION**

- A. Fabricate components free of visual distortion and free of defects.
- B. Fabricate components with tight joints, corners, and seams.
- C. Pre-drill holes for attachment.
- D. End closures are to be factory fabricated to match components.

**PART 3 EXECUTION****3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that rough openings, concealed blocking, and anchors are correctly sized and located.
- C. Verify that field measurements are as required.
- D. Verify that surfaces and conditions are ready to accept the Work of this Section.
- E. Examine products to be installed for damage and other conditions detrimental to completion of the Work.
- F. Proceed with installation only after unsatisfactory conditions have been corrected.

**3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of Work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.

**3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install the Work in compliance with the design requirements, applicable codes, manufacturer's recommendations, and the Contract Documents.
- C. Install components in accordance with manufacturer's instructions, level and plumb, secured rigidly in position to supporting construction.
- D. Position bottom of corner guards 4 inches above finished floor unless indicated otherwise.

**3.4 TOLERANCES**

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation From Required Height: 1/4 inch (6 mm).

**3.5 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures.
- B. Clean installed Work in accordance with manufacturer's recommendations including cleaning procedures and materials.

**3.6 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed construction from damage and unauthorized tampering.

**END OF SECTION**

## SECTION 10 28 00 TOILET ACCESSORIES

### PART 1 GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Toilet room accessories.
  - 2. Shower accessories.
  - 3. Utility room accessories.
- B. Related Requirements:
  - 1. Section 04 20 00 - Unit Masonry.
  - 2. Section 06 10 53 - Miscellaneous Rough Carpentry: Blocking in framed walls.
  - 3. Division 09 - Finishes: Sections describing wall materials and finishes.
  - 4. Division 10 - Specialties: Sections describing Toilet Compartments.
  - 5. Division 26 - Electrical: Construction related to electric devices.

#### 1.2 REFERENCES

- A. Americans with Disabilities Act (ADA):
  - 1. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; current edition.
- B. ASTM International (ASTM):
  - 1. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
  - 2. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service, 2022.
  - 3. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
  - 4. ASTM A666 - Standard Specification for Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar, 2023.
  - 5. ASTM B86 - Standard Specification for Zinc and Zinc-Aluminum (ZA) Alloy Foundry and Die Castings; 2023.
  - 6. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium; 2017, Reapproval 2022.
  - 7. ASTM C1036 - Standard Specification for Flat Glass; 2021.
  - 8. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.
  - 9. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror; 2024.
  - 10. ASTM F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs; 2022.

#### 1.3 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate the Work with placement of internal wall reinforcement and reinforcement of toilet partitions to receive anchor attachments.
- C. Coordinate electrical requirements with electrical service construction.

## 1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on accessories describing size, finish, details of function, attachment methods.
- C. Manufacturer's Installation Instructions: Submit special procedures, conditions requiring special attention.

## 1.5 QUALITY ASSURANCE

- A. Single Source Responsibility: Provide products of same manufacturer unless otherwise acceptable to Architect.
  - 1. Exception: Products whose Basis of Design manufacturer differs from majority of other indicated products.

## 1.6 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
  - 1. Two (2) keys for each accessory.

## PART 2 PRODUCTS

### 2.1 GENERAL REQUIREMENTS

- A. All devices to be compliant with applicable codes and ADA standards.
- B. Manufactured and 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.
- C. Design grab bars, attachments, anchors and provide blocking to resist minimum 250 lbs concentrated load applied at any point in any direction.
- D. Keys: Furnish two (2) keys for each accessory to Owner; master key lockable accessories.

### 2.2 TOILET AND BATH ACCESSORIES

- A. Manufacturers:
  - 1. American Specialties, Inc. (ASI).
  - 2. Bobrick Washroom Accessories.
  - 3. Bradley Corporation.
  - 4. Electric Hand Dryers:
    - a. Bobrick Washroom Accessories.
    - b. Dyson.
    - c. Excel Dryer, Inc.
    - d. Pinnacle Dryer Corporation.
  - 5. Substitutions: Section 01 60 00 - Product Requirements.

### 2.3 MATERIALS

- A. Stainless Steel Sheet: ASTM A666, Type 304.
- B. Stainless Steel Tubing: ASTM A269/A269M, Grade T316.



- C. Galvanized Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G90/Z275 coating.
- D. Zinc Alloy: Die cast, ASTM B86.
- E. Mirror Glass:
  - 1. Fully tempered safety glass, ASTM C1048; and ASTM C1036 Type I, Class 1, Quality Q2, with silvering as required.
- F. Adhesive: Two component epoxy type, waterproof.
- G. Fasteners, Screws, and Bolts: Stainless steel, ASTM F593; tamper-proof, security type.
- H. Expansion Shields: Fiber, lead, stainless steel, or rubber as recommended by accessory manufacturer for component and substrate.

## 2.4 TOILET ROOM ACCESSORIES

- A. Toilet Tissue Dispenser (TD): Open roll type with both rolls accessible.
  - 1. Double Roll Type: Surface mounted bracket, satin finished cast aluminum brackets.
    - a. Controlled Delivery Type: To be in all stalls and toilets except ADA accessible stalls and toilets. Eccentric-shaped plastic spindles for 1/2 revolution delivery, designed to prevent theft of tissue roll.
      - 1) Basis of Design:
        - a) [Bobrick B-274](#) (surface mounted).
      - b. Non-Controlled Delivery Type: To be in all ADA accessible stalls and toilets. Eccentric-shaped plastic spindles, designed to prevent theft of tissue roll.
        - 1) Basis of Design:
          - a) [Bobrick B-2740](#) (surface mounted).
- B. Paper Towel Dispenser (PTD):
  - 1. In addition to locations indicated on Drawings, provide PTD at all sinks where PTD or EHD is not indicated.
  - 2. Folded paper type, stainless steel, hinged door with tumbler lock, minimum capacity of 350 C-fold towels.
    - a. Basis of Design:
      - 1) [Bobrick B-262](#) (surface mounted, view slot).
- C. Soap Dispenser (SD):
  - 1. In addition to locations indicated on Drawings, provide SD at all sinks where SD is not indicated.
  - 2. Liquid soap dispenser; stainless steel body, back, lid and working parts; lid hinged and special key access; push type soap valve; window gage refill indicator; 40 ounces minimum capacity.
    - a. Basis of Design:
      - 1) [Bobrick B-4112](#) (surface mounted, horizontal tank).
- D. Framed Mirrors (MIR 1 and MIR 2):
  - 1. Mirror Glass: 1/4 inch thick tempered mirror glass; ASTM C1048, abrasion-resistant coated mirror.
  - 2. Frame: Stainless steel; 3/4 inch angle shapes (0.05 inch thick); mitered and welded and ground corners; satin finish; tamperproof hanging system.
  - 3. Backing: Full-mirror sized, minimum 0.03 inch galvanized steel sheet and non-absorptive filler material.
  - 4. Size and Configuration: As indicated on Drawings.
  - 5. Location: As indicated on Drawings.
  - 6. Basis of Design:
    - a. [Bobrick B-2908 Series](#).

- E. Grab Bars (GB):
1. Stainless steel, 1-1/2 or 1-1/4 inch outside diameter, minimum 0.05 inch (18 gauge) wall thickness, safety grip peened grasping surface finish; concealed flange mounting; 1-1/2 inches clearance between wall and inside of grab bar.
  2. Push/Pull Point Load: 250 pound-force (1112 N), minimum.
  3. Length and Configuration: As indicated on Drawings.
  4. Basis of Design:
    - a. [Bobrick B-6806.99](#) (1-1/2 O.D.).
- F. Sanitary Napkin Disposal Unit (SND):
1. Stainless steel; self-closing door; locking bottom panel with full-length stainless steel piano-type hinge and removable receptacle.
  2. For thru-partition, 2 side access units, coordinate fit with toilet partition thickness.
  3. Basis of Design:
    - a. [Bobrick B-254](#) (surface mounted).
    - b. [Bobrick B-353](#) (recess mounted).
    - c. [Bobrick B-354](#) (thru-partition, 2 sides).
- G. Electric Hand Dryers (EHD): Coordinate electrical requirements.
1. Operation: Automatic sensor-operated on and off.
  2. Air Nozzle: Fixed downward direction.
  3. Basis of Design:
    - a. ADA Compliant - Surface Mount:
      - 1) [Pinnacle P3-12S](#) - Stainless steel case; Heated air.
- H. Baby Changing Table (BCT):
1. Basis of Design:
    - a. [Bradley 963](#) Series: Plastic; color as selected by Architect (surface mounted).
- I. Coat Hook (CH): Solid aluminum casting, matte finish; rubber bumper protects wall and partition surfaces; 4 screws attachment base.
1. Provide coat hook on each toilet compartment door, inside compartment.
    - a. Secure coat hooks with machine screws from hook side and pan head sleeve nuts (hex socket) from opposite end for thru-bolt assembly.
  2. Provide coat hooks in locations indicated on Drawings.
  3. Basis of Design:
    - a. [Bobrick B-212](#).

## 2.5 SHOWER ACCESSORIES

- A. Grab Bars (GB):
1. Stainless steel, 1-1/2 or 1-1/4 inch outside diameter, minimum 0.05 inch (18 gauge) wall thickness, safety grip peened grasping surface finish; concealed flange mounting; 1-1/2 inches clearance between wall and inside of grab bar.
  2. Push/Pull Point Load: 250 pound-force (1112 N), minimum.
  3. Length and Configuration: As indicated on Drawings.
  4. Basis of Design:
    - a. [Bobrick B-6861.99](#) (1-1/2 O.D.) (Shower).
- B. Shower Curtain Rod (SCR): Stainless steel tube, extra heavy duty; 1-1/4 inch outside diameter, 0.05 inch (18 gauge) wall thickness, satin-finished, with satin-finished stainless steel flanges, for concealed mounting.
1. Include shower curtain for each rod; opaque vinyl, 0.008 inch thick minimum, matte finish, with antibacterial treatment; flameproof and stain-resistant; 6 inches wider than rod length.

2. Include shower curtain hooks with each shower rod and curtain; stainless steel Type 304 wire, pear-shaped; sized to fit curtain rod diameter.
3. Basis of Design:
  - a. [Bobrick B-6047 Series](#) (curtain rod).
  - b. [Bobrick 204 Series](#) (curtain).
  - c. [Bobrick 204-1](#) (curtain hooks).
- C. Robe Hook (RH): Stainless steel; single prong; rectangular-shaped hook; satin finish; concealed mounting with vandal resistant escutcheon.
  1. Provide one (1) per each shower; locate outside stall on wall 16 inches from stall.
  2. Basis of Design:
    - a. [Bobrick B-76717](#).
- D. Towel Bar (TB): Heavy duty stainless steel Type 304, 0.05 inch (18 gauge) thick, 1 inch round tubular bar; exposed or concealed attachment, satin finish.
  1. Length: 24 inches.
  2. Basis of Design:
    - a. [Bobrick B-530](#).
- E. Wall-Mounted Soap Dish (WSD): Heavy duty, one-piece stainless steel, dish with two ridges and drain holes; surface-mounted; satin finish; concealed mechanical fastening suitable for substrate.
  1. Basis of Design:
    - a. [Bobrick B-6807](#).
- F. Shower Seat (SS): Folding type; surface wall-mounted; welded tubular seat frame, structural support members, hinges and mechanical fasteners of Type 304 stainless steel, rectangular seat; supports 500 lbs, minimum.
  1. Seat: Phenolic or polymeric composite one-piece seat or seat slats, of color as selected by Architect.
  2. Basis of Design:
    - a. [Bobrick B-5191](#).

## 2.6 UTILITY ROOM ACCESSORIES

- A. Mop and Broom Holder (MH): 0.05 inch thick (18 gage), Type 304 stainless steel.
  1. Mop Holders: Four (4) spring-loaded rubber cam holders, holds mops 8 inches from wall.
  2. Shelf: 18 gage, 8 inches deep.
  3. Rag Hooks: One each, midway between mop holders.
  4. Length: 36 inches.
  5. Basis of Design:
    - a. [Bobrick B-224 x 36](#).
- B. Mop Sink Wall Splash Guard: 16 gage, Type 304 Stainless steel.
  1. Provide wall guard at each mop sink in project.
  2. Wall guard height to span from mop sink top rim to 8 inches above water supply pipe wall penetrations, and not less than 36 inches above mop sink top rim.
  3. Fabrication: Custom fit to wall configuration; one piece fabrication; configured to protect all wall surfaces adjacent to mop sink rim; all edges to be single hemmed; corners to be ground smooth.
  4. Fasteners: Stainless steel, low profile pan head screws with EPDM bonded seal washer.
  5. Installation: Ensure that mop sink rim has been fully sealed to wall prior to installation of wall guard. At frame walls, ensure that adequate blocking is behind wall finish to engage with fasteners. Bottom of wall guard to be 1/8 inch above mop

sink rim (allowing gap for application of sealant bead). After attaching wall guard to wall, apply sealant around entire perimeter of wall guard.

## 2.7 FACTORY FINISHING

- A. Stainless Steel: No. 4 satin brushed finish, unless otherwise noted.
- B. Chrome/Nickel Plating: ASTM B456, Type SC 2 polished finish, unless otherwise noted.
- C. Baked Enamel: Pretreat to clean condition, apply one coat primer and minimum two coats epoxy baked enamel.
- D. Powder-Coated Steel: Clean, degrease, and neutralize. Follow immediately with a phosphatizing treatment, prime coat, and two finish coats of powder coat enamel.
- E. Galvanizing for Items Other than Sheet: Comply with ASTM A123/A123M; galvanized ferrous metal and fastening devices; minimum 1.2 oz/sq ft coating thickness; galvanized after fabrication.
- F. Shop Primed Ferrous Metals: Pretreat and clean, spray apply one coat primer and bake.
- G. Back paint components where contact is made with building finishes to prevent electrolysis.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify exact location of accessories for installation.
- C. Verify that internal wall reinforcement and reinforcement of toilet partitions, to receive anchor attachments, is installed and adequate to attach the work securely.
- D. Coordinate electrical requirements with electrical service construction.
- E. Verify field measurements are as indicated on product data instructed by manufacturer.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment used during installation.
- C. Deliver inserts and rough-in frames to site for timely installation.
- D. Provide templates and rough-in measurements as required.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install plumb and level, securely and rigidly anchored to substrate.
- C. Mounting Heights and Locations: As required by accessibility regulations and as indicated on Drawings.

### 3.4 ADJUSTING

- A. Section 01 73 00 - Execution: Starting, testing, adjusting, and balancing.
- B. Adjust and test installed Work for proper functionality.

**3.5 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Clean installed Work and comply with manufacturer's recommendations.

**3.6 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed Work from damage.

**END OF SECTION**



**SECTION 10 44 00**  
**FIRE PROTECTION SPECIALTIES**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Fire extinguishers.
  - 2. Fire extinguisher cabinets.
  - 3. Accessories.
- B. Related Requirements:
  - 1. Section 04 20 00 - Unit Masonry: Walls for mounting equipment.
  - 2. Section 09 21 16 - Gypsum Board Assemblies: Walls for mounting equipment.

**1.2 REFERENCE STANDARDS**

- A. ASTM International (ASTM):
  - 1. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2023a.
- B. Factory Mutual (FM):
  - 1. FM (AG) - FM Approval Guide; Current Edition.
- C. National Fire Protection Association (NFPA):
  - 1. NFPA 10 - Standard for Portable Fire Extinguishers; 2022.
- D. Underwriters Laboratories Inc. (UL):
  - 1. UL (DIR) - Online Certification Directory; Current Edition.

**1.3 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data:
  - 1. Submit extinguisher operational features, full range of colors and finishes, and anchorage details.
  - 2. Submit cabinet product data, operational features, full range of colors and finishes, and anchorage details.
- C. Shop Drawings:
  - 1. Indicate mounting measurements for brackets, locations, and fire ratings.
  - 2. Indicate cabinet physical dimensions, rough-in measurements for recessed cabinets, installation measurements for cabinets. Locations, and fire ratings.
- D. Manufacturer's Installation Instructions: Submit special criteria and wall opening coordination requirements.
- E. Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.

**1.4 CLOSEOUT SUBMITTALS**

- A. Section 01 78 23 - Operation and Maintenance Data.
- B. Operation and Maintenance Data: Submit test, refill or recharge schedules and recertification requirements.

## 1.5 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.
- B. Do not install extinguishers when ambient temperature is capable of freezing extinguisher ingredients.

## PART 2 PRODUCTS

### 2.1 FIRE EXTINGUISHERS

- A. Manufacturers:
  - 1. Activar Construction Products Group Inc. - JL Industries.
  - 2. Ansul, a Tyco Business.
  - 3. Kidde, a unit of United Technologies Corporation.
  - 4. Nystrom, Inc.
  - 5. Potter-Roemer.
  - 6. Pyro-Chem, a Tyco Business.
  - 7. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design: Activar Construction Products Group Inc. - JL Industries.
- C. 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.
- D. Multipurpose Dry Chemical Type Fire Extinguishers: Carbon steel tank, with pressure gauge.
  - 1. Class: A:B:C type.
  - 2. Size: 10 pounds.
  - 3. Finish: Baked polyester powder coat, red color.
  - 4. Temperature range: Minus 40 degrees F to 120 degrees F.
- E. Wet Chemical Type Fire Extinguishers: Stainless steel tank, with pressure gauge.
  - 1. Class: K type.
  - 2. Size: 1.8 gallons.
  - 3. Finish: Polished stainless steel.
  - 4. Temperature range: Minus 20 degrees F to 120 degrees F.

### 2.2 FIRE EXTINGUISHER CABINETS

- A. Manufacturers:
  - 1. Activar Construction Products Group, Inc. - JL Industries.
  - 2. Kidde, a unit of United Technologies Corp.
  - 3. Larsen's Manufacturing Company.
  - 4. Nystrom Inc.
  - 5. Potter-Roemer.
  - 6. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design: Activar - JL Industries - Academy Series.
- C. Fire Extinguishers Cabinets: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
  - 1. Fire Rating: Listed and labeled in accordance with ASTM E814 requirements for fire resistance rating of walls where being installed.



2. Provide fire extinguisher cabinets classified and labeled by UL for purpose specified and indicated.
- D. Non-Fire Rated Cabinet Construction:
  1. Formed aluminum; 0.036 inch thick base metal.
- E. Fire Rated Cabinet Construction: Fire rating to be as required by rating of wall construction.
  1. Steel; double wall or outer and inner boxes with minimum 5/8 inch thick fire barrier material.
- F. Cabinet Trim and Installation Configuration:
  1. Semi-Recessed Trim Type:
    - a. 2-1/2 inch projection from wall surface; rolled edge; 1-3/4 inch face width.
- G. Cabinet Tub Size: Provide tube size as needed to accommodate required extinguisher and accessories content.
- H. Door: Minimum 0.036 inch thick base metal formed to 5/8 inch thickness, reinforced for flatness and rigidity with nylon catch. Continuous hinge door for 180 degrees opening. Pull to be surfaced mounted handle type with two through-door bolts.
  1. Glazing: Acrylic plastic, clear, 1/8 inch thick, flat shape and set in resilient channel glazing gasket.
    - a. Full door glazed panel.
  2. Signage:
    - a. Die cut vinyl letters, self adhering; uppercase Helvetica font; vertical descending composition.
      - 1) Application:
        - a) Reverse adhered on inside face of door glazing panel.
      - 2) Letters color to be as selected by Architect from full range of options.
- I. Cabinet Mounting Hardware: Appropriate to cabinet, with pre-drilled holes for placement of anchors; no visible fasteners on exterior of cabinet.
- J. Weld, fill, and grind joinery and components smooth.
- K. Finishes:
  1. Non-Fire Rated Cabinets:
    - a. Cabinet Exterior Trim and Door Finish:
      - 1) Aluminum Construction: Clear anodized finish.
    - b. Cabinet Tub Finish: Match exterior material and finish.
  2. Fire Rated Cabinets:
    - a. Cabinet Exterior Trim, Door, and Tub Finish:
      - 1) Steel Construction: Powder coat finish; color as selected by Architect from manufacturer's full range.

## 2.3 ACCESSORIES

- A. Extinguisher Brackets:
  1. Formed stainless steel, satin finish.
- B. Fire Blanket: Fire retardant treated wool; red, 62 x 84 inch size. One per Science classroom.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify locations and mounting heights for each unit.

- C. Verify rough openings for cabinets are correctly sized and located.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install cabinets plumb and level in wall openings and as indicated on Drawings.
- C. Install wall brackets at location indicated on Drawings.
- D. Secure rigidly in place.
- E. Install extinguishers and accessories in cabinets or on wall brackets as indicated on Drawings.

### 3.4 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures.
- B. Clean installed work in accordance with manufacturer's recommendations including cleaning procedures and materials.

### 3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed construction from damage.

### 3.6 SCHEDULES

- A. Fire Extinguisher Cabinet Locations: As indicated on Drawings.
  - 1. In fire rated construction, provide fire rated cabinets in compliance with the requirements for the fire rated construction.
- B. Fire Extinguisher Locations by Type:
  - 1. Type K and Type A:B:C fire extinguishers:
    - a. Kitchens (bracket installed if no cabinet indicated).
  - 2. Type A:B:C fire extinguishers:
    - a. All locations not indicated to be other Type. Areas include, but are not limited to the following:
      - 1) Corridors.
      - 2) Assembly Areas.
      - 3) Work Areas.
      - 4) Mechanical Rooms (bracket installed if no cabinet indicated).
      - 5) Electrical Rooms (bracket installed if no cabinet indicated).
      - 6) Elevator Equipment Rooms (bracket installed if no cabinet indicated).
      - 7) Science Classrooms and Science Prep Rooms
      - 8) Field House
- C. Fire Extinguisher Quantities by Type:
  - 1. As indicated on Drawings.

**END OF SECTION**

## SECTION 10 51 13

### METAL LOCKERS

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Section includes factory manufactured metal lockers and accessories.
  - 1. Kitchen Staff Lockers.
  - 2. Athletic Lockers.
  - 3. Benches.

##### 1.2 REFERENCES

- A. Americans with Disabilities Act (ADA):
  - 1. ADA Standards - ADA Standards for Accessible Design; Current Edition.
- B. ASTM International (ASTM):
  - 1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
  - 2. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2023.

##### 1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate locker plan layout, elevations, filler panels, ADA compliant lockers, numbering plan, and combination lock code.
  - 1. Indicate layout and dimensions for locker benches.
- C. Product Data: Submit data on locker types, sizes, and accessories.
- D. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of finishes and colors available for products with factory-applied finishes; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples on same product material type indicated for final Work; each sample 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Manufacturer's Installation Instructions: Submit installation template and attachment devices.

##### 1.4 DELIVERY, STORAGE, AND PROTECTION

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Protect components and accessories from warping, moisture, and other damage.

##### 1.5 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.

1. One (1) complete set of each type of replaceable accessories with fasteners including hinges, latches, clips, etc.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Manufacturers:
  1. Art Metal Products.
  2. ASI Storage Solutions.
  3. List Industries, Inc.
  4. Lyon Workspace Products.
  5. Penco Products, Inc.
  6. Republic Storage Systems Company.
  7. Tensco Storage.
  8. Substitutions: Section 01 60 00 - Product Requirements.

### **2.2 LOCKER TYPES**

- A. Kitchen Staff Lockers:
  1. Class: Conventional.
  2. Configuration: Refer to Drawings for locker configurations.
  3. Width:
    - a. 12 inches.
  4. Depth:
    - a. 15 inches.
  5. Height:
    - a. 72 inches; sloped top.
  6. Tiers:
    - a. Double tier.
  7. Base Mounting:
    - a. Concrete Base with face finish to match adjacent wall base in room.
  8. Base Height: 6 inches, unless indicated otherwise on Drawings.
  9. Ventilation Method:
    - a. Door louver vents at upper and lower portion of door.
  10. Accessories:
    - a. Two (2) double prong wall hooks.
    - b. Rubber door silencers.
    - c. Metal plate formed shelf.
  11. Metal: Steel.
    - a. Sides, Bottom, Top, and Shelf: 16 gauge.
    - b. Back: 18 gauge.
    - c. Doors Face and Frame: 14 gauge.
    - d. Hinges: 0.074 inch thick, 2 inches long or continuous, five-knuckle.
    - e. Base and Trim: 18 gauge.
- B. Athletic Lockers: Includes Changing Room lockers.
  1. Class: Conventional.
  2. Configuration: Refer to Drawings for locker configurations.
  3. Width:
    - a. 12 inches.
  4. Depth:
    - a. 15 inches.
  5. Height:

- a. 72 inches; sloped top.
6. Tiers:
  - a. Double tier.
7. Base Mounting:
  - a. Concrete Base with face finish to match adjacent wall base in room.
8. Base Height: 6 inches, unless indicated otherwise on Drawings.
9. Ventilation Method:
  - a. Diamond shaped perforations on sides and door; 3/4 x 1-1/2 inch perforations.
10. Accessories:
  - a. Three (3) single prong wall hooks.
  - b. One (1) double prong ceiling hooks.
  - c. Rubber door silencers.
  - d. Metal plate formed shelf.
11. Metal: Steel.
  - a. Sides, Bottom, Top, and Shelf: 16 gauge.
  - b. Back: 18 gauge.
  - c. Doors Face and Frame: 14 gauge.
  - d. Hinges: 0.074 inch thick, 2 inches long or continuous, five-knuckle.
  - e. Base and Trim: 18 gauge.

### 2.3 LOCKER FABRICATION

- A. General:
  1. Factory Assembled Construction: Made of formed sheet steel; metal edges finished smooth without burrs; finished inside and out.
    - a. Locker Body Components: Formed and flanged from steel sheet of the following type and thicknesses indicated:
      - 1) Commercial Steel (CS), Type B, supplied for exposed applications and complying with ASTM A1008/A1008M and the following:
        - a) Zinc-Coated by the Hot-Dip Process: Comply with ASTM A653/A653M:
          - (1) Coating designation G60/Z180.
          - (2) Coating designation G90/Z275.
        - b) Uncoated.
  2. ADA Compliance: Applies to all locker designated as ADA accessible.
    - a. Comply with ICC A117.1 and ADA Standards.
    - b. Decal with international symbol of accessibility on face of locker.
    - c. Shelves: Adjustable type.
    - d. Latches and Locks: ADA compliant.
  3. Provide locker units constructed with components capable of being securely anchored to the supporting substrate. Reinforce components as required to anchor units to withstand imposed loads.
  4. Provide metal top, end, closure, and filler panels; 16 gauge.
  5. Finish edges smooth without burrs.
  6. Finish Type: Metal finish to be on all surfaces and components.
    - a. Powder coat; minimum 2 mil dry film thickness.
  7. Colors: To be selected by Architect from manufacturer's full range.
- B. Locker Body:
  1. Formed and flanged; with steel stiffener ribs; electric spot welded.
  2. Provide finished heavy gauge steel end panel for exposed end lockers.
- C. Frames: Formed channel shape, welded, and ground flush, welded to body, resilient gaskets and latching for quiet operation.

- D. Doors: Hollow channel construction, 1-3/16 inch thick; welded construction, channel reinforced top and bottom with intermediate stiffener ribs, grind, and finish edges smooth. Provide rubber silencers.
- E. Hinges: Welded to door frame and securely fastened to door.
  - 1. Two hinges for doors less than 42 inches high.
  - 2. Three hinges for doors 42 - 60 inches high.
  - 3. Continuous hinge for doors greater than 60 inches high, or 20 inches wide, or lockers located in athletic/changing room locations, or workshop locations.
- F. Door Number Plates: Provide rectangular shaped aluminum plates. Form numbers 3/8 inch high of block font style, in contrasting color. Provide ADA designation for ADA compliant lockers

## 2.4 LOCKER LATCHES AND LOCKS

- A. Latch Types: Recessed type; formed stainless steel; unless indicated otherwise.
  - 1. Recessed type is always to be ADA compliant, even if locker is not designated to be ADA accessible.
- B. Lock Types:
  - 1. Built-In Locks:
    - a. Master combination lock.
    - b. Five preset combination changes.
    - c. Master keyed in front/center of spin-dial.
    - d. Master keys.
    - e. LH and RH reversible.

## 2.5 BENCHES

- A. Dimensions: As indicated on Drawings.
- B. Components:
  - 1. Seat: Laminated solid wood strips, birch or maple wood, sealed and varnished.
  - 2. Pedestals:
    - a. Stationary type.
  - 3. Metal Components:
    - a. Stainless steel, satin finish.
  - 4. Fasteners and Anchors: Stainless steel.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that conditions, finishes, substrates, and anchoring construction are adequate and acceptable to receive Work of this Section.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.

**3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install lockers plumb and square. Joints between adjacent surfaces to be flush hairline joints.
- C. Secure lockers with anchor devices to suit substrate construction.
  - 1. Minimum Pullout Force: 100 lb.
- D. Bolt adjoining locker units together to provide rigid installation.
- E. Install finished accessories, end panels, filler panels, and bases.
- F. Replace components that are damaged, not fitting properly or not operating smoothly.

**3.4 ADJUSTING**

- A. Section 01 73 00 - Execution: Starting, testing, adjusting, and balancing.
- B. Adjust doors and latches to operate smoothly and without binding.
- C. Adjust built-in locks (if any) to operate smoothly and without binding of dial or key.
- D. Touch-up with factory-supplied paint and repair or replace damaged products before substantial completion.

**3.5 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Clean locker interiors and exterior surfaces.

**3.6 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect the Work from damage.

**END OF SECTION**





**SECTION 10 56 13**  
**METAL STORAGE SHELVING**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Metal storage shelving units.

**1.2 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit data for all components.
- C. Shop Drawings: Indicate shelving unit components, assembly, anchorage, elevations, dimensions, and room plan layout for each location. Include schedule list indicating room locations and quantity of shelving units.
- D. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of finishes and colors available for products with factory-applied finishes; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples on same product material type indicated for final Work; each sample 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Manufacturer's Installation Instructions: Indicate special precautions for installation.

**1.3 QUALIFICATIONS**

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five (5) years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum three (3) years documented experience.

**1.4 DELIVERY, STORAGE, AND HANDLING**

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Accept components on site in manufacturer's original packaging. Inspect for damage.

**PART 2 PRODUCTS**

**2.1 METAL STORAGE SHELVING**

- A. Manufacturers:
  - 1. Lyon Workspace Products.
  - 2. Penco Products.
  - 3. Spacesaver.
  - 4. Tensco Corp.
  - 5. Substitutions: Section 01 60 00 - Product Requirements.

- B. Metal Storage Shelving: Factory-formed, field-assembled, freestanding, upright metal storage shelving system; designed for shelves to span between and be supported by corner posts, with shelves adjustable over the entire height of shelving unit. Shelving units to be engineered to safely support cumulative loaded shelf loads indicated.
- C. Components:
  - 1. Posts: Tubular, L-shaped, and T-shaped, cold-rolled steel, minimum 16 gauge thick, punched on 1-1/2 inch centers. Engineered to safely support loads indicated.
  - 2. Shelves: Box formed edges, minimum 20 gauge thick steel. Engineered to support the following loads:
    - a. Minimum 800 lbs for shelf size of 36W x 18D inches or 36W x 24D inches.
    - b. Minimum 550 lbs for shelf size of 48W x 18D inches or 48W x 24D inches.
- D. Accessories:
  - 1. Shelf Clips: Hot-rolled steel, 12 gauge thick, one-piece construction.
  - 2. Sides and Backs:
    - a. Solid steel panels; 24 gauge thick steel.
- E. Fabrication:
  - 1. Fabricate shelves with turned down box edges with return flange spot welded to bottom of shelf.
  - 2. Fabricate shelves 48 inches long by 24 inches deep, unless indicated otherwise on Drawings.
  - 3. Overall Unit Height: Shelves placed equidistant unless Drawings indicate otherwise.
    - a. 84 inches (5 shelves).
- F. Finish: All metal assemblies and components to be factory powder coated.
  - 1. Colors:
    - a. As selected by Architect from manufacturer's full range.

## 2.2 FOOD STORAGE METAL SHELVING

- A. Manufacturers:
  - 1. Advance Tabco.
  - 2. Metro Food Service Products.
  - 3. Regency.
  - 4. Steelton Metal Products.
  - 5. Substitutions: Section 01 60 00 - Product Requirements.
- B. Product Description: Food storage metal shelving to be factory-formed, field-assembled, freestanding, upright metal wire storage shelving system; designed for shelves to span between and be supported by corner posts, with shelves adjustable over the entire height of shelving unit.
- C. Components:
  - 1. Posts: Tubular carbon steel, epoxy coating finish, single piece construction, 1 inch diameter, 72 inches length.
  - 2. Shelves: Steel wire construction, factory welded, epoxy coating finish, 1-1/4 inches thickness. 4 shelves per shelving unit, adjustable in 1 inch increments at posts.
- D. Fabrication:
  - 1. Fabricate shelves 48 inches long by 18 inches deep, unless indicated otherwise on Drawings.
  - 2. Overall shelving unit height to be 72 inches.
- E. Factory Finishing:
  - 1. Manufacturer's standard epoxy coating finish.
    - a. All metal components and accessories.

- b. Colors:
  - 1) As selected by Architect from manufacturer's full range.
- F. Location:
  - 1) Field house building in the concession room. See kitchen equipment specifications and drawings for food storage metal shelving in the school kitchen.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify dimensions, tolerances, and methods of attachment with other Work.
- C. Verify spaces are ready to ready to receive Work of this Section.

### **3.2 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install components according to manufacturer's written instructions, using fasteners appropriate to substrate indicated and recommended by manufacturer.
- C. Install units level, plumb, and firmly anchored.
- D. Anchor units to back wall to prevent tip-over.

### **3.3 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Replace damaged or defective components.
- C. Remove temporary labels and protective coatings.
- D. Clean exposed surfaces.

### **3.4 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect shelving from damage.

**END OF SECTION**



**SECTION 10 56 16**  
**FABRICATED WOOD STORAGE SHELVING**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section includes factory fabricated and finished modular wood storage shelving units.

**1.2 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit manufacturer's detailed product data. Include unit construction and finishes. Provide data for all components.
- C. Shop Drawings: Submit shop drawings for shelving units describing dimensions, locations, room layout, materials, and finishes. Include methods of assembly and jointing, thickness of parts, hardware to be used.
- D. Manufacturer's Installation Instructions: Indicate special precautions for installation.

**1.3 QUALIFICATIONS**

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three (3) years documented experience.
- B. Installer: Company specializing in installation of products specified in this section with minimum three (3) years documented experience.

**1.4 DELIVERY, STORAGE, AND HANDLING**

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Accept components on site in manufacturer's original packaging. Inspect for damage.
- C. Protect components from moisture damage.

**PART 2 PRODUCTS****2.1 FABRICATED WOOD STORAGE SHELVING**

- A. Manufacturers:
  - 1. Excalibur Wood Products.
  - 2. Lundia USA.
  - 3. Palmetto Shelving Systems.
  - 4. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design: Palmetto Shelving Systems.
- C. Shelving Unit Size: 36W x 12D x 84H inches, unless indicated otherwise on Drawings.
  - 1. Where Drawings indicate shelving to be continuous from wall-to-wall, adjust shelving unit width accordingly, but not as to exceed shelf length of 42 inches in non-book shelving units. Shelf lengths for book shelving units are not to exceed 36 inches.

**2.2 COMPONENTS**

- A. Vertical Uprights: Hemlock, spruce or douglas fir species wood; minimum 1-5/8 x 1-1/4 inches. Groove-cut entire length of uprights on one face to receive shelf end support channels. Groove to be 3/8 x 5/8 inch deep. Along length of uprights, for shelf support pins and shelf adjustment, drill holes of 3/16 diameter at 1 inch centers for insertion of shelf support pins. Drilled hole centers to be measured from finish top of each upright to ensure level shelf installation.
- B. Vertical Shelving End Panels: Open framed stiles and rails. Fabricate with two uprights as stiles, bridged by three or more wood rails joined to uprights with mortised, glued, and pinned wood joinery. Rails to be at panel top and bottom, and others equally distributed.
- C. Shelves: White pine species wood; minimum 3/4 inch thick. Each end to be machined to accept roll formed steel end channels shaped to fit over each end of the shelf and to rest on the shelf support pins. Finger joints are not acceptable.
  - 1. Provide minimum seven (7) shelves per each shelving unit.
  - 2. Provide shelf support pins for each shelf and four (4) extra pins per each shelving unit.
- D. Lateral Cross Bracing: Provide lateral bracing at back of each shelving unit between each set of shelving end panels (uprights). Bracing to be 2 steel straps assembled with riveted center to form X-shape. Each steel strap to be minimum 18 gauge by 3/4 inch wide, galvanized or powder coated steel. Pre-drill each end of each strap for fastening to shelving end panels (uprights).
- E. Base Kickboard: Provide continuous 4 inch pine kickboard for each elevation.

### 2.3 ACCESSORIES

- A. Shelf Support Pins: Zinc plated steel, 3/16 inch diameter x 1-1/4 inches long, with 5/16 inch diameter head.
  - 1. Provide shelf support pins for each shelf and four (4) extra pins per each shelving unit.
- B. Hardware: Fasteners and anchoring devices to be formed from non-corrosive metal and of size and strength suitable for intended use.

### 2.4 FACTORY FINISHING

- A. Wood Components: Edges to be eased. All surfaces to be sanded smooth; sealed and lacquered.
- B. Steel Components: Smooth finish, without burrs; galvanized or powder coat.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify dimensions, tolerances, and methods of attachment with other work.
- C. Verify spaces are ready to receive work of this Section.

### 3.2 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of work.
- B. Install components according to manufacturer's written instructions, using fasteners appropriate to substrate indicated and recommended by manufacturer.
- C. Install units and components level, plumb, and firmly anchored to substrate structure to prevent tip-over.

**3.3 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Replace damaged or defective components.
- C. Remove temporary labels and protective coatings.
- D. Clean exposed surfaces.

**3.4 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed construction from damage.

**END OF SECTION**





**SECTION 10 71 13**  
**EXTERIOR SUN CONTROL DEVICES**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Section includes exterior sun control devices installed for shading and to reduce heat gain.
  - 1. Exterior Sunscreens.
  - 2. Exterior Sunshades.
- B. Related Requirements:
  - 1. Division 03 - Concrete: Cast-in-place concrete.
  - 2. Division 05 - Metals: Sections related to structural steel for supporting structure.
  - 3. Division 08 - Openings: Sections related to framed opening infill.

**1.2 REFERENCE STANDARDS**

- A. American Architectural Manufacturers Association (AAMA):
  - 1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2020.
  - 2. AAMA 612 - Voluntary Specification, Performance Requirements, and Test Procedures for Combined Coatings of Anodic Oxide and Transparent Organic Coatings on Architectural Aluminum; 2020, With Errata 2022.
  - 3. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
  - 4. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
  - 5. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site; 2015.
- B. American Society of Civil Engineers (ASCE):
  - 1. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- C. ASTM International (ASTM):
  - 1. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
  - 2. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
  - 3. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.
  - 4. ASTM B26/B26M - Standard Specification for Aluminum-Alloy Sand Castings; 2018, with Editorial Revision.
  - 5. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
  - 6. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
  - 7. ASTM D1187/D1187M - Standard Specification for Asphalt-Base Emulsions for Use as Protective Coatings for Metal; 2024.

8. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference; 2014, Reapproval 2021.
  9. ASTM F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs; 2022.
- D. American Welding Society (AWS):
1. AWS D1.2/D1.2M - Structural Welding Code - Aluminum; 2014, Errata 2020.
  2. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel; 2018, Errata 2022.
- E. The Society for Protective Coatings (SSPC):
1. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic, and Type II - Organic); 2019.

### 1.3 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate base components and requirements for attachment and anchorage to structure.
- C. Coordinate work of other Sections that interface and are related to the work of this Section.

### 1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Manufacturer's technical and descriptive data on sun control components and assemblies.
- C. Shop Drawings: Include plans; elevations; sections; and details showing profiles, angles, and spacing of blades, frames, and supports. Show unit dimensions related to supporting and adjoining structures and construction. Indicate anchorage details and locations.
- D. Structural Calculations:
  1. Submit a comprehensive analysis of design loads, including dead loads, live loads, snow loads, snow drift loads, wind loads and thermal movement. Design calculations shall identify the moment and shear forces transferred to the structure or supports through the installation connections.
  2. Structural Calculations shall be stamped and signed by a professional engineer registered in jurisdiction where Project is located.
- E. Samples for Initial Selection: Two manufacturer's color charts illustrating the finishes and colors available for products with factory-applied color finishes; submit for Architect's initial selection.
- F. Samples for Verification: From the Architect's initial selection, prepare two samples for each selected finish and color; on same product material type indicated for final Work; each 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- G. Provide written approval from the Glazed Aluminum Curtain Wall (GACW) manufacturer indicating that they have reviewed and approve of the details for attaching the Sun Control Devices of this Section to the GACW manufacturer's system framing and that the GACW's warranties of their GACW system and its finishes will NOT be voided by such attachment.

### 1.5 QUALITY ASSURANCE

- A. Designer Qualifications: Structural and wind load design is to be designed by a Professional Structural Engineer experienced in design of the Work of this Section and licensed in the State in which the Project is located.

- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section with minimum five (5) years documented experience.
- C. Installer Qualifications: Company specializing in performing Work of this Section with minimum five (5) years documented experience.
- D. Welding Standards:
  - 1. Comply with AWS D1.2, "Structural Welding Code--Aluminum."
  - 2. Comply with AWS D1.3, "Structural Welding Code--Sheet Steel."
  - 3. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

## 1.6 DELIVERY, STORAGE, AND PROTECTION

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Comply with AAMA CW-10.
- C. Protect prefinished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather. Provide adequate ventilation through wrappings.

## 1.7 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Warranty period is to begin on the project Date of Substantial Completion.
- C. Exterior Sunscreens: Provide five (5) year warranty to correct defective Work.
- D. Exterior Sunshades: Provide one (1) year Installer Warranty for the Work in this Section. Warranty is to cover defects in material and workmanship. Installer agrees to replace and repair any defects at no cost to the owner.
- E. Provide ten (10) year manufacturer warranty against excessive degradation of metal finishes. Include provision for replacement of units with excessive fading, chalking, peeling, blistering, or flaking.

## PART 2 PRODUCTS

### 2.1 PERFORMANCE AND DESIGN REQUIREMENTS

- A. Wind Loads: Design and size components and system to withstand dead loads and live loads caused by positive and negative wind loads acting normal to plane of wall, including increased wind loads at building corners.
  - 1. As calculated in accordance with ASCE 7 - Calculation of Wind Loads, as measured in accordance with ASTM E330/E330M.
  - 2. Comply with Design Loads indicated on Drawings and applicable code requirements based on geographical location.
- B. System Assembly: Accommodate the following without damage to system or components.
  - 1. Movement within system.
  - 2. Movement between system, system components and perimeter construction.
  - 3. Dynamic loading and release of loads.
  - 4. Deflection of structural support framing.
  - 5. Tolerance of supporting components.

- C. Expansion and Contraction: System to provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over 12 hour period without causing detrimental effect to system components and anchorage.
- D. System Internal Drainage: Drain water entering joints, condensation, or migrating moisture occurring within system, to exterior by weep drainage network.
- E. Not Permitted: Vibration harmonics, wind whistles, noises caused by thermal movement, thermal movement transmitted to other building elements, loosening, weakening, or fracturing of attachments or components of system.

## 2.2 MANUFACTURERS

- A. Manufacturers:
  - 1. Airolite Company, LLC.
  - 2. All-Lite Architectural Products.
  - 3. AMETCO Manufacturing Corporation.
  - 4. Architectural Grilles & Sunshades, Inc.
  - 5. ASCA, Inc.
  - 6. C/S Group.
  - 7. Dittmer Architectural Aluminum.
  - 8. Intertec by Doralco.
  - 9. Peachtree Protective Covers.
  - 10. Ruskin Company.
  - 11. Substitutions: Section 01 60 00 - Product Requirements.

## 2.3 EXTERIOR SUNSCREENS

- A. Sunscreen Systems: Fixed projecting type; shop fabricated, shop finished, extruded aluminum components including outriggers, louvers (blades), and fascia; fabricated free of defects impairing strength, durability, or appearance.
  - 1. Basis of Design: C/S Group - Airfoil
  - 2. Locations:
    - a. As indicated on Drawings.
  - 3. Materials:
    - a. Aluminum Extrusions: ASTM B221, alloy 6063-T5 or T-52.
    - b. Aluminum Sheet: ASTM B209/B209M, alloy 3003 or 5005.
      - 1) Temper as required for forming.
  - 4. Assembly Configurations and Sizes:
    - a. As indicated on Drawings.
  - 5. Component Sizes:
    - a. As indicated on Drawings.
  - 6. Component Shapes:
    - a. Outrigger Shape:
      - 1) Metal plate.
    - b. Fascia Shape:
      - 1) Rectangular tube shape.
    - c. Blade Shape:
      - 1) Rectangular tube shape.
    - d. Blade Angle:
      - 1) 45 degrees unless indicated otherwise on Drawings.
  - 7. Finish:
    - a. Class I Natural Anodized Finish, AAMA 611.

## 2.4 EXTERIOR SUNSHADES

- A. Sunshade Systems: Fixed type; shop fabricated, shop finished, extruded aluminum components including supports, framing, sub framing, slats (blades), and fascia; fabricated free of defects impairing strength, durability, or appearance.
  - 1. Basis of Design: Architectural Grilles & Sunshades, Inc.
  - 2. Locations:
    - a. Auditorium entry, gymnasium entry, front entry and media entry.
  - 3. Materials:
    - a. Aluminum Extrusions: ASTM B221, alloy 6063-T5.
    - b. Aluminum Sheet: ASTM B209/B209M, alloy 5052-H32 or greater.
      - 1) Temper as required for forming.
  - 4. Assembly Configurations and Sizes:
    - a. As indicated on Drawings.
  - 5. Component Sizes:
    - a. As indicated on Drawings.
  - 6. Component Shapes:
    - a. As indicated on Drawings.
  - 7. Finish:
    - a. Manufacturer's premium wood grain finish. Color/pattern to be selected by Architect from manufacturer's premium wood grain finishes.

## 2.5 MATERIALS

- A. Aluminum Extrusions: ASTM B221, alloy 6063-T5 or T-52, unless indicated otherwise.
- B. Aluminum Sheet: ASTM B209/B209M, alloy 3003 or 5005, unless indicated otherwise.
  - 1. Temper as required for forming.
- C. Aluminum Castings: ASTM B26/B26M, alloy 319.
- D. Galvanized Steel Sheet: ASTM A653/A653M, G90 zinc coating, mill phosphatized.
- E. Stainless-Steel Sheet: ASTM A666, Austenitic Type 302 or 304.
- F. Fasteners: Same metal and alloy as fastened metal or stainless steel Type 302 or 304 in accordance with ASTM F593, unless otherwise indicated. Do not use metals that are incompatible with joined materials.
  - 1. Use types and sizes to suit joining and anchoring requirements.
  - 2. Use hex socket head screws for exposed fasteners, unless otherwise indicated.
- G. Anchors and Inserts: Type, size, and material required for loading and installation indicated. Use nonferrous metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as needed for corrosion resistance. Use toothed steel or expansion bolt devices for drilled-in-place anchors.
- H. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12 but containing no asbestos fibers, or cold-applied asphalt emulsion complying with ASTM D1187.

## 2.6 FABRICATION

- A. Field Measurements: Verify actual supporting and adjoining construction by field measurements before fabrication; and indicate recorded measurements on final Shop Drawings. Verify that supporting construction is as required for support of the sun control devices. Coordinate construction to ensure that sun control assemblies fit properly to supporting and adjoining construction and coordinate schedule with construction progress to avoid delaying the Work.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, coordinate related construction to ensure that sun control devices correspond to established dimensions and construction.
- B. Shop assemble sun control systems to the greatest extent practical to facilitate timely installation at project site and to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- C. Maintain equal spacing between sun control blades unless indicated otherwise on Drawings.
- D. Separation between blades and frames to produce uniform appearance.
- E. Include supports, anchorages, and accessories required for complete assembly.
- F. Join frame members to one another and to fixed sun control blades with fillet welds concealed from view, unless size of sun control assembly makes concealed, bolted connections between frame members necessary.

## 2.7 SHOP FINISHING

- A. Anodized Aluminum Finish:
  1. Class I Natural Anodized Finish: AAMA 611, AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.
- B. Color and Gloss: As selected by Architect from manufacturer's full range.
- C. Touch-Up Materials: As recommended by finish manufacturer for field application.
- D. Extent of Finish:
  1. Apply factory finishes to all components surfaces and completed assemblies.
  2. Apply finish to surfaces cut during fabrication so no natural aluminum is visible in completed assemblies, including joint edges.
  3. Apply touch-up materials recommended by coating manufacturer for field application to cut ends and minor damage to factory applied finish.
- E. Concealed Steel Items: Galvanized to ASTM A123/A123M; minimum 2.0 oz/sq ft coating thickness; galvanized after fabrication.
- F. Apply bituminous paint to concealed aluminum and steel surfaces in contact with cementitious or dissimilar metals.
- G. Touch-Up Primer for Galvanized Steel Surfaces: SSPC Paint 20 zinc rich.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify dimensions, tolerances, and method of attachment with other Work.
- C. Verify that construction to which the Work is to be anchored is complete, structurally sound, and adequate to provide the required securement.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.

- C. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

### **3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install the work in compliance with the design requirements, applicable codes, manufacturer's recommendations, and the contract documents.
- C. Locate and install sun control assemblies level, plumb, and at indicated alignment with adjacent work.
- D. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.
- E. Form closely fitted joints with exposed connections accurately located and secured.
- F. Repair finishes damaged by cutting, welding, soldering, and grinding. Restore finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory, make required alterations, and refinish entire unit or provide new units.
- G. Protect galvanized and nonferrous-metal surfaces from corrosion or galvanic action by applying a heavy coating of bituminous paint on surfaces that will be in contact with concrete, masonry, or dissimilar metals.

### **3.4 ERECTION TOLERANCES**

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation from Level: Plus, or minus 1/8 inch in 20 ft.
- C. Maximum Misalignment from Position: Plus, or minus 1/8 inch
- D. Maximum Misalignment from Adjoining Members Abutting in Plane: 1/32 inch.

### **3.5 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Clean exposed surfaces with water and a mild soap or detergent not harmful to finishes, or as otherwise recommended by manufacturer. Thoroughly rinse surfaces and dry.
- C. Clean and touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

### **3.6 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect sun control devices from damage during construction.

**END OF SECTION**





**SECTION 10 73 16****CANOPIES****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Factory finished metal canopies suspended from building structure.
- B. Related Requirements:
  - 1. Section 10 73 26 - Walkway Coverings: Walkway coverings supported by columns.
  - 2. Division 05 - Metals: Sections related to structural steel for supporting structure.
  - 3. Division 08 - Openings: Sections related to framed opening infill.

**1.2 REFERENCES**

- A. American Architectural Manufacturers Association (AAMA):
  - 1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2020.
  - 2. AAMA 612 - Voluntary Specification, Performance Requirements, and Test Procedures for Combined Coatings of Anodic Oxide and Transparent Organic Coatings on Architectural Aluminum; 2020, with Errata 2022.
  - 3. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
  - 4. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
  - 5. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site; 2015.
- B. American Society of Civil Engineers (ASCE):
  - 1. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- C. ASTM International (ASTM):
  - 1. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
  - 2. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
- D. American Welding Society, Inc. (AWS):
  - 1. AWS D1.2/D1.2M - Structural Welding Code - Aluminum; 2014, with Errata 2020.

**1.3 COORDINATION**

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate base components and requirements for attachment and anchorage to structure.
- C. Coordinate work of other Sections that interface and are related to the work of this Section (drainage, sidewalks, building openings, exterior walls, roofing, soffits, fascia, lighting, etc.).

**1.4 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

- B. Product Data: Manufacturer's product information, specifications and installation instructions for components and accessories.
- C. Shop Drawings: Indicate system and component profiles, sizes, connection attachments, anchorage, size, and type of fasteners; anticipated deflection under load; affected related work; expansion and contraction joint locations and details; drainage details and flow diagrams; field welding; and accessories.
  - 1. Prepare shop drawings indicating attachment system, framing, transverse cross sections, covering and trim details, and installation details to clearly indicate proper assembly of components.
  - 2. Shop drawings and engineering data indicating compliance with requirements of this Section are to be designed and sealed by a licensed professional Engineer. Include test results of previous testing meeting performance criteria, and other supportive data.
- D. Engineering Certification: Submit written certification prepared and signed by a licensed professional Engineer indicating compliance with applicable codes and Performance Requirements indicated in this Section.
- E. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of finishes and colors available for products with factory-applied color finishes; submit for Architect's initial selections.
- F. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples on same product material type indicated for final work; each sample 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.

## 1.5 QUALITY ASSURANCE

- A. Designer Qualifications: Design of canopy systems included in this Section are to be designed and sealed by a licensed Professional Engineer, experienced in design of work of this type and licensed in the State in which the Project is located. Engineer is to certify that all applicable code requirements have been met. Engineer may be in the employ of the manufacturer of the covering systems, provided Engineer is compliant with the above registration requirement.
- B. Comply with the current provisions of the following unless otherwise indicated:
  - 1. Applicable codes and authorities having jurisdiction (AHJ).
  - 2. AWS (American Welding Society) standards for structural welding.
- C. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum five (5) years documented experience.
- D. Installer Qualifications: Company specializing in performing the work specified in this Section with minimum five (5) years documented experience.
- E. Single Source Requirement: If project includes Section 10 73 16 - Canopies and Section 10 73 26 - Walkway Coverings, manufacturer to be same and installer to be same for both Sections.

## 1.6 DELIVERY, STORAGE, AND PROTECTION

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Comply with AAMA CW-10.
- C. Protect prefinished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather. Provide for adequate ventilation through wrappings.

## 1.7 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Provide five (5) year manufacturer's warranty for finish.
- C. Provide manufacturer's standard one (1) year warranty that includes, but is not limited to, coverage for structural performance, water tightness and finish.

## PART 2 PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Design system and size components, and anchorage to safely withstand Live Loads, Snow Loads, Wind Loads (+ and -), and Seismic Loads as indicated on Drawings for the Structural Design Criteria and in compliance with ASCE 7 and the State Building Code for the State in which the project is located.
- B. System to provide for expansion and contraction within system components caused by a cycling temperature range of 120 degrees F without causing detrimental effects to system or components.
- C. System to accommodate, without damage to system or components, movement within system, movement between system and perimeter framing components, dynamic loading and release of loads, and deflection of structural support framing.
- D. Conform to applicable code for fire resistance ratings for items.

### 2.2 MANUFACTURERS

- A. Manufacturers:
  - 1. AVAdek, Inc.
  - 2. Dittmer Architectural Aluminum.
  - 3. Mitchell Metals.
  - 4. Mapes Architectural Products.
  - 5. Peachtree Protective Covers.
  - 6. Perfection Architectural Systems, Inc.
  - 7. Tennessee Valley Metals, Inc., East Coast TVM.
  - 8. Substitutions: Section 01 60 00 - Product Requirements.

### 2.3 MATERIALS

- A. Extruded Aluminum: ASTM B221; 6063 alloy, T6 temper typical; 6061 alloy, T6 temper for extruded structural members.
- B. Sheet Aluminum: ASTM B209/B209M; 6061 alloy, T6 temper.
- C. Fasteners:
  - 1. Deck Screws (rivets not permitted): Type 18-8 non-magnetic stainless steel sealed with a neoprene "O" ring beneath 5/8 inch outside dimension, conical washer.
  - 2. Rivets: Size 3/16 x 1/2 inch grip range aluminum rivets with aluminum mandrel.
  - 3. Bolts: All bolts, nuts, and washers to be 18-8 non-magnetic stainless steel.
  - 4. Tek Screws: Not permitted.

### 2.4 COMPONENTS

- A. Decking: Extruded self-flashing aluminum sections; interlocking into a watertight composite unit. Extrusion thickness to be a required to withstand imposed loads.

- B. Soffit Type: Flush bottom, unless indicated otherwise on Drawings.
- C. Fascia: Extruded aluminum.
  - 1. For integral fascia and structural frame extrusion, 0.125 inch thick, minimum.
  - 2. For separate fascia extrusion secured to structural frame, 0.050 inch thick, minimum.
  - 3. Shape and size to be as indicated on Drawings.
- D. Flashing: Extruded aluminum, 0.040 inch thick; same finish as for system components; secured with concealed fastening method.

## 2.5 FABRICATION

- A. Field Measurements: Verify actual supporting and adjoining construction by field measurements before fabrication; and indicate recorded measurements on final Shop Drawings. Verify that supporting construction is as required for support of the Sun Control Devices. Coordinate construction to ensure that sun control assemblies fit properly to supporting and adjoining construction and coordinate schedule with construction progress to avoid delaying the Work.
  - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, coordinate related construction to ensure that Sun Control Devices correspond to established dimensions and construction.
- B. Fabricate assemblies to comply with design as indicated on Drawings.
- C. Fit and shop assemble components in largest practical sizes, for delivery to site.
- D. Fabricate components with joints tightly fitted and secured. Provide allowance for expansion and contraction of entire system.
- E. Provide drainage pathway without leaks and to point of drainage discharge.
- F. For canopies suspended from building (and without columns for drainage), provide for drainage openings with water diverters along bottom of canopy outer edge member. Drainage openings to be as indicated on Drawings. If drainage openings are not indicated on Drawings, locate drainage openings away from building face and not in direct line of door openings.
- G. Arrange fasteners, attachments and jointing to ensure concealment from view.
- H. Supply components required for anchorage of framing. Fabricate anchors and related components of same material and finish as framing, except where specifically noted otherwise.
- I. Continuously seal joined pieces by continuous welds.
- J. Welding In accordance with ANSI/AWS D1.2/D1.2M.
- K. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, hairline, and waterproof. Ease exposed edges to small uniform radius.
- L. Accurately form components to suit each other and to building structure.
- M. Deck Construction: Deck shall be manufactured of extruded modules that interlock in a self-flashing manner. Interlocking joints shall be positively fastened at not less than 18 inches o.c. creating a monolithic structural unit capable of developing the full strength of the sections. The fastenings must have minimum shear strength of 350 pounds each. Deck shall be assembled with sufficient camber to offset dead load deflection.

## 2.6 ACCESSORIES

- A. Fittings: Elbows, T-shapes, wall brackets; cast aluminum.

- B. Splice Connectors: Concealed spigot; cast aluminum.
- C. Struts: Manufacturer's standard rod type and material.
- D. Wall Brackets: Manufacturer's standard decorative type for mounting in wall structure, unless shape, profile, or configuration is otherwise indicated on Drawings.
- E. Exposed Fasteners: Flush countersunk stainless steel screws, bolts, and rivets; finish to be same as factory finish indicated.
- F. Protective Coating for dissimilar materials: Clear acrylic; two coats; compatible with materials to be coated.

## 2.7 FACTORY FINISHING

- A. All surfaces of components, fabrications, and accessories to be factory finished to match colors selected by Architect from full range of colors.
- B. Painted Aluminum Finish: AA-M12C12R1x non-specular as fabricated mechanical finish, chemically cleaned, and prepared for applied coating; with organic coating.
  - 1. Superior Performing Organic Coatings: AAMA 2605, thermally cured polyvinylidene fluoride (PVDF) resin-based coating, fluoropolymer finish containing minimum 70 percent PVDF resins.
    - a. Number of Coats:
      - 1) Two (2) coat system, 1.2 mil minimum total dry-film thickness.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that substrates and anchor conditions are acceptable and are ready to receive work.
- C. Verify dimensions, tolerances, and method of attachment with other work.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install as indicated on Drawings and in accordance with Engineer's and manufacturer's instructions.
- C. Install components plumb and level, accurately fitted, free from distortion or defects.
- D. Apply two coats of clear acrylic coating to aluminum surfaces in contact with dissimilar materials and cementitious embedment. Application to be concealed from view.
- E. Install anchors required for connecting framing to structure.

### 3.4 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation from Plumb: 1/4 inch per story, non-cumulative.

- C. Maximum Misalignment from True Position: 1/4 inch.
- D. Maximum Variation from Plane: 1/4 inch every 10 feet, non-cumulative.
- E. Maximum Variation from Plane Alignment of Two Adjoining Members: 0.015 inch.

### **3.5 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work and comply with manufacturer's recommendations.
- B. Clean installed work in accordance with manufacturer's recommended materials and procedures.

### **3.6 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protect installed construction.

**END OF SECTION**

**SECTION 10 75 00****FLAGPOLES****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Flagpoles installed with in-ground foundation.
- B. Related Requirements:
  - 1. Section 03 30 00 - Cast-in-Place Concrete: Concrete for base and foundation construction.

**1.2 REFERENCES**

- A. ASTM International (ASTM):
  - 1. ASTM B241/B241M - Standard Specification for Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube; 2022.
- B. National Association of Architectural Metal Manufacturers (NAAMM):
  - 1. NAAMM FP 1001 - Guide Specifications for Design of Metal Flagpoles; 2007.

**1.3 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on pole, accessories, and configurations.
- C. Shop Drawings: Indicate detailed dimensions, attachment details, anchor requirements, imposed loads, and foundation details for in-ground installed flagpoles.
  - 1. Shop drawings and engineering data indicating compliance with requirements of this Section and applicable code requirements are to be designed and sealed by a Professional Engineer experienced in design of the work in this Section and licensed to perform structural engineering in the State in which the project is located.
- D. Flag Designs: Submit drawings indicating design, colors, and fabrication details of flag(s) required.

**1.4 CLOSEOUT SUBMITTALS**

- A. Section 01 78 23 - Operation and Maintenance Data.
- B. Operation and Maintenance Data: Submit Operation and Maintenance Data.

**1.5 QUALIFICATIONS**

- A. Delegated Designer Requirement: Design flagpole, flagpole foundation, and anchorage under direct supervision of Professional Engineer experienced in design of the work in this Section and licensed in State in which the project is located.

**1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Spiral wrap flagpole with protective covering and pack in protective shipping tubes or containers.
- C. Protect flagpole and accessories from damage or moisture.

**1.7 SPARE PARTS AND MAINTENANCE PRODUCTS**

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
1. Four (4) keys to lockable cleat box.
  2. Two (2) specialty adjustment and maintenance tools.

**PART 2 PRODUCTS****2.1 PERFORMANCE REQUIREMENTS**

- A. Structural Performance: Provide flagpoles capable of withstanding the effects of wind loads as determined according to NAAMM FP 1001. Design for non-resonant safety factor of 2.5; to resist without permanent deformation at design wind speed as indicated on Drawings; with flag deployed and flag size as indicated in this Section.

**2.2 FLAGPOLES - IN-GROUND MOUNTED TYPE**

- A. Manufacturers:
1. American Flagpole.
  2. Concord Industries, Inc.
  3. Ewing.
  4. Morgan-Francis Flagpole.
  5. Pole-Tech Company, Inc.
- B. Aluminum: ASTM B241/B241M, 6063 alloy, T6 temper.
- C. Flagpole Quantities Required and Configuration Table: Tapered design.

Quantity Required	Above Ground Height.	Butt Diameter	Wall Thickness	Finial Ball Dia.	Flag Size
1	45 feet	8 inches min**	0.188 inch min**	4 inches	8 x 12 feet
1	50 feet	10 inches min**	0.188 inch min**	4 inches	10 x 15 feet

\*\* Minimum dimension subject to increase in accordance with Engineer's Design and Performance Requirements.

- D. Accessories:
1. Flag Types: Flag graphic design is to comply with the referenced entity's official design. Fabrication to be of nylon fabric with hemmed edges and brass grommets. Provide one (1) each of the following flags.
    - a. United States flag. Design in accordance with stars and stripes design.
    - b. State flag. Design in accordance with State in which project is located.
    - c. County flag. Design in accordance with County in which project is located.
  2. Halyard: External type; minimum 3/8 inch diameter nylon, braided, with stainless steel or bronze core. Provide non-corrosive hardware required to display (attach/fly) the following quantity of flags per flagpole.
    - a. One (1) flag per flagpole.
  3. Finial Ball: Aluminum; finish to match flagpole.
  4. Truck Assembly: Cast aluminum; revolving, stainless steel ball bearings, non-fouling.
  5. Cleats: 9 inch size, aluminum with stainless steel fastenings, two for each halyard.
  6. Cleat Box: Aluminum, with built-in hinge and lockable assembly, attached to pole with tamper proof screws inside box.
  7. Foundation Tube Sleeve: Minimum 16 gauge corrugated galvanized steel; depth as required for loads imposed on flagpole.
  8. Pole Base Attachment: Sleeve; aluminum base with base cover.



9. Lightning Ground Cable: Copper No. 6 AWG, soft drawn.
- E. Factory Finishing:
  1. Aluminum: Anodized to clear color.
  2. Finial: Spun finish.
  3. Metal Surfaces in Contact with Concrete: Coat with asphaltic paint.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify area is ready to receive work and dimensions are as required.

### **3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Coat metal sleeve surfaces below grade, in contact with cementitious surfaces, and in contact with dissimilar metals with asphaltic paint.

### **3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install work in accordance with Delegated Design by Engineer and manufacturer's requirements.
- C. Provide isolation barrier between dissimilar materials.
- D. Electrically ground flagpole installation.

### **3.4 ERECTION TOLERANCES**

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation from Plumb: 1 inch.

### **3.5 ADJUSTING**

- A. Section 01 73 00 - Execution: Adjusting.
- B. Adjust operating devices so halyard and flag function smoothly.

**END OF SECTION**



## SECTION 11 30 13

### RESIDENTIAL APPLIANCES

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Section includes residential appliances with installation including connections to utilities.
- B. Related Requirements:
  - 1. Division 22 - Plumbing: Coordinate equipment plumbing requirements.
  - 2. Division 23 - HVAC: Coordinate equipment venting requirements.
  - 3. Division 26 - Electrical: Coordinate equipment electrical requirements.

##### 1.2 REFERENCES

- A. American Gas Association (AGA):
  - 1. AGA Certification Seal.
- B. National Electrical Manufacturers Association (NEMA):
  - 1. NEMA Standards; Current.
- C. Underwriters Laboratories Inc. (UL):
  - 1. UL (DIR) - Online Certification Directory; Current Edition.
- D. U.S. Environmental Protection Agency (EPA):
  - 1. Energy Star - Label Indicating Compliance With Certification Standards for EPA Energy Star Voluntary Labeling Program.

##### 1.3 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate plumbing, venting, and electrical work with requirements of appliances.

##### 1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit data on appliances; indicate configuration, sizes, materials, finishes, locations, and utility connections and locations.
- C. Shop Drawings:
  - 1. Indicate in large scale detail, fabricated equipment showing construction methods, types and gages of metal, hardware and fittings, plan, front elevation, minimum of one cross-section. Indicate verification that the projects planned provisions for utilities, ventilation and connectivity are compliant with the requirements of the appliance and/or device, to include types, sizes, locations, and accessibility.
  - 2. Illustrate complicated parts of typical items in cut-away perspective.
  - 3. For control systems, indicate service connections, characteristics, and wiring diagrams.
- D. Samples: Submit samples illustrating manufacturer's full range of color and finish options for selection by Architect.
- E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.
- F. Manufacturer's Installation Instructions: Submit special procedures for built-in items and perimeter conditions requiring special attention.

## 1.5 CLOSEOUT SUBMITTALS

- A. Section 01 77 00 - Closeout Procedures.
- B. Operation and Maintenance Data: Submit manufacturer's operating instructions for specified equipment and care and maintenance of finished surfaces.

## 1.6 QUALITY ASSURANCE

- A. Electric Appliances: Listed and labeled by UL (DIR) and complying with NEMA Standards.
- B. Gas Appliances: Bearing design certification seal of American Gas Association (AGA).

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Store products clear of floor in manner to prevent damage.
- C. Coordinate size of access and route to place of installation.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers:
  - 1. Frigidaire Products.
  - 2. GE Appliances.
  - 3. LG Electronics.
  - 4. Whirlpool Corporation.
  - 5. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design: Refer to appliance types indicated.

### 2.2 KITCHEN APPLIANCES

- A. Refrigerator/Freezer:
  - 1. Locations: Family and Consumer Sciences classroom and Fieldhouse
  - 2. Quantity: 6 units each.
  - 3. GE - Model [GIE18GTNRWW](#) (17.5 cu. ft. top-freezer refrigerator, icemaker, Energy Star, white).
- B. Range/Oven:
  - 1. Locations: Family and Consumer Sciences classroom
  - 2. Quantity: 6 unit each.
  - 3. GE - Model [JS645DLWW](#) (30 inches wide, slide-in electric range/oven, front control, white).
    - a. Range Hood:
      - 1) GE - Model JVX5305SJSS (under cabinet vent hood, same manufacturer, finish, and width as range, recirculating, 2-speed fan control minimum, 270 cfm blower minimum, dual halogen lights, removable/washable grease filter, Energy Star).
- C. Dishwasher:
  - 1. Locations: Family and Consumer Sciences classroom
  - 2. Quantity: 6 unit each.

3. GE - Model [GDF550PGRWW](#) (built-in dishwasher, tall tub, SS tub/door liner, Energy Star, white).
- D. Microwave Oven (countertop type):
1. Locations: Family and Consumer Sciences classroom and Fieldhouse
  2. Quantity: 7 unit each.
  3. GE - Model [PES722DLWW](#) (2.2 cu. ft. countertop microwave oven, glass turntable, white).
- E. Coffee Maker:
1. Locations: Fieldhouse
  2. Quantity: 1 unit each.
  3. GE - Model G7CDAASSPSS (12 cup capacity, drip brew type).
  4. Keurig - Model K50 K-Classic Coffee Maker (K-cup coffee inserts, three cup size option, single cup brew, 48 oz water reservoir, black).

### 2.3 LAUNDRY APPLIANCES

- A. Stackable Washer and Dryer (full-size, front loaders):
1. Provided by Owner and installed by Contractor.
  2. Locations: Kitchen Locker
  3. Quantity: 1 unit each.
  4. GE - Washer Model [GFW650SSNWW](#) (4.8 cu. ft. capacity, front load washer, SS drum, with steam, Energy Star, white).
  5. GE - Dryer Model [GFD65ESSNWW](#) (7.8 cu. ft. capacity, front load electric dryer, SS drum, with steam, white).
  6. Whirlpool - Washer Model WFW8620HW (5.0 cu. ft. capacity, front load washer, SS drum, with steam, white).
  7. Whirlpool - Dryer Model WED8620HW (7.4 cu. ft. capacity, front load electric dryer, steam cycle, Energy Star, white).

### 2.4 ACCESSORIES

- A. Provide rough-in hardware, supports and connections, attachment devices, closure trim, and accessories.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify plumbing, electrical, and venting service connection requirements.
- C. Verify supports and anchorage construction is correct and in required locations.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.

- B. Installation is to comply with manufacturer's recommendations and building code requirements.
- C. Insulate to prevent electrolysis between dissimilar metals.
- D. Use anchoring devices appropriate for equipment and expected usage.

### **3.4 ADJUSTING**

- A. Section 01 73 00 - Execution: Starting, testing, adjusting, and balancing.
- B. Adjust equipment and apparatus to ensure proper working order and conditions.
- C. Remove and replace equipment creating excessive noise or vibration.

### **3.5 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Remove masking or protective covering from stainless steel and other finished surfaces.
- C. Wash and clean equipment.
- D. Polish glass, plastic, hardware, accessories, fixtures, and fittings.

### **3.6 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed Work from damage.

**END OF SECTION**

**SECTION 11 40 00****FOOD SERVICE EQUIPMENT****PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. The general provisions of the contract including general and supplementary conditions and general requirements apply to the work specified in this section.

**1.2 RELATED WORK SPECIFIED ELSEWHERE**

- A. Plumbing: Refer to Division 22, including:
  - 1. Rough-in piping for gas and water supply and waste lines.
  - 2. Piping for supply and waste lines.
  - 3. Traps, grease traps, line strainers, tail pieces, valves, stops, shut offs and miscellaneous fittings required for complete installation.
  - 4. Final connections.
  - 5. Indirect drains for sink compartments.
- B. Mechanical: Refer to Division 23, including:
  - 1. Roof mounted fans and connecting ductwork not shown as part of the kitchen equipment.
  - 2. Final connections, including approved welded duct connections to hoods.
- C. Electrical: Refer to Division 26, including:
  - 1. Rough-in conduit, wiring, line and disconnect switches, safety cut-offs and fittings, control panels, fuses, boxes, and fittings required for complete installation.
  - 2. Final connections, including mounting and wiring of switches furnished as part of the food service equipment (unless otherwise indicated on the drawings).
- D. Mechanical Work:
  - 1. Provide exhaust hoods with connection collars ready for final connection by HVAC Section.
  - 2. Provide stainless steel exposed ducts to ceiling for dishmachine.

**1.3 WORK INCLUDED THIS SECTION:**

- A. Furnish and install all food service equipment as specified herein, including that which is reasonably inferred, with all related items necessary to complete work shown on contract drawings and/or required by these specifications.
- B. Electrical Work:
  - 1. Interwiring of food service equipment between components within equipment, such as heating elements, switches, thermostats, motors, etc., complete with junction box as is applicable, ready for final connection.
  - 2. Voltages shall be as indicated on contract drawings. Any differences in electrical characteristics at job site from those shown on contract documents must be submitted to Architect for consideration prior to ordering equipment.
- C. Plumbing Work:
  - 1. Furnish all equipment with faucets, sink waste assemblies, and trim as specified in this section.

2. Other than sink compartments, extend all indirect waste lines to nearest floor receptor. All such drain lines to be properly sized. Drain shall terminate with proper air gap above flood rim of floor receptor. Drain lines to be copper with silver paint unless specified otherwise. Drain lines in public areas to be chrome plated where exposed to public view.
- D. Mechanical Work:
1. Provide exhaust hoods with connection collars ready for final connection by Division 23.

#### 1.4 QUALITY ASSURANCE

- A. It is required that all custom fabricated equipment such as food serving units, tables, sinks, counter tops, etc., be manufactured by a food service equipment fabricator who has the plant, personnel and engineering equipment required. Such manufacturer shall be subject to approval of Architect. All work in the above category shall be manufactured by one manufacturer and shall be of uniform design and finish.
- B. Manufacturer of this equipment must be able to show that they are now and for the past five years have been engaged in manufacture or distribution of equipment, as required under this contract, as their principal product.
- C. Manufacturer of equipment herein specified shall be a recognized distributor for items of equipment specified herein which are of other manufacture than their own.
- D. Only manufacturers who can meet the foregoing qualifications will be acceptable.
- E. All work shall be done in an approved professional manner, to the complete satisfaction of the Owner.

#### 1.5 SUBMITTALS

- A. Submit shop drawings as required by General Conditions. All shop drawings and rough-in drawings shall be CAD drafted and must be submitted in .DWF or .PDF electronic format. Multiple hard copies are not acceptable.
- B. Shop drawings and bound brochures covering manufactured or "buy-out" items covering all work and equipment included in this contract shall be submitted to Architect as soon as possible after award of contract. After approval, Food Service Equipment Contractor shall furnish to Architect electronic files of shop drawings and brochures, corrected as required by virtue of review comments, for distribution to various interested trades on project. All costs of reproduction and submission shall be part of the contract.  
Bound brochure and cut sheet submittals must be copied to Owner for review and comment.
- C. Provide fully dimensioned rough-in plans at 1/4" scale, consisting of a separate drawing for each discipline. Each drawing shall show equipment shaded down 50%. Rough-in set shall include all required mechanical, electrical, plumbing, services for equipment and dimensioned rough-in location for same. Rough-in locations shown shall make allowances for required traps, switches, etc., thereby not requiring interpretation or adjustment on the part of other Contractors. The Food Service Equipment Contractor shall visit the site to verify all rough-in and sleeve locations prior to installation of finished floors and shall cooperate with other Contractors involved in proper location of same. The Food Service Equipment Contractor shall be responsible for any required relocations of rough-in due to errors or inaccuracies on those rough-in plans which they prepare.



- D. Rough-in plans shall include all required services which relate to equipment, but which may not directly connect thereto, such as convenience outlets at walls, hose stations, floor drains, etc.
- E. Rough-in plans shall also include all required outlet services for equipment which is designated on the drawing schedule, even though such equipment may not be included in this contract. Drawings shall indicate dimensions for floor depressions, wall openings, etc., for equipment.
- F. Fully dimensioned and detailed shop drawings of custom fabricated equipment items shall be submitted, drawn at 3/4" and 1 - 1/2" scale for plans, elevations, and sections respectively. Drawings shall show all details of construction, installation, and relation to adjoining and related work where cutting or close fitting is required. Drawings shall show all reinforcements, anchorage, and other work required for complete installation of all fixtures.
- G. Do not begin fabrication of custom manufactured equipment until approvals of shop drawings have been received and until field measurements have been taken by Food Service Equipment Contractor, where such measurements are necessary to assure proper conformance with intent of contract drawings and specifications.
- H. Make field measurements, giving due consideration to any architectural, mechanical, or structural discrepancies which may occur during construction of building. No extra compensation will be allowed for any difference between actual measurements secured at job site and dimensions indicated on contract drawings. Any differences which may be found at job site during field measurements shall be submitted to Architect for consideration before proceeding with fabrication of equipment.
- I. Submit illustrative brochures for manufactured or "buy-out" equipment items, complete with illustrations, specifications, line drawings, rough-in requirements, and list of accessories or other specified additional requirements. Brochures shall be bound and shall include data on all equipment which is to be provided, arranged in numerical sequence which conforms to item numbers of specifications. Omission of data does not reduce obligation to provide items as specified.
- J. Approval of shop schedules and brochures will be in general and shall be understood to mean that Architect has no objection to use of materials or processes shown. Approval does not relieve Food Service Equipment Contractor from responsibility for errors, omissions, or deviations from their contract requirements.

## **1.6 SUBSTITUTIONS - STANDARDS**

- A. Refer to Instructions to Bidders and Division 01 for requirements.
- B. All unspecified substitutions after bid must be submitted to Owner for written approval prior to acceptance.

## **1.7 DRAWINGS**

- A. Drawings which constitute part of contract documents indicate general arrangement of piping and location of equipment. Should it be necessary to deviate from arrangement indicated to meet structural conditions, make such deviations without expense to Owner.
- B. Specifications and drawings are reasonably exact, but their extreme accuracy is not guaranteed. Drawings and specifications are for assistance and guidance of Contractor, and exact locations, distances and levels shall be governed by the building.

**1.8 MANUFACTURER'S DIRECTIONS**

- A. Follow manufacturer's directions in all cases where manufacturers of articles used in this contract furnish directions or prints covering points not shown on drawings or specifications.

**1.9 INDUSTRY STANDARDS**

- A. Electric operated and/or heated equipment, fabricated or otherwise, shall conform to latest standards of National Electric Manufacturers Association and of Underwriters Laboratories, Inc., and shall bear the U.L. label.
- B. Cooking and hot food holding equipment shall meet minimum construction standards as noted by NSF #4.
- C. Refrigeration equipment shall meet minimum construction standards as noted by NSF #7.
- D. Items of food service equipment furnished shall bear the N.S.F. seal.
- E. Food service equipment shall be installed in accord with N.S.F. standards.
- F. Work and materials shall comply with requirements of applicable codes, ordinances, and regulations, including but not limited to those of Occupational Safety and Health Act (OSHA), National Fire Protection Association, State Fire Marshal, State Accident Commission, U.S. Public Health Service, State Board of Health, local health codes, etc.
- G. No extra charge will be paid for furnishing items required by regulations, even though such may not be shown on drawings or called for in these specifications.
- H. Rulings and interpretations of enforcing agencies shall be considered part of regulations.

**PART 2 - PRODUCTS****2.1 MANUFACTURED EQUIPMENT**

- A. All like types of equipment such as all refrigerated and heated cabinets, all ovens, and all mixers shall be by the same manufacturer.
- B. Except as may be specified otherwise under individual item specifications in "Equipment Schedule", all items of standard manufactured equipment shall be complete in accord with manufacturer's standard specification for specific unit or model called for, including finishes, components, attachments, appurtenances, etc., except as follows:
  - 1. All items of standard equipment shall be that manufacturer's latest model at time of delivery.
  - 2. Substitutions for manufactured equipment specified will be accorded consideration under terms set forth in "Substitutions - Standards".

**2.2 FABRICATED EQUIPMENT**

- A. Stainless steel shall be U.S. standard gauges as called for, 18-8, Type 302, Type 304, No. 4 finish.

- B. Galvanized iron shall be Armco or equal. Framework of galvanized iron shall be welded construction, having welds smooth, and where galvanizing has been burned off, touched up with high grade aluminum bronze.
- C. Legs and crossrails shall be continuously welded, unless otherwise noted, and ground smooth.
- D. Bottom of legs at floor shall be fitted with sanitary stainless-steel bullet type foot, with not less than 2" adjustment.
- E. Legs shall be fastened to equipment as follows:
  - 1. To sinks by means of closed gussets. Gussets shall be stainless steel, reinforced with bushing, having set screws for securing legs.
  - 2. To tables and drainboards with closed gussets which shall be welded to stainless steel hat sections or channels, 14 gauge or heavier, exposed hat sections having closed ends. Bracing shall be welded to the underside of tops.
- F. Closed gussets shall be a 3" minimum diameter at top, continuously welded to frame members or to sink bottom.
- G. Sinks, unless otherwise specified, shall be furnished with rotary type waste outlets, without connected overflows: Atlantic Brass Works Model 772-RB; Fisher Brass Foundry Model 250A; T&S; or approved equal. Where exposed, furnish wastes chromium plated.
- H. Rolls shall be 1 1/2" diameter, except as detailed contrary, with corners bullnosed, ground and polished.
- I. Seams and joints shall be shop welded. Welds to be ground smooth and polished to match original finish. Materials 18 gauge or heavier shall be welded.
- J. Metal tops shall be one-piece welded construction, unless specified otherwise, reinforced on underside with stainless steel hat sections or channels welded in place. Crossbracing to be not more than 30" on centers.
- K. Drawers to be 18-gauge stainless steel channel type housing and drawer cradle, both housing and cradle being reinforced and welded at corners, housing being secured to underside of table top, and both housing and cradle being sized for and fitted with 18-gauge 20" x 20" x 5" deep stainless-steel drawer insert having coved corners. Drawer insert shall be easily removable from cradle without tools or having to remove entire drawer. Drawers to have stainless steel fronts. Provide with recessed flush type stainless steel pulls.
- L. Support drawer on fabricated 14-gauge stainless steel interlocking channel solid delrin ball bearing wheels. Support slides shall be load rated at 200 lb. per pair. Slides to be Component Hardware S52 Series.
- M. Enclosed cabinet type bases shall be made of formed steel sheets reinforced with formed steel sections to create a rigid structure. Steel shall be 18-gauge or heavier. Base shall be welded construction throughout with front rails, mullions, etc., welded to appear as one-piece construction. All exposed sections of interior and exterior shall be stainless steel, and unexposed sections shall be galvanized steel, unless specified contrary.
- N. Hardware shall be solid materials and except where unexposed or specified contrary, of cast brass, chrome plated. Stampings are not acceptable. Identify all hardware with the manufacturer's name and number so that broken or worn parts may be ordered and replaced.

- O. Fabricate sink compartments with fully coved vertical and horizontal corners. Multiple compartment partition to be double thickness, continuously welded where sheets join at top. Front of multiple compartment sinks to be continuous on exterior. Bottoms shall be creased to drain.
- P. Ends of all fixtures, splashbacks, shelves, etc., shall be finished flush to walls or adjoining fixtures.
- Q. Fabricate sink compartments with fully coved vertical and horizontal corners. Multiple compartment partition to be double thickness, continuously welded where sheets join at top. Front of multiple compartment sinks to be continuous on exterior. Bottoms shall be creased to drain.
- R. Ends of all fixtures, splashbacks, shelves, etc., shall be finished flush to walls or adjoining fixtures.
- S. Dishtables, draintables, splashbacks and turned-up edges shall have radius bends in all horizontal and vertical corners, coved at intersections.
- T. Rounded and coved corners or radius bends shall be 1/2" radius or longer.
- U. Shelves in fixtures with enclosed bases shall be turned up on back and sides and feathered slightly to insure tight fit to enclosure panels. Bottom shelves shall be made for easy removal unless otherwise noted.
- V. Undersides of tops to be coated with heavy-bodied resinous material compounded for permanent, non-flaking adhesion to metal, 1/8" thick, applied after reinforcing members have been installed, drying without dirt-catching crevices.
- W. Metal components, unless specified or noted otherwise, to be the following gauges:
 

Counter and table tops	14 ga. Stainless Steel
Wall shelves	16 ga. Stainless Steel
Pipe leg undershelves	16 ga. Stainless Steel
Drawer fronts	16 ga. Stainless Steel
Enclosed cabinet bases	18 ga. Stainless Steel
Sinks and drainboards	14 ga. Stainless Steel
Exhaust hoods	18 ga. Stainless Steel
Legs 1 - 5/8" diameter	16 ga. Stainless Steel
Doors (outer pan)	18 ga. Stainless Steel
Doors (inner pan)	20 ga. Stainless Steel
- X. Products fabricated by Savannah Industrial Solutions, John Boos, Premier Stainless, Eagle Group, Advance Tabco, or approved equal, modified to comply with specifications, are acceptable.

### 2.3 HEATING EQUIPMENT

- A. Wherever electric heating equipment or thermostat control for such equipment is specified, it shall be complete, and of the materials, size and rating specified within equipment item or details. All such equipment shall be designed and installed to be easily cleaned or to be easily removed for cleaning.
- B. Electrical appliances or heating element circuits of 120 volts shall not exceed 1650 watts, unless specifically shown contrary.

### 2.4 SWITCHES AND CONTROLS

- A. Food Service Equipment Contractor shall supply on each motor driven appliance or electrical heating unit suitable control switch of proper type in accord with Underwriter's Code.
- B. All internal wiring for fabricated equipment items included, all electrical devices, wiring, controls, switches, etc., built into or forming an integral part of these items shall be furnished and installed by Food Service Equipment Contractor in their factory or building site with all items complete to junction box for final connection to building lines by Electrical Contractor.
- C. Provide standard 3-prong plugs to fit "U" slot grounding type receptacles, similar to No. 5262, for all equipment items powered by plugging into 110-120 volts, single phase AC. Also, provide suitable length 3-wire cord for equipment.

## **2.5 CONNECTION TERMINALS**

- A. All equipment shall be complete with connection terminals as standardized by equipment manufacturers, except where specified otherwise.

## **2.6 LOCKS**

- A. Fit all doors for reach-in refrigerated compartments with locking type latches. Provide master keys.

# **PART 3 - EXECUTION**

## **3.1 GENERAL**

- A. Work under this contract and covered under this section of specifications includes but is not limited to:
  - 1. Cutting of holes and/or ferrules on equipment for piping, drains, electrical outlets, conduits, etc. as required to coordinate installation of food service equipment with work of other Contractors on project.
  - 2. Field checking of building and rough-in requirements, and submission of brochures and shop drawings, all as required hereinbefore under "Submittals".
  - 3. Repair of all damage to premises as result of this installation, and removal of all debris left by those engaged in this installation.
  - 4. Having all food service equipment fixtures completely cleaned and ready for operation when building is turned over to Owner with the use of Sanitech chemicals approved for food service use; clean with all-purpose cleaner/germicide/sanitizer.

## **3.2 INSTALLATION PROCEDURES**

- A. Food Service Equipment Contractor shall make arrangements for receiving their custom fabricated and "buy out" equipment and shall make delivery into building as requisitioned by their installation superintendent. They shall not consign any of their equipment to Owner or to any other Contractor unless they have written acceptance from them and have made satisfactory arrangements for the payment of all freight and handling charges.
- B. Food Service Equipment Contractor shall deliver all their custom fabricated and "buy out" equipment temporarily in its final location, permitting Trades to make necessary arrangements for connection of service lines; they shall then move equipment sufficiently to permit installation of service lines, after which they shall realign their equipment level and plumb, making final erection as shown on contract drawings.

- C. All portable or counter mounted equipment weighing more than 25 pounds shall be mounted on 4" stainless steel adjustable legs.
- D. This Contractor shall coordinate their work and cooperate with other trades working at site toward the orderly progress of the project.
- E. Architect or Owner's Agent shall always have access to plant or shop in which custom fabricated equipment is being manufactured, from time contract is let until equipment is shipped, in order that progress of work can be checked, as well as any technical problem which may arise in coordination of equipment with building. Any approval given at this point of manufacture shall be tentative, subject to final inspection and test after complete installation.
- F. Food Service Equipment Contractor shall assist Architect, Owner, and/or Owner's Agent in making any desired tests during or prior to final inspection of equipment; they shall remove immediately any work or equipment rejected by Architect, Owner, and/or Owner's Agent, replacing same with work conforming with contract requirements, and shall reimburse mechanical and/or other contractors involved for extra work made necessary by such replacement.
- G. This Contractor shall keep premises free from accumulation of their waste material and rubbish, and at completion of their work shall remove their rubbish and implements, leaving areas of their work broom clean.
- H. This Contractor shall provide and maintain coverings or other approved protection for finished surfaces and other parts of their equipment subject to damage during and after erection. After removal of protective coverings, all field joints shall be grounded, polished and entire work shall be thoroughly cleaned and polished.

### **3.3 TRIMMING AND SEALING EQUIPMENT**

- A. Seal completely spaces between all units to walls, ceilings, floors, and adjoining (not portable) units with enclosed bodies against entrance of food particles or vermin by means of trim strips, welding, soldering, or commercial joint material best suited to nature of equipment and adjoining surface material.
- B. Close ends of all hollow sections.
- C. Equipment butting against walls, ceilings, floor surfaces and corners to fit tightly against same; backsplashes or risers which fit against wall to be neatly scribed and sealed to wall with Dow Corning # 732 RTV or General Electric clear silicone sealant, wiping excess sealant out of joint to fillet radius. Where required to prevent shifting of equipment and breaking wall seal, anchor item to floor or wall.
- D. Treat enclosed spaces (inaccessible after equipment installation) for vermin prevention in accord with industry practice.

### **3.4 TESTING AND DEMONSTRATION OF EQUIPMENT**

- A. After completion of installation, all equipment using water, gas, and electricity shall be performance inspected and tested by a factory certified service agent, including wet test of hood fire suppression systems, if so required. Food Service Equipment Contractor shall document that these inspections have been performed prior to scheduling demonstrations and Owner acceptance of equipment.

- B. Food Service Equipment Contractor shall arrange to have all manufactured, mechanically operated equipment furnished under this contract demonstrated by authorized representatives of equipment manufacturers, these representatives to instruct Owner's designated personnel in use, care and maintenance of all items of equipment after same are in working order. Demonstration and instruction shall be held on dates designated by Owner.
- C. Food Service Equipment Contractor shall provide a competent service representative to be present when installation is put into operation.

### 3.5 EQUIPMENT HANDLING AND STORAGE

- A. Deliver equipment to site, properly crated and protected, and store in safe place, protected from damage until time for installation.

### 3.6 GUARANTEE

- A. Special Project Warranty: Provide written warranty, signed by manufacturer, agreeing to replace/repair, within warranty period, with inadequate and defective materials and workmanship, including leakage, breakage, improper assembly, or failure to perform as required, provided manufacturer's instructions for handling, installing, protecting, and maintaining units have been adhered to during warranty period. This warranty shall be in addition to, and not limitation of, the rights the Owner may have against the Contractor under the Contract Documents.
- B. Warranty Period:  
1 year minimum from date of Substantial Completion, all new equipment furnished.  
5-year warranty period on refrigeration compressors.  
10-year warranty period on walk-in panels.

### 3.7 OPERATING AND MAINTENANCE MANUALS

- A. After completion of installation, Food Service Equipment Contractor shall present to Owner three sets of all operating and maintenance manuals, covering all mechanically operated equipment furnished under this contract, each set being neatly bound in loose-leaf binder having durable cover.
- B. Include in each binder a list of names, addresses and telephone numbers of local servicing agencies authorized to make necessary repairs and/or adjustments of equipment furnished under this contract.

## PART 4 – EQUIPMENT SCHEDULE

ITEM 01	COLD STORAGE ASSEMBLY	QUANTITY AS SCHEDULED
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Provide prefabricated cold storage room assembly of size and shape shown on plan and detail drawings. Exact overall size to be field verified prior to fabrication.

- A. Insulation:  
Panels shall be insulated with 4” thick urethane, foamed or poured in place using HCPC (no CFC) blowing agent. Foam shall be 2.25 lb. density, 95% closed cell. Panels shall meet STME-84 (UL-723) and be listed by Underwriters laboratories. Panels shall have a maximum flame spread of 25, maximum smoke developed of 450 minimum. Flash ignition of 600 degrees and minimum self-ignition of 800 degrees F.
- B. Coved corners:



- Assembly shall be constructed so that all interior wall, floor, and ceiling intersections shall comply with N.S.F. requirements.
- C. Cam lock fasteners:  
All panel intersections and wall, floor and ceiling intersections shall be secured by cam-lock fasteners connected with 2" wide metal straps set in and surrounded by insulation.
- D. Finishes:  
Exterior and interior finishes shall be as shown on drawings.
- E. Doors:  
Door size and finish shall be as shown on drawings, and shall be furnished complete with sill wiper gasket, and a minimum of 3 spring loaded lift type hinges. Doors to be Super doors with a reinforced 14 ga. U-Channel steel frame, backed with additional 1/8" steel plate drilled and tapped where all hardware is mounted. 3/16" backing on all doors larger than 42" wide. Exterior door to be equipped with automatic door closer. Cooler and Freezer doors to be equipped with perimeter heat. All doors to be equipped with heavy duty padlocking pull-handle lever, with inside safety release.
- F. Thermometers:  
Each compartment to be provided with exterior flush mounted thermometer mounted at eye level to each door. Provide remote read-out for freezer compartment at exterior cooler door.
- G. Lights:  
Each compartment to be furnished complete with manufacturer's standard light fixtures, having protective cover, mounted and pre-wired to switch with pilot light in door section. Extra light fixtures as needed to provide 30-foot candles 30" above floor. Lights to be furnished and installed by this section.
- H. Ceiling panels to be one piece, self-supporting and span full width of assembly when available.
- I. Floor:  
Recessed insulated floor by Food Service Equipment Contractor with .100 diamond tread aluminum.  
Reinforced floor panels to support minimum 1200 pounds per square foot.  
The floor and ceiling shall have maximum length panels to span full length of box, if possible, otherwise stagger joints so there are no common "four corner" intersections and no joints occurring in doorways.
- J. Refrigeration System:  
Shall be furnished by manufacturer as part of cold storage room assembly, provide each compartment with complete refrigeration system sized to maintain appropriate temperature. Provide temperature alarm system with remote read-out and recording capability.  
Condensing units to be air-cooled, remote. Units to have performance and wiring characteristics as scheduled on drawings. Refrigeration systems to be designed for use with R448 refrigerant. Condensing units to be provided with painted galvanized steel all-weather housing, controls, and crankcase heaters, all suitable for outdoor conditions, and located as shown on drawings. Evaporators to be low-silhouette type with adaptive defrost control equal to a Bally SmartVap+controller. Evaporators to be equipped with 2speed EC motors, running full speed while refrigeration is engaged, and running at 1/3 speed while system is pumped down; mounted at locations shown on drawings. Performance and wiring characteristics to be as scheduled on drawings. Condensing units shall be provided with 2 speed EC fan motors, running full speed while refrigeration is engaged and 1/2" speed while ambient temp is below 60 degrees Fahrenheit. Also, the crank case heater will be turned off at an ambient above 60 degrees Fahrenheit.  
The evaporator drain lines are to be provided by this section and extended to floor receptors outside assembly.  
Freezer drain lines to be wrapped with heater cable and insulated with pre-molded foamed plastic insulation suitable for the application. Thickness as recommended by manufacturer.  
Refrigerant lines over 75 feet must be field verified.  
Refrigerant piping to be ACR copper tubing, hard temper, with wrought fittings and silver solder







Provide wire shelving unit with the following features:

- A. Arrange using quantities and sizes as shown on plan drawings
- B. (4) Open grid shelves with epoxy coated steel frames & removable polymer shelf mats
- C. (1) Solid shelf, (4) polymer posts
- D. Antimicrobial product protection
- E. (4) Swivel 5" casters with polyurethane treads (2 braked)

Shelving unit to be as manufactured by Metro, Model No.5Q557EG3, Quantum, or Cambro.

ITEM 04C                   SHELVING UNIT, HYBRID POLY/WIRE                   QUANTITY AS SCHEDULED

Provide wire shelving unit with the following features:

- A. Arrange using quantities and sizes as shown on plan drawings
- B. (4) Open grid shelves with epoxy coated steel frames & removable polymer shelf mats
- C. (1) Solid shelf, (4) polymer posts
- D. Antimicrobial product protection
- E. (4) Swivel 5" casters with polyurethane treads (2 braked)

Shelving unit to be as manufactured by Metro, Model No.5Q537EG3, Quantum, or Cambro.

ITEM 05                   POT & PAN SHELVING RACK                   QUANTITY AS SCHEDULED

Provide drying rack unit with the following features:

- A. 48"W x 24"D x 68"H
- B. (4) Shelves solid embossed SS
- C. (4) Polymer swivel casters (2 with brakes)

Drying rack unit to be as manufactured by Metro, Model No. PR48ES, Eagle, or Cambro.

ITEM 06                   PROOFER CABINET, MOBILE                   QUANTITY AS SCHEDULED

Provide proofer cabinet with the following features:

- A. Mobile
- B. Full-size, insulated
- C. Convection holding
- D. Accommodates (14) 18" x 26" sheet pans or (28) 13" x 18" sheet pans or (28) 12" x 20" hotel pans
- E. Load limit 65 lbs. (29.25 kg) per rack
- F. (2) Field reversible hinged solid dutch doors
- G. Magnetic door handle
- H. Membrane control
- I. HACCP temperature downloads
- J. CVap technology
- K. USB port
- L. Manual water fill
- M. Stainless steel interior & exterior
- N. Voltage as scheduled, cord and plug
- O. Caster mounted

Proofer cabinet to be as manufactured by Winston Foodservice, Model No. HOV3-14UV, Alto-Shaam, or Cres-Cor.

ITEM 07                   WORK TABLE, S/S TOP                   QUANTITY AS SCHEDULED

Provide work table with the following features:

- A. 108"W x 30"D
- B. 14 Gauge 304 stainless steel top with non-drip edge
- C. Adjustable stainless steel undershelf



## ITEM 12 FOOD SLICER, ELECTRIC QUANTITY AS SCHEDULED

Provide food slicer with the following features:

- A. Automatic, single speed
- B. Adonized aluminum finish, carriage & knife cover
- C. Medium duty, angled feed
- D. 13" Chrome plated knife
- E. Carriage & gauge interlocks, no volt release
- F. Poly-v belt drive system
- G. Top mounted sharpener
- G. Voltage as scheduled, cord and plug

Food slicer to be as manufactured by Hobart, Model EDGE13A-11, Globe, or Berkel.

## ITEM 13 FOOD PROCESSOR, BENCHTOP QUANTITY AS SCHEDULED

Provide food processor with the following features:

- A. Includes: vegetable prep attachment with kidney shaped & cylindrical hopper (no bowl)
- B. (1) 3MM grating disc
- C. (1) 3MM slicing disc
- D. Stainless steel base
- E. Single speed 425 RPM
- F. Voltage as scheduled, cord and plug

Food processor to be as manufactured by Robot Coupe, Model No. CL50EULTRA, or approved equal.

~~ITEM 14 PLANETARY MIXER QUANTITY AS SCHEDULED~~

—

~~Provide bench type mixer with the following features:~~

- ~~A. Stainless steel bowl, beater, whip & spiral dough arm~~
- ~~B. 20-Quart~~
- ~~C. Three (3) fixed speeds plus stir speed~~
- ~~D. Gear driven transmission~~
- ~~E. 15-minute timer~~
- ~~F. #12 taper hub~~
- ~~G. Manual bowl lift~~
- ~~H. Stainless steel bowl guard~~
- ~~I. ½ HP~~
- ~~J. Voltage as scheduled, cord and plug~~
- ~~K. Equipment stand~~

~~Mixer to be as manufactured by Hobart, Model HL200-1STD, Globe, or Univex.~~

## ITEM 14 NOT USED (CD REVISION 12/13/24)

## ITEM 15 REACH-IN REFRIGERATOR QUANTITY AS SCHEDULED

Provide reach-in refrigerator with the following features:

- A. Two-section
- B. 49-5/8"W
- C. 48.0 cu ft Capacity
- D. Self-contained bottom mounted refrigeration
- E. (2) Full-height solid hinged self-closing field reversible doors (locking), hinged left & right
- F. (6) Epoxy coated wire shelves
- G. Height adjustable clips
- H. Digital controls with LED display

- I. Auto defrost
  - J. LED interior lighting
  - K. Stainless steel interior, stainless steel front & sides, galvanized steel top, bottom & rear
  - L. (2) Leg stabilizers
  - M. (4) 5" Swivel casters (2 locking)
  - N. Voltage as scheduled, cord and plug
- Reach-in refrigerator to be as manufactured by Everest Refrigeration, Model No. EBSR2, Continental, or Beverage Air.

ITEMS 16-17 NOT USED

ITEM 18 WORK TABLE, S/S TOP QUANTITY AS SCHEDULED

Provide work table with the following features:

- A. 60"W x 30"D
- B. 14 Gauge 304 stainless steel top with 5"H backsplash
- C. Stainless steel legs with side & rear crossrails
- D. Adjustable stainless steel bullet feet
- E. Drawer assembly, centered
- F. Capping strip

Work table to be as manufactured by Advance Tabco, Model TKSS-305, Eagle, or Premier Stainless.

ITEM 19 INGREDIENT BIN QUANTITY AS SCHEDULED

Provide ingredient bin with the following features:

- A. Mobile
- B. 27 Gallon capacity
- C. 1-Pc seamless polyethylene bin
- D. 2-Pc sliding polycarbonate lid
- E. S-hook on front (scoop NOT included)
- F. (4) 3" Heavy duty casters (2 front swivel, 2 fixed)
- G. White with clear cover

Ingredient bin to be as manufactured by Cambro, Model No. IBS27148, Carlisle, or Rubbermaid.

ITEM 20 WORK TABLE, S/S TOP QUANTITY AS SCHEDULED

Provide work table with the following features:

- A. 48"W x 30"D
- B. 14 Gauge 304 stainless steel top with 5"H backsplash
- C. 18 Gauge stainless steel adjustable undershelf
- D. Stainless steel legs with stainless steel bullet feet
- E. Capping strip

Work table to be as manufactured by Advance Tabco, Model KSS-304, Eagle, or Premier Stainless.

ITEM 21 WORK TABLE, S/S TOP QUANTITY AS SCHEDULED

Provide work table with the following features:

- A. 60"W x 30"D
- B. 14 Gauge 304 stainless steel top with 5"H backsplash
- C. Stainless steel legs with side & rear crossrails
- D. Adjustable stainless steel bullet feet
- E. Capping strip

Work table to be as manufactured by Advance Tabco, Model TKSS-305, Eagle, or Premier Stainless.

ITEMS 22-23 NOT USED  
ITEM 24 EXHAUST HOOD QUANTITY AS SCHEDULED

Provide island mount type canopy exhaust hood of size, shape and content as shown on detail drawings, having the following features:

- A. All exposed surfaces of 18-gauge 430SS, 12 to 20-gauge stainless steel construction
- B. N.F.P.A. 96 construction, including all joints and seams welded externally, continuous, and liquid tight
- C. 5/8" diameter hanger rods to structural ceiling, approximately 96" on center
- D. Stainless steel high-efficiency baffle type U.L. classified grease extracting filters, with handles
- E. Integral grease gutter sloped to drain to grease receptacle
- F. Vapor-proof U.L. listed recessed LED light fixtures
- G. Coordinated installation of fire suppression system as specified for Item 25
- H. Integral make-up air plenum along front as shown
- I. Provide spacer frame to allow passage of utility chase between hood sections and stainless-steel trim on bottom and ends
- J. Removable stainless steel perimeter trim and/or closure panels from top of hood to ceiling
- K. Food Service Equipment Contractor shall provide and install any secondary supporting members required to suspend exhaust hoods. Hood supports shall include seismic bracing, if required, installed in accord with SMACNA guidelines
- L. Fire suppression cabinet with pre-wire control package and switches with variable speed control fan.

Exhaust hood to be as manufactured by Captive-Aire, Model ND2-PSP, Gaylord, or Avtec.

ITEM 25 FIRE SUPPRESSION SYSTEM QUANTITY AS SCHEDULED

Provide automatic wet chemical fire suppression system as required to protect exhaust hood, Item 24, and the cooking equipment located under this hood, and having the following features:

- A. All tanks, control heads, piping, relays, cable, fusible links, nozzles, elbows, etc., as required for complete system
- B. Brass nozzles and chrome plated or sleeved exposed piping
- C. Manual strike mechanism in accessible location
- D. Installation in accord with N.F.P.A. 17A code requirements and coordinate with exhaust hood construction and installation
- E. Four contacts for use by E.C., one contact for alarm, one for supply fan shut-off, one for shunt trip actuation, and one spare
- F. Provide mechanical gas solenoid valve loose for installation by plumber

Fire suppression system to be as manufactured by Ansul, Model R-102, Pyro-chem, or Range Guard.

ITEM 26 UTILITY DISTRIBUTION SYSTEM QUANTITY AS SCHEDULED

Provide island utility chase to serve items under exhaust hood, having the following features:

- A. Type 18-gauge 330 stainless steel construction.
- B. Unit(s) shall be UL/ETL listed.
- C. Breaker panel factory installed in end riser for single point field connection.
- D. Designed to include electrical wireway system. Each appliance to be fed from the individual breakers which are wired to each receptacle located along the raceway.
- E. All outlets shall provide moisture resistant covers and have been sized per NEMA standards. Each is supplied with a matching cord and plug set if these are not already supplied by the equipment manufacturer.
- F. The plumbing riser shall house manual shut-off valves for each incoming main supply line located in the UDS. The plumbing manifolds shall be provided with stub-outs along the raceway



- for the individual plumbing connections. Each stub-out shall be equipped with a manual shut-off valve.
- G. The plumbing compartment shall be completely isolated from the electrical with all piping labeled. Hot and cold water and steam supply and return manifolds shall be insulated.
  - H. Gas and water quick-disconnects to be provided for connection to equipment.
  - I. Gas shut-off valve to come installed in UDS.
  - J. Length as shown on drawings, with utilities coming from above.
  - K. Lift out doors shall provide easy access to risers. Removeable panels provided along the length of the raceway shall allow access to either plumbing or electrical compartments.
  - L. Note: Cord and plugs must not interfere with placement of equipment.
  - M. UDS must comply with all national and local code standards.
- Utility chase to be as manufactured by Captive-Aire, Model UDI, Gaylord, or Avtec.

ITEM 27A                      COMBI OVEN, ELECTRIC    QUANTITY AS SCHEDULED

Provide combi-oven with the following features:

- A. Electric
- B. Boilerless
- C. (6) 18"x26" Full sheet pan or (12) 12" x 20" x 1" hotel pan capacity
- D. 20 Stages each, with 399 cooking recipes storage
- E. (4) Cooking modes: hot air, steam, combi-steam & retherm
- F. Disappearing door, triple pane door with anti-microbial hygienic door handle, hinged on right
- G. 10" Wi-Fi-ready, high resolution control panel
- H. LED lights
- I. Multi-point core temperature probe
- J. Five-speed auto reversing fan
- K. Includes (3) wire shelves
- L. Pull-out spray hose
- M. Fully automatic hands-free cleaning system
- N. Stainless steel construction
- O. Water filter, backflow preventer
- P. Ventless, no hood required
- Q. Voltage as scheduled, direct connection

Combi-oven to be as manufactured by Convotherm, Model No. C4 ET 6.20EB-N, Alto-Shaam, or Cleveland.

ITEM 27B                      COMBI OVEN, ELECTRIC    QUANTITY AS SCHEDULED

Provide combi-oven with the following features:

- A. Electric
- B. Boilerless
- C. (10) 18"x26" Full sheet pan or (20) 12" x 20" x 1" hotel pan capacity
- D. 10" Wi-fi ready, high resolution control panel with 399 cooking recipes storage
- E. (4) Cooking modes: hot air, steam, combi-steam & retherm
- F. Triple pane right hinged door with anti-microbial hygienic door handle
- G. LED lights
- H. Multi-point core temperature probe
- I. Five-speed auto reversing fan
- J. Includes (5) wire shelves
- K. Pull-out spray hose
- L. Fully automatic hands-free cleaning system
- M. Stainless steel construction
- N. Water filter, backflow preventer



- O. Stacking kit, caster mounted
  - P. Voltage as scheduled, direct connection
- Combi-oven to be as manufactured by Convotherm, Model No. C4 ET 10.20EB-N, Alto-Shaam, or Cleveland.

ITEM 28                    CONVECTION OVEN, ELECTRIC                    QUANTITY AS SCHEDULED

Provide convection oven with the following features:

- A. Double-deck
- B. Standard depth
- C. Capacity (5) 18" x 26" pans per compartment
- D. Solid state infinite controls, top & bottom oven
- E. 2-Speed fans, interior light
- F. Dependent glass doors
- G. Vent connector
- H. Stainless steel front, sides & top
- I. Low profile casters
- J. Voltage as scheduled, (2) direct connections

Convection oven to be as manufactured by Blodgett, Model ZEPH-100-E DBL, Cleveland, or Alto-Shaam.

ITEM 29                    CONVECTION STEAMER, ELECTRIC                    QUANTITY AS SCHEDULED

Provide convection steamer having the following features:

- A. Boilerless
- B. Double stacked
- D. On ES26304066E equipment stand
- E. (6) Full size pan capacity
- F. 60-Minute electro-mechanical timer & manual (continuous steaming) bypass switch
- G. Left-hand hinged door
- H. Controls on right
- I. Automatic drain & water level controls
- J. Clean shield interior
- K. Standard treated & tap water connection
- L. Stainless steel exterior
- M. 4" Adjustable legs with flanged feet
- N. Voltage as scheduled, (2) direct connections
- O. Water filter, back flow preventer
- P. Drain cooling kit

Convection steamer to be as manufactured by Cleveland, Model No. (2) 22CET66.1, Accu-Temp, or Groen.

ITEM 30                    TILTING SKILLET, ELECTRIC                    QUANTITY AS SCHEDULED

Provide tilting skillet braising pan with the following features:

- A. 30-Gallon capacity
- B. Bead blasted cooking surface
- C. 10° Tilt cooking feature, power tilt
- D. Power tilt, with hand tilt override
- E. Spring-assisted cover with vent, gallon & liter markings
- F. Stainless steel construction with open leg frame
- G. Voltage as scheduled, direct connection
- H. Single pantry faucet, with mounting bracket and 60" hose

Tilted skillet to be as manufactured by Cleveland Range, Model No. SGL30T1, or Cleveland, or Garland.

ITEM 31 FLOOR TROUGH QUANTITY AS SCHEDULED

Provide floor trough with the following features:

- A. 36"W x 18"D, 6" deep receptacle
- B. (1) 4" OD tailpiece
- C. Stainless steel beehive strainer
- D. 14/304 Stainless steel
- E. Brushed satin finish
- F. Pultruded fiberglass grating

Floor trough to be as manufactured by IMC/Teddy, Model ASFT-1836-PFG, Eagle Group, or SPG.

ITEMS 32-33 NOT USED

ITEM 34 ICE MAKER, CUBE STYLE QUANTITY AS SCHEDULED

Provide ice maker with the following features:

- A. 22"W
- B. Air-cooled
- C. Self-contained condenser
- D. Production capacity up to 489 lb/24 hours at 70°/50°
- E. Crescent cube style
- F. Stainless steel finish
- G. R-404A refrigerant
- H. Voltage as scheduled, direct connection
- I. Water filtration system
- J. Backflow prevention device

Ice maker to be as manufactured by Hoshizaki, Model No. KM-350MAJ, Manitowoc, or Scotsman.

ITEM 34.1 ICE BIN QUANTITY AS SCHEDULED

Provide ice bin having the following features:

- A. 30"W  
with 8" top kit
- B. Top-hinged front-opening door
- C. 500-lb Ice storage capacity
- D. For top-mounted ice maker
- E. Stainless steel exterior
- F. 6" Legs included
- G. Antimicrobial protection

Ice bin to be as manufactured by Hoshizaki, Model No. B-500SF, Manitowoc, or Scotsman.

ITEM 35 HOSE REEL QUANTITY AS SCHEDULED

Provide hose reel assembly having the following features:

- A. Open stainless steel
- B. 50 Ft. of 3/8" hose
- C. Front trigger water gun with swivel
- D. Vacuum breaker
- E. 3/8" NPT flexible water connector
- F. 8" wall mount faucet and control valve
- G. Backflow preventer

Hose reel to be as manufactured by T&S Brass B-7142- C1MXS2E, Fisher, or approved equal.

ITEM 36                    BUSSING UTILITY CART                    QUANTITY AS SCHEDULED

Provide utility cart with the following features:

- A.     3-Tier
- B.     19"W x 33"D x 32"H
- C.     1" Upturn on all sides of all shelves
- D.     12-1/2" Shelf clearance
- E.     (1) Push handle
- F.     Angle legs include bumpers
- G.     500 Lbs. capacity
- H.     430 Stainless steel all welded construction
- I.     4" Casters

Utility cart to be as manufactured by Eagle Group, Model UUC-322, John Boos, Lakeside.

ITEM 37                    NOT USED

ITEM 38                    THREE (3) COMPARTMENT SINK                    QUANTITY AS SCHEDULED

Provide three compartment sink with the following features:

- A.     With left & right-hand drainboards
- B.     24" Front-to-back x 24"W sink compartments 11" Deep, (3) lever drains
- C.     11"H backsplash
- D.     Stainless steel legs with adjustable left-to-right and front cross rails
- E.     36" Left & right drainboards
- F.     14 Gauge 304 stainless steel
- G.     1" Adjustable bullet feet
- H.     T&S B-0231 wall mount faucet, 12" swing
- I.     T&S B-0133-01-CR wall mount pre-rinse unit, with 14" add-on faucet
- J.     (2) Wall mount sorting shelves

One compartment sink to be as manufactured by Advance Tabco, Model 94-43-72-36RL, Eagle, or Premier Stainless.

ITEM 39                    SOILED DISHTABLE, "L" SHAPED                    QUANTITY AS SCHEDULED

Provide soiled dishtable with the following features:

- A.     L-shaped, fabricate as detailed
- B.     Attaches to right of dish machine operator
- C.     10-1/2" H Backsplash
- D.     With pre-rinse sink, lever drain
- E.     Stainless steel legs, with stainless steel crossrails
- F.     119" Long
- G.     14/304 Stainless steel
- H.     Pre-rinse basket with slide bar
- J.     Pass window as detailed with accommodations for roll down door

Soiled dishtable to be as manufactured by Advance Tabco, Model DTS-K30-120R, Eagle, or Premier Stainless.

ITEM 40                    DISHWASHER, CONVEYOR TYPE                    QUANTITY AS SCHEDULED

Provide dishwasher with the following features:

- A.     Single tank

- B. (202) Racks/hour
- C. Insulated hinged doors
- D. .62 Gallon/rack
- E. Stainless steel enclosure panels
- F. Microprocessor controls with low temperature & dirty water indicators
- G. NSF Pot & Pan mode
- H. Programable de-lime notification
- I. Electric tank heat 15kW
- J. Built-in integral 30kW electric booster
- K. Drain water tempering kit
- L. Voltage as scheduled, dual point direct connections
- M. Right to left operation
- N. R/L direct drive unload series
- O. Drain water tempering kit
- P. Table limit switch

Dishwasher to be as manufactured by Hobart, Model CL44EN-BAS+BUILDUP, Champion, or CMA Dishmachines.

ITEM 40.1 PANT LEG HOOD & VENT DUCT QUANTITY AS SCHEDULED

Provide pantleg duct with the following features:

- A. 56"W x 16"D x 52"H
- B. Fits 44" conveyor dish machines that include vent cowls (4" x 16")
- C. Includes: stainless steel pantleg duct & ceiling trim ring (10" x 10")

Dishwasher duct to be as manufactured by Avtec, Model No. SSA-PANTLEG44, John Boos, Premier Stainless.

ITEM 41 CLEAN DISHTABLE QUANTITY AS SCHEDULED

Provide clean dishtable with the following features:

- A. Straight design, fabricate as detailed
- B. Attaches to left of dish machine operator
- C. 10-1/2"H Backsplash
- D. 3" Rolled front & side rims
- E. Stainless steel legs & crossrails
- F. 71"W x 30"D
- G. 14/304 Stainless steel
- H. Table limit switch provision
- I. Sorting shelf, 42"W

Clean dishtable to be as manufactured by Advance Tabco, Model DTC-S30-72L, Eagle, or Premier Stainless.

ITEM 42 NOT USED

ITEM 43 MILK COOLER QUANTITY AS SCHEDULED

Provide milk cooler with the following features:

- A. Cold wall, normal temperature
- B. 49"W x 30-5/8"D x 41-1/8"H
- C. 20.32 Cu. ft.
- D. Single access
- E. Exterior digital thermometer
- F. (12) 13" x 13" x 11" or (8) 19" x 13" x 11" Case capacity

- G. Self-latching doors/lids with safety bumpers
- H. Cylinder lock
- I. Wire floor racks
- J. Floor drain
- K. Electronic control, automatic defrost
- L. Stainless steel interior & exterior
- M. R290 Hydrocarbon refrigerant
- N. Caster mounted
- O. Voltage as scheduled, cord and plug

Milk cooler to be as manufactured by Beverage Air, Model No. SM49HC-S, Continental, or Hoshizaki.

ITEM 44                      SERVING COUNTER, HOT FOOD                      QUANTITY AS SCHEDULED

Provide hot food serving counter with the following features:

- A. Electric
- B. 5-Pan capacity
- C. Stainless steel construction
- D. Dry storage compartments, double door
- E. Caster mounted
- F. 1/2" Drain(s) for hot food wells plumbed to common valve
- G. 36" Standard height
- H. Voltage as scheduled, cord and plug
- I. Laminate base, verify finishes with Interior/Architect
- J. Sneeze guard, with LED light
- K. Line-up lock, toe plates
- L. Tray slide, drop-down
- M. Work shelf, fold-down

Hot food serving counter to be as manufactured by Delfield, Model No. SH-5-NU, Duke, or Piper.

ITEM 45                      SERVING COUNTER, COLD FOOD                      QUANTITY AS SCHEDULED

Provide serving counter with the following features:

- A. 4-Pan size accommodates 6" deep pans
- B. Drain with valve
- C. 18 Gauge stainless steel base
- D. Caster mounted
- E. Eutectic fluid self-contained refrigeration
- F. R290 Hydrocarbon refrigerant
- G. 36" Standard height
- H. Voltage as scheduled, cord and plug
- I. Laminate base, verify finishes with Interior/Architect
- J. Sneeze guard, with LED light
- K. Line-up lock, toe plates
- L. Tray slide, drop-down
- M. Work shelf, fold-down
- N. Modified 14" Top extension

Serving counter to be as manufactured by Delfield, Model No. SCSC-60-EFP, Duke, or Piper.

ITEM 46                      SERVING COUNTER, UTILITY                      QUANTITY AS SCHEDULED

Provide serving counter with the following features:

- A. 60" long
- B. 14-Gauge stainless steel counter top



- C. Auger agitator dispensing
  - D. Stainless steel exterior
  - E. 4" Legs standard
  - F. Voltage as scheduled, cord and plug
  - G. Water filter
  - H. Backflow prevention device.
- Ice and water dispenser to be as manufactured by Hoskizaki, Model No. DM-4420N, Ice-O-Matic, or Scotsman. (CD REVISIONS 12/13/24)

**ITEM 51                      WORK TABLE    QUANTITY AS SCHEDULED**

Provide worktable having the following features:

- A. 36"W x 36"D
- B. 14 Gauge 304 stainless steel top with countertop non drip edge
- C. Stainless steel legs with side & rear cross rails
- D. Adjustable stainless steel bullet feet

Worktable to as manufactured by Advance Tabco, Model No. TVSS-363, Eagle, or Premier Stainless. (CD REVISIONS 12/13/24)

**END OF SECTION 114000**





## SECTION 11 52 13

### PROJECTION SCREENS

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
  - 1. Electrically operated projection screens.
- B. Related Sections:
  - 1. Section 04 20 00 - Unit Masonry: Substrate for screens mounted at unit masonry construction.
  - 2. Section 09 21 16 - Gypsum Board Assemblies: Substrate for screens mounted at gypsum board assembly construction.
  - 3. Section 09 51 13 - Acoustical Panel Ceilings: Substrate for screens mounted at acoustical panel ceiling construction.
  - 4. Division 26: Electrical characteristics and wiring connections, and electrical service to main disconnect and control unit.

##### 1.2 REFERENCES

- A. National Fire Protection Association (NFPA):
  - 1. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films; 2023, with Errata.
- B. Underwriters Laboratories Inc. (UL):
  - 1. UL (DIR) - Online Certification Directory; Current Edition.

##### 1.3 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Prior to fabrication, coordinate screen system dimensions, mounting components, and operational requirements to interface with adjacent construction elements such as ceilings, walls, and suspensions systems.
  - 1. For screens with electrical requirements, coordinate electrical service requirements with available electrical service and locations for screen operation switch controls.
- C. For screen case concealed above finish ceiling, coordinate installation with ceiling finishes and screen case finish trim.

##### 1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit manufacturer's product data on components, materials, finishes, and operation of units.
  - 1. For screens with electrical requirements, include electrical requirements.
- C. Shop Drawings: Submit drawings indicating locations, dimensions, and details for supporting, mounting, and anchoring screens to building structure. Include components and finish details for interface with adjacent construction.
  - 1. For screen with electrical requirements:
    - a. Include manufacturer's wiring diagram and locations for operating switches.
    - b. Indicate verified electrical service requirements for motor adequate for screen size and operation.

- D. Samples: Submit samples illustrating manufacturer's full range of colors and finishes available. Submit for Architects selection.
- E. Manufacturer's Installation Instructions: Submit detailed installation instructions including rough-in measurements.
- F. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

### **1.5 CLOSEOUT SUBMITTALS**

- A. Section 01 77 00 - Closeout Procedures: Requirements for submittals.
- B. Operation and Maintenance Data:
  - 1. Submit parts catalog with complete list of equipment replacement parts; identify each entry with equipment description and identifying code.
  - 2. Submit technical information for servicing operating equipment.

### **1.6 QUALIFICATIONS**

- A. Manufacturer: Company specializing in manufacturing Products specified in this Section with minimum three (3) years documented experience.
- B. Installer: Company specializing in performing work of this Section with minimum three (3) years documented experience.

### **1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Deliver projection screens after building is enclosed, other work within spaces where screens are to be installed is substantially complete, and installation of screens is ready to take place.
- C. Protect projection screens from damage before, during and after installation.

### **1.8 WARRANTY**

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Manufacturer's Warranty: Provide five (5) manufacturer's warranty executed by authorized company official. Manufacturer's warranty is in addition to, and does not limit, other rights Owner may have under Contract Documents.
  - 1. Warrant the manufacturer's products to be free from defects in materials and workmanship for the warranty period from the date of project substantial completion.

## **PART 2 PRODUCTS**

### **2.1 CHARACTERISTICS - GENERAL**

- A. Flame Resistant: Screen material passes when tested in accordance with NFPA 701, Test 1 or Test 2.
- B. Mildew resistant; washable with mild soap and water solution.
- C. Screen system deployment and retraction operation is to be smooth and without binding.

### **2.2 PROJECTION SCREEN - ELECTRIC MOTOR OPERATED**

- A. Manufacturers:
  - 1. Draper, Inc.

2. Da-Lite Screen Co., Inc.
  3. Stewart Filmscreen Corp.
  4. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design:
1. Draper, Inc.. – Ultimate Access XL V
- C. Location:
1. Auditorium Stage - One (1) screen required..
- D. Mounting Configuration: Installation to be anchored and supported to building structure.
1. As indicated on Drawings.
  2. Concealed Type (recessed); bottom to be flush to finished ceiling with finish trim; components above ceiling to be plenum rated.
    - a. Factory manufactured and finished trim for flush installation to surrounding ceiling construction type. Finish of trim and exposed bottom of case and doors to be black.
- E. Screen Case: Factory constructed; protection against dust and debris infiltration; maximum noise free operation; and suited for mounting configuration.
1. Bottom Panel:
    - a. Automatic open and close bottom door operation; removable for service.
  2. Color of screen case, hardware, and all exposed installation components to be black.
- F. Screen Viewing Surface: To be seamless and as follows.
1. Front projection optical performance:
    - a. Gain of 1.0 minimum; Half-Gain Angle of 85 degrees minimum.
      - 1) Basis of Design: Draper – Matt White XT1000V.
  2. Viewing Area:
    - a. 135 inches high x 216 inches wide; 16:10 Aspect Ratio.
    - b. Add additional drop to meet screen total length.
- G. Screen Total Length: Vertical dimension from bottom of screen roller case to bottom of bottom weighted rail.
1. Screen total length to be as required to deploy screen to within 3 feet of finished floor. Refer to Drawings. Adjust fully open stop position accordingly.
- H. Screen Material Edges:
1. Top edge to be mounted on, and securely anchored to, rigid metal roller supported by self-aligning bearings in brackets.
  2. Bottom edge to be mounted into extruded metal tubular bar with concealed added weight to provide vertical tension on screen surface; finish to match screen case; provide closure end caps.
  3. Sides to have integral screen tensioning cable system. Tab guide cable tensioning system to maintain even lateral tension and hold viewing surface flat.
  4. Screen Edge Borders and Top Extension:
    - a. Bottom and both sides to be black masking border.
    - b. Area from top of viewing area and extending upward into screen case:
      - 1) Area to be black masking area.
- I. Control Stations:
1. One for each screen; location as indicated on Drawings.
- J. Provide all installation support members and hardware required for anchor and support projection screen system to building structure.

### 2.3 ELECTRICAL CHARACTERISTICS AND COMPONENTS

- A. Electrical Characteristics: Comply with Division 26 - Electrical provisions.
- B. Electrical Components: Provide components listed and classified by UL (DIR) as suitable for the purpose specified and indicated, and as required for fully operational installation.
- C. Motor: 120 volts, single phase, 60 Hz; pre-wired; sufficient for smooth and quiet operation.
  - 1. Instant reversing, gear drive motor of size and capacity recommended by screen manufacturer, with permanently lubricated ball bearing, automatic thermal overload protection, preset limit switches to automatically stop screen in UP and DOWN position, and positive stop action to prevent coasting; remotely controlled as indicated on Drawings.
  - 2. Motor housed within rigid metal roller.
- D. Disconnect Switch: Factory mount disconnect switch on equipment.
- E. Screen Control Station(s): Electric, 3-position, keyed control switch for each screen with metal device box and cover plate for flush wall mounting and for connection to electric power supply.
- F. Remote Control: Hand-held, wireless battery operated device.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify rough-in opening and conditions are acceptable.
- C. Verify electrical power service is available and of correct characteristics.

### 3.2 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install projection screens at location indicated on Drawings.
- C. For screen cases concealed above finish ceiling, coordinate installation with ceiling finishes and screen case finish trim.
- D. Anchor and support installation to building structure.
- E. Install screens as to produce smooth and quiet operations, plumb and straight vertical edges, and plumb and flat viewing surfaces when screen is deployed.
- F. For screens with electrical requirements, install electrical connections and control switches.
  - 1. Test electrically operated units to verify screen controls, limit switches, closure and other operating components are in optimum functioning conditions.

### 3.3 ADJUSTING

- A. Section 01 73 00 - Execution: Starting, testing, adjusting, and balancing.
- B. Adjust installed unit for smooth and balanced operation.

### 3.4 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work and comply with manufacturer's recommendations.

- B. Remove protective coverings from finished surfaces. Clean surfaces and components ready for inspection.

### **3.5 PROTECTION OF FINISHED WORK**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect work from damage and do not permit use of projection screens after installation.

### **3.6 DEMONSTRATION AND TRAINING**

- A. Section 01 79 00 - Demonstration and Training: Provide demonstration and training to the Owner regarding operation and maintenance of component of the installed Work.

**END OF SECTION**



## SECTION 11 53 00

### LABORATORY EQUIPMENT

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
  - 1. Corrosives and acids storage cabinets.
  - 2. Flammables storage cabinets.
  - 3. Laboratory refrigeration units.
  - 4. Accessories.

##### 1.2 REFERENCES

- A. Environmental Protection Agency (EPA).
- B. Factory Mutual (FM).
- C. International Code Council (ICC):
  - 1. ICC (IFC) - International Fire Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. National Fire Protection Association (NFPA):
  - 1. NFPA 1 - Fire Code; 2024.
  - 2. NFPA 30 - Flammable and Combustible Liquids Code; 2024.
- E. Underwriters Laboratories Inc. (UL):
  - 1. UL (Dir) - Online Certification Directory; Current Edition.
- F. US Department of Labor - Occupational Safety and Health Act (OSHA).

##### 1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
  - 1. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
  - 2. Coordinate requirements of this Section with any utilities, alarms, or grounding connection requirements that may be required.

##### 1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data and drawings indicating compliance with product specifications Regulatory Requirements indicated in this Section.
- C. Manufacturer's Installation Instructions: Indicate special installation criteria and interface with adjacent components.

##### 1.5 QUALIFICATIONS

- A. Manufacturer Qualifications: Company specializing in manufacturing Products specified in this Section with minimum five (5) years documented experience.
- B. Installer Qualifications: Company specializing in performing work of this Section and with minimum three (3) years documented experience.

**1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Deliver products in manufacturer's original packaging. Store materials in a dry, protected, well-vented area. Inspect product upon receipt and report damaged material immediately to delivering carrier and note such damage on the carrier's freight bill of lading.

**1.7 WARRANTY**

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Manufacturer's Warranty: Provide manufacturer's standard ten (10) year warranty for materials and workmanship to be free of defects. Warranty duration to begin with the date of Substantial Completion.

**PART 2 PRODUCTS****2.1 CORROSIVES AND ACIDS STORAGE CABINETS**

- A. Regulatory Requirements:
  - 1. Comply with approvals and requirements of FM, UL, OSHA, NFPA 1, NFPA 30, ICC (IFC), EPA, and authorities having jurisdiction.
- B. Manufacturers:
  - 1. Durham Manufacturing.
  - 2. Global Industrial.
  - 3. Justrite.
  - 4. Labconco.
  - 5. Substitutions: Section 01 60 00 - Product Requirements.
- C. Basis of Design: Justrite - Sure-Grip EX Safety Storage Cabinet.
- D. Storage Cabinet Types:
  - 1. Acid Storage Cabinet:
    - a. Size and Capacity:
      - 1) 65 H x 24 W x 18 D inches. 22 gallons (83 L) capacity.
    - b. Color: As selected by Architect from manufacturer's full range.
  - 2. Base Storage Cabinet:
    - a. Size and Capacity:
      - 1) 65 H x 24 W x 18 D inches. 22 gallons (83 L) capacity.
    - b. Color: As selected by Architect from manufacturer's full range.
- E. Cabinet:
  - 1. Double wall construction; 18 gauge steel.
  - 2. Leakproof seals.
  - 3. Comply with EPA requirements for leakproof spills sump, and not less than 2 inches.
  - 4. Dual vents.
  - 5. Grounding wire connection.
  - 6. Leveling feet.
- F. Cabinet Doors:
  - 1. Double wall construction; 18 gauge steel.
  - 2. Single door for cabinet width of 24 inches or less. Double doors for cabinet width greater than 24 inches.
  - 3. Door hinges to be secured to frame at cabinet side panels.



4. Self-closing doors shut and latch automatically when a fusible link melts at 165° F (74° C) under fire conditions. Self-closing mechanism is to allow obstruction-free access to contents. Coordinated self-closing for double doors.
  5. Three-point self-latching doors.
  6. Door Latch: Recessed with perimeter flange; paddle type pull latch release; lockable cylinder with keys; secondary security lock feature for padlock use.
  7. Factory apply warning labels indicating type of contents and labels as may be required in compliance with Regulatory Requirements.
- G. Shelves: Adjustable locations with adjustable mount brackets.
1. One adjustable shelf for each 18 inches of cabinet overall height.
  2. Shelves designed with slight slope to rear allowing minor spills to drain from rear of shelf to bottom spills sump.
  3. Polyethylene trays attached to galvanized steel shelves and a separate polyethylene liner for the bottom sump, resistant to aggressive chemicals. Liner is to be easily removed for cleaning of drips and leaks.
  4. Provide extra polyethylene work tray that can be secured to cabinet top for a handy work surface.
- H. Fabrication:
1. Fabricate components free of distortion and defects.
  2. Corners and joints to be fully welded and finished prior to application of finish.
- I. Finishes:
1. Epoxy powder coat finish on interior and exterior cabinet surfaces.

## 2.2 FLAMMABLES STORAGE CABINETS

- A. Regulatory Requirements:
1. Comply with approvals and requirements of FM, UL, OSHA, NFPA 1, NFPA 30, ICC (IFC), EPA, and authorities having jurisdiction.
- B. Manufacturers:
1. Durham Manufacturing.
  2. Global Industrial.
  3. Justrite.
  4. Labconco.
  5. Substitutions: Section 01 60 00 - Product Requirements.
- C. Basis of Design: Justrite - Sure-Grip EX Safety Storage Cabinet.
- D. Flammable Storage Cabinet:
1. Size and Capacity:
    - a. 65 H x 24 W x 18 D inches. 22 gallons (83 L) capacity.
  2. Color: Yellow.
  3. Double wall construction; 18 gauge steel.
  4. Leakproof seals.
  5. Comply with EPA requirements for leakproof spills sump, and not less than 2 inches.
  6. Dual vents with flame arresters.
  7. Grounding wire connection.
  8. Leveling feet.
- E. Cabinet Doors:
1. Double wall construction; 18 gauge steel.
  2. Single door for cabinet width of 24 inches or less. Double doors for cabinet width greater than 24 inches.
  3. Door hinges to be secured to frame at cabinet side panels.

4. Self-closing doors shut and latch automatically when a fusible link melts at 165° F (74° C) under fire conditions. Self-closing mechanism is to allow obstruction-free access to contents. Coordinated self-closing for double doors.
  5. Three-point self-latching doors.
  6. Door Latch: Recessed with perimeter flange; paddle type pull latch release; lockable cylinder with keys; secondary security lock feature for padlock use.
  7. Factory apply warning labels indicating type of contents and labels as may be required in compliance with Regulatory Requirements.
- F. Shelves: Adjustable locations with adjustable mount brackets.
1. One adjustable shelf for each 18 inches of cabinet overall height.
  2. Shelves designed with slight slope to rear allowing minor spills to drain from rear of shelf to bottom spills sump.
  3. Galvanized steel shelves.
- G. Fabrication:
1. Fabricate components free of distortion and defects.
  2. Corners and joints to be fully welded and finished prior to application of finish.
- H. Finishes:
1. Epoxy powder coat finish on interior and exterior cabinet surfaces.

### 2.3 LABORATORY REFRIGERATION UNITS

- A. Manufacturers:
1. Labcold.
  2. Liebherr.
  3. Thermo Scientific.
  4. Substitutions: Section 01 60 00 - Product Requirements.
- B. Refrigerator/Freezer Units.
1. Basis of Design:
    - a. Liebherr - LCexv 4010.
  2. Vertical standing unit with lockable self-closing doors to each refrigerator and freezer compartments.
  3. Spark-free interior compartments.
  4. Volume Capacity:
    - a. Refrigerator Capacity: Minimum 200 L (7.0 cu ft).
    - b. Freezer Capacity: Minimum 50 L (1.76 cu ft).
  5. Locations: As indicated on Drawings.

### 2.4 ACCESSORIES

- A. Goggles Storage Cabinet:
1. Basis of Design: Sellstrom - S90494 Germicidal Cabinet.
  2. Germicidal goggles and safety glasses sanitizing cabinet.
  3. Temperature Range: 0 to 40 degrees C. Maximum relative humidity 80 percent for temperatures up to 31 degrees C, decreasing linearly to 50 percent relative humidity at 40 degrees C.
  4. Listed UL (DIR).
  5. Electrical: 120V, 60hz; integrated 10 amp fuse protection against electrical overload.
  6. Controller: Automatic 5 minute timer control.
  7. Cabinet: 22 gauge steel; surface mounted type; white baked enamel.
  8. Goggle Racks: 8 shelf racks; 0.187 steel wire; white baked enamel.
  9. Capacity: 40 goggles.
  10. Lock: Stainless steel; vandal-resistant; keyed to laboratory casework master key.

- B. Fire Blanket and Cabinet:
  - 1. Basis of Design:
    - a. Larsen - FB 1016 Series, standard cabinet (16W x 10H x 8D inches).
  - 2. Cabinet: 22 gauge steel; surface mounted type; red baked enamel.
  - 3. Blanket: 62 x 80 inches; wool and complying with 16 CFR 1610.
- C. Wall Hooks: Wall mounted upper and lower pronged hook for lab coats and other articles.
  - 1. Basis of Design: Spectrum Plastics, Ltd. - Toughook.
  - 2. Coordination: Provide concealed solid blocking at wall locations for mounting hooks.
  - 3. Material: Molded nylon-plastic; vandal resistant; unbreakable.
  - 4. Size and Shape: Curved design with hook at top and at bottom.
    - a. 16W x 120H x 32D millimeters (0.63W x 4.73H x 1.25D inches).
  - 5. Mounting: Each hook to be wall mounted with 2 screws through screw holes formed during manufacturing process. Holes to be countersunk for recessing screw heads. Provide stainless steel screws of length required to securely anchor hoods through substrate and into structure or blocking behind substrate.
  - 6. Color: To be selected by Architect from manufacturer's full range.
  - 7. Quantity: One per student.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that field measurements are as required.
- C. Verify that surfaces and conditions are ready to accept the Work of this Section.
- D. Examine products to be installed for damage and other conditions detrimental to completion of the Work.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of Work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.

### **3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install equipment in compliance with the design requirements, regulatory requirements, and manufacturer's recommendations.
- C. Install equipment plumb and level.
- D. Anchor equipment securely in place.
- E. For equipment requires utilities, alarms, or grounding connections, apply connections securely.

### **3.4 ADJUSTING**

- A. Section 01 73 00 - Execution: Starting, testing, adjusting, and balancing.
- B. Adjust operating components to smooth operation without binding.

**3.5 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures.
- B. Clean installed Work in accordance with manufacturer's recommendations including cleaning procedures and materials.

**3.6 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed construction from damage and unauthorized tampering.

**3.7 DEMONSTRATION AND TRAINING**

- A. Section 01 79 00 - Demonstration and Training: Provide demonstration and training to Owner regarding operation and maintenance of the Work of this Section.

**END OF SECTION**

## SECTION 11 61 43

### STAGE CURTAINS

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Section includes fire retardant stage curtains and rigging.
  - 1. The term “curtains” refers to all hanging fabric items indicated in this Section and includes, but is not limited to, curtains, travelers, valances, masking borders, masking legs, cyclorama hangings, etc.
- B. Related Requirements:
  - 1. Section 26 55 61.10 - Auditorium Theatrical Lighting Systems.
    - a. Comply with for requirements for the Theatrical Systems Integrator (TSI) responsibilities indicated in Section 26 55 61.10.

##### 1.2 REFERENCE STANDARDS

- A. Aerospace Industries Association (AIA) - National Aerospace Standard (Metric) (NASM):
  - 1. NASM 16491 - Grommet, Metallic, General Specification For; 2023.
- B. FM Global (FM):
  - 1. FM (AG) - FM Approval Guide; Current Edition.
- C. Intertek Testing Services (ITS):
  - 1. ITS (DIR) - Directory of Listed Products; Current Edition.
- D. National Fire Protection Association (NFPA):
  - 1. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films; 2023, with Errata.
- E. Military and Government Specs & Standards (Naval Publications and Form Center) (NPFC):
  - 1. NPFC - RR-C-271 - Chains And Attachments, Carbon And Alloy Steel; 2021 - Revision H, Amendment 2022.
- F. Underwriters Laboratories (UL):
  - 1. UL (DIR) - Online Certification Directory; Current Edition.

##### 1.3 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate structural and other requirements of this Section with other related construction elements.
- C. Coordinate support and anchorage requirements with building construction elements required to provide adequate support and anchorage locations.

##### 1.4 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this Section. Review the work requirements, project conditions, sequencing, application procedures, quality control, testing and inspection and production schedule.

##### 1.5 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Provide for each type of product as follows:
  - 1. Stage Curtains: Provide information on type of curtain, weight, location for use on project, and type of flame retardancy.
  - 2. Tracks: Provide capacity of each curtain track to support curtain weight and control curtain operation.
  - 3. Electric Curtain Operators: Provide rated capacities, operating characteristics, and electrical characteristics.
- C. Shop Drawings: Indicate installation information for components not dimensioned or detailed in product data.
  - 1. Submit floor plans, elevations, detail sections of typical rigging elements, locations in plan and section views, and attachment details of curtains and operating clearances. Show anchors, hardware, operating equipment, and other components not included in manufacturer's standard product data. Coordinate stage curtains and battens with theatrical lighting plan and equipment.
  - 2. Submit fabric assembly and support details.
  - 3. Submit documentation indicating load capacity of each batten, track, attachment, and rigging components.
  - 4. Submit curtain attachment locations and corresponding loads imposed on structure.
  - 5. Delegated Design Data: Indicate stage curtain system structural attachments, including analysis data signed and sealed by Professional Engineer responsible for the design.
  - 6. Electrical:
    - a. Submit locations of equipment components, switches, and controls; identify between manufacturer installed and field installed wiring.
    - b. Submit wiring diagrams for power, signal, and control wiring.
- D. Plans and Layout Drawings: Submit for approval by Architect before installation. Drawings are to include all components, rigging, and locations for the Work.
  - 1. Masking Plan and Lighting Fixture Layout: Drawings, prepared by the Theatrical Systems Integrator (TSI), indicating the installation of the Work indicated in the following specification Sections:
    - a. Section 11 61 43 - Stage Curtains.
    - b. Section 26 55 61.10 - Auditorium Theatrical Lighting Systems.
- E. Samples for Initial Selection: Two manufacturer's color charts for each type of stage curtain material indicated that includes full range of colors, textures, and patterns available, along with 12-inch (305 mm) square fabric sample, in any color, of each fabric type and seam; Submit for Architect's initial selections.
- F. Samples for Verification: From the Architect's initial selections, prepare and submit two samples of each material; 12 inch square samples of each selected fabric from dye lot to be used for this work, with specified treatments applied and showing repeat of patterns; mark top and face of fabric.
- G. Qualification Data: Submit data for companies and persons indicated in QUALITY ASSURANCE article demonstrating their capabilities and experience. Include indicated qualifications requirements and a list of at least ten (10) completed projects with names and addresses of projects, architects/designers, and owners.

## 1.6 CLOSEOUT SUBMITTALS

- A. Section 01 78 23 - Operation and Maintenance Data.
- B. Project Record Documents: Drawings and record of actual locations of installed items.

- C. Operation and Maintenance Data: Submit data for stage curtains and rigging to include in maintenance manuals.

## 1.7 QUALITY ASSURANCE

- A. Delegated Designer Qualifications: Perform design of track and support systems 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. Theatrical Systems Integrator (TSI): Company specializing in providing theatrical systems and the Work indicated in the Contract Documents.
  - 1. Comply with the TSI requirements indicated in Section 26 55 61.10 - Auditorium Theatrical Lighting Systems, QUALITY ASSURANCE article.
- C. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum five (5) years documented experience.

## 1.8 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Special Warranty: Provide Special Warranty to Owner.
  - 1. Warrant systems and equipment to be free of defective components, faulty workmanship, or improper adjustment for the Warranty Period indicated. Replace items showing evidence of defective materials or workmanship (including installation workmanship) within thirty (30) days after notification. Make replacements without cost to the Owner. Rectify conditions that might present a hazard to human life, well-being and/or property within forty-eight (48) hours of notification.
  - 2. Warranty Period: One (1) year beginning on the project Date of Substantial Completion.

## PART 2 PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Stage Curtain Systems Design: Engage qualified designer to develop design of stage curtain system, including comprehensive project specific analysis of necessary structural system attachments in compliance with performance requirements.
- B. Structural Performance: Ensure attachment of stage curtain system to structure withstands material weight and operational loads applicable for this project and in compliance with local building codes and authorities having jurisdiction.
  - 1. Design Loads: Weight of stage curtains and track system.
- C. Fire-Test Characteristics: Stage curtain fabrics in compliance with NFPA 701 flame propagation fire test requirements conducted by authorized testing agency, listed by UL (DIR), ITS (DIR), or FM (AG) and acceptable to authorities having jurisdiction.
  - 1. Permanently attach label to fabric of each curtain assembly indicating fabric treatment as follows:
    - a. Inherently Flame Retardant (IFR), fibers/yarns that are non-combustible for life of fabric.
    - b. Durable Flame Retardant (DFR), fibers/yarns that are non-combustible for life of fabric.
    - c. Flame Retardant (FR), fabric has been topically treated in an immersion process with chemical fire retardant.
    - d. Indicate retreatment requirements after cleaning or after designated time period.

2. Permanently attach swatch of matching fabric from same dye lot, at least 12 inches square, to backside of curtain assembly for use as fire-resistance test strip.
- D. Electrical Components: To be listed and labeled in compliance with NFPA 70, by a qualified testing agency, and marked for designated application.

## 2.2 STAGE CURTAINS

- A. Manufacturers:
1. Frankel Associates, Inc.
  2. JB Martin Ltd.
  3. KM Fabrics, Inc.
  4. Valley Forge Fabrics, Inc.
  5. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design: Refer to CURTAIN SCHEDULE article at end of this Section.

## 2.3 COMPONENTS

- A. Curtain Fabric: Woven Cotton Velour with napped fabric of 100 percent cotton; 54-inch minimum width; not less than 40 backing ends per inch, 40 pile ends per inch, and 32 picks per inch; 640 pile tufts per square inch; 60 percent fullness, and other characteristics as follows:
1. Heavy Weight: Fabric weighing not less than 25 oz. per linear yard before flameproofing, with pile height of approximately 135 mils.
    - a. Exception: Fabric weighing less than 25 oz. per linear yard is acceptable only for specific items as indicated in this Section.
  2. Color: As indicated in Curtain Schedule at end of this Section.
- B. Lining: Yarn-dyed denim cloth of 100 percent cotton, woven in warp-faced twill; 54-inch minimum width.

## 2.4 CURTAIN TRACKS AND PIPE BATTENS

- A. Main Curtain Track: H&H Specialties 400 Series or equivalent.
- B. Rear Curtain Track: H&H Specialties 200 Series or equivalent.
- C. Pipe Battens: 1-1/2 inch diameter, Schedule 40, Plain-End Tested Pipe. Internal Bolt-Thru Pipe splices shall be used as needed; threaded couplers shall not be accepted. Pipe battens shall be supported at not less than 10 feet OC and dead hung from structure above.
- D. Hanging Hardware: JR Clancy #698 Beam Clamp with two 3/8 x 1 inch, Grade 5 hex bolts, with lock nuts, and a 1/4 inch round pin anchor shackle or as required.
- E. Chains and Trim Chains: Grade 30 Proof coil chain for dead hanging; zinc plated; manufactured to Federal Specification NPFC - RR-C-271-E, 1/4 inch Proof Coil Chain.

## 2.5 ACCESSORIES

- A. Jack Chain: No. 8 weighing not less than 9 oz per yard for the bottom hems of draperies.
- B. Tie Lines: Solid braided black "venetian blind" or mason cord No .4-1/2 (9/64 inch diameter).
- C. Grommets: Comply with NASM 16491. For black curtains, grommets to be black anodic finished.

## 2.6 FABRICATION

- A. Confirm field measurements before fabrication.



- B. Sewing and Fabrication:
1. Table drapery, as removed from bolts, across an inspection window for detecting weaving flaws and imperfections. Remove and do not incorporate detected flaws. Sew all black draperies nap up; color velour nap down. Construct fabrics and draperies as specified herein, unless otherwise noted.
  2. Unless specified otherwise herein, sew fabrics with a locked filament polyester core thread in a running interlock stitch and not more than nine stitches per inch. Monofilament thread is not acceptable.
  3. Fabricate the fabric panels to run the height of the various sections without horizontal seams. Box pleat at the top in the fullness listed, exclusive of turn-back facing. Sew pleats on the face side of the drapery and reinforce across the top with jute webbing. Sew the webbing to the top of the drapery with two runs of stitching using a double needle machine with 2.75 inch needle spacing and heavy industrial thread. Locate brass grommets in the center of the webbing width so no horizontal stitching is cut or severed. Locate grommets on each pleat at 12 inches OC for flat sewn and pleated panels. Employ matching thread throughout.
  4. Provide full length drapery items operating from traveler tracks with nickel plated oblong spring harness or carabineer type clips fastened in place by means of heavy nylon or polyester strap double stitched to webbing. Provide other drapery installed in grommets with tie lines for attachment to rigging. Employ black cotton solid braided "venetian blind" or mason cord No. 4-1/2 (9/64 inch diameter), 36 inch long, double knotted and tied as tie lines.
  5. Sew bottom hems 6 inches deep with full length items containing No. 8 jack chain in a separate pocket inside the bottom hem with chain being held 2 inches above extreme bottom of curtain (except where pipe batten weights are called out).
  6. Fabricate so that the bottom edge of the face fabric and lining is within 0.25 inch parallel with the top edge of the drapery, for true hanging across full width.
  7. Sew lining in the same fullness as the face fabric with side hems 1 inch wide. Fabricate so the lining is sewn inside the bottom hem of the face fabric to prevent catching air when the curtain descends. Lace the sides of the lining to the inside of the side hems of the face fabric with 1 inch wide webbing. 1 inch webbing loops are sewn to both the face fabric and lining at 9 inches OC and the lacing webbing runs through the loops loosely connecting the face fabric to the lining. Provide two 6 inch tucks in lining no more than 36 inches from the bottom of the curtain to allow for a total adjustment of 12 inches in the lining height due to shrinkage. For curtain less than 10 feet high, provide one shrinkage tuck.
- C. Construction: Refer to materials specified in this Section and include materials indicated in Curtain Schedule at end of this Section.
1. Main Curtain Travelers (Grand Drape) and Main Valance (Valance):
    - a. Fabricate in two lined panels to provide for bi-parting action. Finish each panel to the dimensions and fullness indicated in Curtain Schedules.
    - b. Provide lining (if indicated in Curtain Schedule) as indicated in "Sewing and Fabrication" paragraphs above.
    - c. Face back the center edges of each panel with a 1/2 width of fabric. Stop the lining (if indicated in Curtain Schedule) at the edge of this turnback as indicated in "Sewing and Fabrication" paragraphs above.
    - d. Face back the offstage edges of each panel with at least 2 inches of fabric.
    - e. Fabricate the top of each panel with face material pleats 12 inches OC. Reinforce tops with jute webbing with brass grommets 12 inches OC.
    - f. Fabricate the bottom of each panel with a 6 inch double-turned hem with No. 8 jack chain inserted in a separate pocket 2 inches above the finish floor and placed inside the hem.
  2. Rear Curtain Travelers (Rear Curtain):

- a. Fabricate in two panels to provide for bi-parting action. Finish each panel to the dimensions and fullness indicated in Curtain Schedules.
  - b. Provide no lining.
  - c. Face back the center edges of each panel with a 1/2 width of fabric.
  - d. Face back the offstage edges of each panel with at least 2 inches of fabric.
  - e. Fabricate the top of each panel with face material pleats 12 inches OC.  
Reinforce tops with jute webbing with brass grommets 12 inches OC.
  - f. Fabricate the bottom of each panel by sewing a No. 8 jack chain inside the bottom pocket. Line batten pocket with No. 8 canvas duck. Provide hook and loop fastener closures for pocket ends.
3. Masking Borders:
- a. Fabricate each panel finished to the dimensions and fullness indicated in the Curtain Schedule.
  - b. For curtains with fullness indicated, sew a No. 8 jack chain inside the bottom hem.
    - 1) Exception: For flat curtains, sew a pipe pocket inside the bottom hem, allowing for a 1/2 inch ID pipe for flat curtains.
  - c. Reinforce tops with jute webbing with brass grommets 12 inches OC and double grommets at both ends. Secure to batten with 36 inch, #4 black cotton tie lines.
4. Rear Border:
- a. Fabricate each panel finished to the dimensions and fullness indicated in the Curtain Schedule.
  - b. For curtains with fullness indicated, sew a No. 8 jack chain inside the bottom hem.
  - c. Reinforce tops with jute webbing with brass grommets 12 inches OC and double grommets at both ends. Secure to batten with 36 inch, #4 black cotton tie lines.
5. Masking Legs:
- a. Fabricate each panel finished to the dimensions and fullness indicated in the Curtain Schedule.
  - b. For curtains with fullness indicated, sew a No. 8 jack chain inside the bottom hem.
    - 1) Exception: For flat curtains, sew a pipe pocket inside the bottom hem, allowing for a 1/2 inch ID pipe for flat curtains.
  - c. Reinforce tops with jute webbing with brass grommets 12 inches OC and double grommets at both ends. Secure to batten with 36 inch, #4 black cotton tie lines.
6. Cyclorama:
- a. Fabricate the cyclorama from seamed panels of leno-cloth finished to the dimensions indicated in the Drapery Schedule.
  - b. Reinforce the top with jute webbing. Provide brass grommets and tie lines 12 inches OC. Provide double grommets at the ends.
  - c. Fabricate the scrims with a 6 inch bottom hem with 1 inch turn-under.
  - d. Fabricate sides with 3 inch double turned hems.
  - e. Fabricate bottom pocket to accommodate 1-1/2 inch OD pipe batten; furnish pipe in accordance with batten specification with internal splice.
- D. Signage:
1. Signage to be legible both in construction and grammar utilizing the English Language.
  2. Mark the centerline of the jute webbing with indelible marker. Use a white tie line on the centerline grommet.

3. Sew a white fabric label on the upper right and left corners of the jute webbing of the drape with the following information:
  - a. Item Name.
  - b. Item Number.
  - c. Dimensions.
  - d. Fullness.
  - e. Date of Manufacture.
  - f. Manufacturer.
- E. Steel Tracks - General: Fabricate of not less than 0.075-inch (14-gage) nominal thickness galvanized roll-formed steel, with continuous bottom slot, and with each half of track in one continuous piece.
  1. Provide curtain carriers for track spaced at 12 inches OC.
- F. Heavy-Duty Track: Equip track with heavy-duty live-end double pulley and heavy-duty dead-end single pulley, with 5 inch cast-iron or nylon wheels on ball bearings, enclosed in steel housings. Provide curtain carriers of molded nylon with a pair of neoprene- or nylon-tired ball-bearing wheels riveted parallel to body. Equip carriers with neoprene or rubber bumper, heavy-duty swivel eye, and trim chain for attaching curtain snap or S hook. Provide end stops for track and adjustable floor block designed to maintain proper tension on 3/8-inch stretch-resistant operating line of braided polypropylene or fiberglass center cord.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that field measurements are as required.
- C. Verify that existing construction, surfaces, and conditions are ready to accept the work of this Section.
- D. Plans and Layout Drawings: Verify that the submitted plans and layout drawings have been approved as indicated in PART 1, SUBMITTALS article of this Section.
- E. Verify that inserts, clips, blocking, and other supports are installed and ready to receive work of this Section.
- F. Examine products to be installed for damage and other conditions detrimental to completion of the Work.
- G. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Furnish layouts for inserts, clips, or other supports required to be installed by other trades to support tracks and battens.

### **3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. All curtains and accessories require dead-hung installation. Provide hanging schedule for approval by Architect prior to installation.

- C. Install track for center-parting curtains with not less than 24-inch overlap of track sections at center, supported by special lap clamps.
- D. Secure curtains to track carriers with track manufacturer's special heavy-duty S-hooks or snap hooks.

### 3.4 ADJUSTING

- A. Section 01 73 00 - Execution: Starting, testing, adjusting, and balancing.
- B. Adjust track and carriers to provide smooth operation of curtains.

### 3.5 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work and comply with manufacturer's recommendations.

### 3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.

### 3.7 DEMONSTRATION AND TRAINING

- A. Section 01 79 00 - Demonstration and Training: Provide demonstration and training to the Owner regarding operation and maintenance of component of the installed Work.

### 3.8 CURTAIN SCHEDULE

- A. Main Curtain Travelers (Grand Drape):
  - 1. Basis of Design:
    - a. KM Fabrics - Memorable
  - 2. Color:
    - a. To be selected by Architect from full range of colors.
  - 3. 100% cotton velour.
  - 4. Weight: 25 oz. per lineal yard.
  - 5. Flame retardant treated.
  - 6. 60% fullness.
  - 7. Lining:
    - a. None
  - 8. Quantity and Size: Field verify quantity and dimensions.
    - a. Two (2) each; 26 feet wide x 18 feet high.
- B. Main Valance (Valance):
  - 1. Basis of Design:
    - a. KM Fabrics - Memorable.
  - 2. Color:
    - a. To be selected by Architect from full range of colors.
  - 3. 100% cotton velour.
  - 4. Weight: 25 oz. per lineal yard.
  - 5. Flame retardant treated.
  - 6. 60% fullness.
  - 7. Lining:
    - a. None
  - 8. Quantity and Size: Field verify quantity and dimensions.
    - a. One (1) each; 52 feet wide x 5 feet high.
- C. Masking Borders:
  - 1. Basis of Design:

- a. KM Fabrics.
  2. Color:
    - a. Black.
  3. 100% cotton velour.
  4. Weight:
    - a. 20-21 oz. per lineal yard.
  5. Flame retardant treated
  6. 60% fullness.
  7. Quantity and Size: Field verify quantity and dimensions.
    - a. Three (3) each; 50 feet wide x 6 feet high.
- D. Masking Legs:
1. Basis of Design:
    - a. KM Fabrics.
  2. Color:
    - a. Black.
  3. 100% cotton velour.
  4. Weight:
    - a. 20-21 oz. per lineal yard.
  5. Flame retardant treated.
  6. 60% fullness.
  7. Quantity and Size: Field verify quantity and dimensions.
    - a. Three (3) pair; 10 feet wide x 18 feet high.
- E. Cyclorama:
1. Color:
    - a. White.
  2. 100% cotton filled leno-cloth.
  3. Weight: 7 oz. per square yard.
  4. Flame retardant treated.
  5. 0% fullness.
  6. Quantity and Size: Field verify quantity and dimensions.
    - a. One (1) each; 50 feet wide' wide x 18 feet high.
- F. Rear Curtain Travelers (Rear Curtain):
1. Basis of Design:
    - a. KM Fabrics - Marvel.
  2. Color:
    - a. Black.
  3. 100% cotton velour.
  4. Weight:
    - a. 20-21 oz. per lineal yard.
  5. Flame retardant treated.
  6. 60% fullness.
  7. Quantity and Size: Field verify quantity and dimensions.
    - a. Two (2) each; 25 feet wide x 18 feet high.
- G. Rear Border:
1. Basis of Design:
    - a. KM Fabrics - Marvel.
  2. Color:
    - a. Black.
  3. 100% cotton velour.
  4. Weight:
    - a. 20-21 oz. per lineal yard.

5. Flame retardant treated.
  6. 60% fullness.
  7. Quantity and Size: Field verify quantity and dimensions.
    - a. One (1) each; 50 feet wide x 5 feet high.
- H. Battens
1. Provide battens for all stage curtains in Curtain Schedule above.
    - a. 52 feet minimum length.
  2. Additionally, provide battens as follows:
    - a. 52 feet minimum length.
    - b. One (1) each; battens for front-of-house (FOH) lighting/electrical (one electric).
    - c. Three (3) each; battens for on-stage lighting/electrical (one for each electric).
    - d. Additional dead hung open battens:
      - 1) Eight (8) each.
  3. Refer to hanging diagram for batten locations; furnish hanging plan shop drawing prior to installation for approval by Architect.
- I. Box Booms (Tormentor lighting positions):
1. Provide two box booms for mounting on pilasters in the auditorium house as indicated on the drawings.
    - a. Construct and mount two box booms, on either side, of 1-1/2 inch O.D. steel pipe, painted flat black.
    - b. Box booms to be 5 feet in length and 18 inches wide with two 90 degree elbows and two mounting flanges for each boom, threaded connections.
    - c. Mounting position to be centered on the pilaster at height coordinated by the theatrical integrator with electrical connections.
      - 1) Mount box boom as high as possible.
      - 2) Provide shop drawing for approval by Architect.

**END OF SECTION**

## SECTION 11 66 23 GYMNASIUM EQUIPMENT

### PART 1 GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Scorer's Table.
  - 2. Gymnasium Floor Cover.
  - 3. Ball Storage Cage.
  - 4. Team Chairs.

#### 1.2 REFERENCES

- A. ASTM International (ASTM):
  - 1. ASTM D2261 - Standard Test Method for Tearing Strength of Fabrics by the Tongue (Single Rip) Procedure (Constant-Rate-of-Extension Tensile Testing Machine); 2013, Editorial Changes 2017.
  - 2. ASTM D5034 - Standard Test Method for Breaking Strength and Elongation of Textile Fabrics (Grab Test):2021.
- B. National Electric Code (NEC):
  - 1. NEC Article 600 - Electric Signs and Outline Lighting; 2021.
- C. National Fire Protection Association (NFPA):
  - 1. NFPA 701 - Standard Methods Of Fire Tests For Flame Propagation Of Textiles And Films; 2023.
- D. Underwriters Laboratories Inc. (UL):
  - 1. UL (DIR) - Online Certification Directory; Current Edition.

#### 1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data describing product construction, sizes, configurations, jointing methods and locations, and functional components.
- C. Shop Drawings: Submit shop drawings including profiles, components, materials, accessories, joint/seam fabrication and locations, and installed use location/layout.
  - 1. Scorer's Table: Include details for folding/locking mechanism, caster type/sizes/quantities/locations, front signage panel attachment to table assembly, electrical requirements.
  - 2. Gymnasium Floor Protective Cover: Include plan indicating cover layout and fabric edge overlap locations. Include details of roller storage racks and quantities required for storage of all fabric rolls.
- D. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of finishes and colors available for products with factory-applied color finishes; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples on same product material type indicated for final Work; each sample 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.

**1.4 CLOSEOUT SUBMITTALS**

- A. Section 01 77 00 - Closeout Procedures.
- B. Operation Data: Include description of equipment operation and required adjusting and testing.
- C. Maintenance Data: Identify system maintenance requirements, parts list, servicing cycles, lubrication types required and local spare part sources.

**1.5 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section with minimum five (5) years documented experience.
- B. Installer Qualifications: Company specializing in performing work of this Section and with minimum five (5) years documented experience.

**1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Deliver products in manufacturer's original packaging. Store materials in a dry, protected, well-vented area. Inspect product upon receipt and report damaged material immediately to delivering carrier and note such damage on the carrier's freight bill of lading.

**1.7 WARRANTY**

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Warranty durations are to begin on the date of Substantial Completion.
- C. Scorer's Table:
  - 1. Manufacturer's Warranty: Provide manufacturer's five (5) year warranty for materials and workmanship to be free of defects. Should a component or material fail to perform its function in normal use within this period, manufacturer is to provide matching repair or new replacement at no charge.
- D. Gym Floor Protective Cover and Storage Rack:
  - 1. Manufacturer's Warranty: Provide manufacturer's warranty for materials and workmanship to be free of defects. Should a component or material fail to perform its function in normal use within this period, manufacturer is to provide matching repair or new replacement at no charge.
    - a. Floor Covers: Warranty duration to be as follows.
      - 1) Weight of 18 - 21 oz/sq yd: Eight (8) years warranty duration.
    - b. Floor Cover Storage Racks: Twenty (20) years warranty duration.
- E. Ball Storage Cage: Provide manufacturer's standard warranty for materials and workmanship to be free of defects.
- F. Team Chairs: Provide manufacturer's standard warranty for materials and workmanship to be free of defects.
  - 1. Team Chairs: Manufacturer's standard duration but not less than one (1) year.
  - 2. Team Chair Storage Carts: Manufacturer's standard duration but not less than one (1) year.

**1.8 SPARE PARTS AND MAINTENANCE PRODUCTS**

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.



- B. Scorer's Table: Furnish 3 spare lamps for the back-lit front panel sign.
- C. Gymnasium Floor Cover.
  - 1. Floor Cover Fabric: Provide 10 percent spare.
  - 2. Floor Cover Storage Racks:
    - a. Hand Cranks: Provide 2 spares.
    - b. Electric Power Winder: Provide 1 spare.
    - c. Roller Tube: Provide 1 spare (include 4 cover attachment clips).

## PART 2 PRODUCTS

### 2.1 SCORER'S TABLE

- A. Manufacturers:
  - 1. Sideline Interactive, LLC.
  - 2. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design: Sideline Interactive, LLC - Backlit Static Table.
- C. Scorer's Table: Designed for interior use and as follows:
  - 1. Electrical components to be certified, listed, and labeled by the following standards organization(s) as suitable for the purpose indicated and installed conditions:
    - a. UL (DIR).
    - b. NECA 600.
  - 2. Electrical components to include electrical surge protection.
  - 3. Capable of withstanding strikes by balls and players.
  - 4. Free-standing unit, transportable, and with heavy-duty locking non-marring swivel casters.
    - a. Capable of folding for transport.
  - 5. Protective padding to be heavy-duty vinyl covered and secured to unit.
    - a. Color to be selected by Architect from manufacturer's full range.
  - 6. Table Length:
    - a. 10 feet.
  - 7. Front Panel Signage: Sign to be factory printed with custom graphics.
    - a. Single panel; full panel static graphics with electric back light illumination.
      - 1) Sized to length and height of table.
      - 2) Custom graphics design to be provided by the Architect.
      - 3) Shatterproof polycarbonate sheet protective cover.
      - 4) Maintenance access panel.
  - 8. Finishes and Colors:
    - a. To be selected by the Architect from manufacturer's full range.
    - b. Metal components to be powder coat finish.
  - 9. Electrical Power Strip: Integral power strip and media wire tray.

### 2.2 GYMNASIUM FLOOR COVER

- A. Manufacturers:
  - 1. CoverSports, a division of Humphrys.
  - 2. CoverMaster.
  - 3. Greatmats.
  - 4. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design:
  - 1. CoverSports - GymGuard Gym Floor Cover.
- C. Gymnasium Floor Cover: Protective floor cover designed for interior use and as follows:

1. Physical Characteristics: Minimum requirements; comply with indicated standard.
    - a. Weight: 27 oz/sq yd, minimum.
      - 1) 8 oz woven polyester fabric coated with 19 oz PVC (9.5 oz each side).
      - 2) Tensile Strength: 315 lbs x 300 lbs (ASTM D5034).
      - 3) Tear Strength: 125 lbs x 90 lbs (ASTM D2261).
      - 4) Surface Finish:
        - a) Smooth surface.
  2. Waterproof, rot and mildew resistant, anti-fungal, and anti-bacterial.
  3. Color to be selected by Architect from manufacturer's full range.
  4. Fire Resistance: Comply with NFPA 701 (large scale), and requirements of local authorities having jurisdiction.
  5. Slip Resistant Surface: Comply with ADA and OSHA requirements.
  6. Seams to be heat weld sealed, minimum 1 inch wide, and are to lay smooth and flat.
  7. Roll Widths:
    - a. 10 feet wide minimum.
  8. Locations: Provide floor cover quantity for floor areas indicated.
    - a. Gymnasium.
      - 1) Entire floor area, less area under extended bleachers.
- D. Floor Cover Storage Racks: Engineered and designed to store multiple fully loaded floor cover rolls; mobile and stable base to deploy and load floor covers; allows for safe cover deployment by 2 persons.
1. Quantity: Provide quantity of storage rack units as required to store required floor cover quantity.
  2. Storage Rollers:
    - a. 8 rollers per each storage rack unit.
  3. Size: Not to exceed 35 inches wide x 68 inches long x 79 inches high.
  4. Frame: Steel framing and stabilizing members with powder coat finish.
  5. Outriggers: Designed to stabilize storage rack during operational use; retractable with adjustable casters to prevent tipping; safety orange color.
  6. Brakes: Floor locking brakes to be at each end of storage rack.
  7. Casters: Lockable heavy-duty swivel casters; non-maintenance bearings for swivel and wheels; non-marring 3/4 inch tread thickness; 3 casters at each end.
  8. Roller Collars: Bright yellow collar on each end of every roller to eliminate finger pinching.
  9. Roller Brackets: Made of polycarbonate with delrin bearings. Mounted with 1/8 inch thick shock absorbing rubber pads.
  10. Roller Safety: Safety bolt on each bracket to prevent roller "pop-ups".
  11. Rollers: Non-corrosive tube; protective coated for clean handling.
  12. Fastening Clips: 4 push-on clips for each roller to secure floor cover sheet to roller.
  13. Hand Cranks: 2 cranks designed to engage both roller ends for loading floor covers.
  14. Accessories:
    - a. Electric Power Winder: Provide one (1) hand-held electric power winder designed to engage roller end for loading floor covers; include reverse rotation switch.
    - b. Floor Cover Brush Cleaner: Provide for each floor cover storage rack. Full width brush system designed to attach to the floor cover storage rack, Sweeps and cleans the floor cover on both sides simultaneously as each floor cover is cranked back (loaded) onto the rack rollers. Designed with two opposing sets of brush heads, each with a row of soft bristles of styrene fiber for fine particles and a row of stiffer polystyrene bristles for heavier debris.
    - c. Storage Rack Cover: Provide one (1) for each floor cover storage rack. Designed to fully cover loaded and stored storage rack; material to be not less than 18 oz vinyl.

- d. Seaming Tape: Provide quantity required for Owner to deploy full coverage of floor cover for six (6) separate events. Extra strength, clear, 3 inches wide, and formulated for easy removal and leaving no glue residue on floor or floor cover.
- e. Seaming Tape Dispensers:
  - 1) Walk-Behind Tape Dispenser: Provide one (1), designed to apply 3 inch wide floor cover seaming tape by user walking behind dispenser in fully erect walking posture. Unit to include tape roll dispenser cradle designed for easy tape roll changeover, flat roller for compressing dispensed tape to application surface, and in-line secondary guide wheel. Handle to be adjustable to user's height. Constructed of heavy gauge steel and enameled or powder coated finished.
  - 2) Hand-Held Tape Dispenser: Provide two (2), designed to apply 3 inch wide floor cover seaming tape by user. Heavy-duty components; heavy gauge steel frame; ergonomically designed handle that won't twist under pressure during use.

### 2.3 BALL STORAGE CAGES

- A. Manufacturers:
  - 1. Gared Holding, LLC.
  - 2. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design:
  - 1. Gared - DBC Deluxe Ball Gage.
- C. Ball Storage Cage: Provide two (2) storage cage units of the following minimum requirements.
  - 1. Size: Overall unit to be 42 inches long x 24 inches wide x 42 inches high (from floor to top of frame's push handle).
    - a. Ball cage shape to be 42 inches long x 24 inches wide x 28 inches high.
  - 2. Construction: Frame to be 1 inch steel tube framing. Ball cage to be 3/16 inch steel wire welded to form 3 inch square grid sections. Cage top to be hinged and lockable.
  - 3. Finish and Color: Factory applied.
    - a. Powder coat; black color.
  - 4. Casters: Provide four (4) swivel casters; each caster with single 3 inch diameter wheel and non-marring tread of 1/2 inch thickness.

### 2.4 TEAM CHAIRS

- A. Team Chairs: Folding type with cushioned seat and backrest.
  - 1. Quantity: Provide thirty-three (33) chairs.
  - 2. Manufacturers:
    - a. Spec Seats.
    - b. Substitutions: Section 01 60 00 - Product Requirements.
  - 3. Basis of Design:
    - a. Spec Seats - Model DS100 Logo Series.
  - 4. Physical Characteristics:
    - a. Metal Frame: 18ga Galvanized Steel (DTC X-Frame)
    - b. Seat: Upholstered with 2.5 to 3 inch cushion thickness.
    - c. Backrest: Upholstered with 1 inch cushion thickness.
    - d. Front Leg: "K" brace with cross-brace.
    - e. Linking Bracket: 11 gauge steel.
    - f. Leg Foot: Non-marring molded metal foot inserts.
    - g. Chair Weight: 20 lbs (9.1 kgs).
    - h. Frame Height: 33 inches, open; 40 inches, closed.

- i. Frame Width: 18.25 inches, includes ganging.
- j. Seat Height: 19.25 inches, from floor to top of seat.
- k. Depth: 22 inches, front to back.
- l. Folded Thickness: 4.5 inches.
- 5. Finishes:
  - a. Metal surfaces to be factory applied powder coat finish.
  - b. Seat and backrest to be factory applied upholstery.
- 6. Colors: To be selected by Architect from manufacturer's full range.
- 7. Graphics: Custom graphics, factory applied to each chair.
  - a. Separate graphics for seat cushion and seat backrest.
  - b. Graphics design to be provided by Architect.
- 8. Accessories:
  - a. Team Chair Storage Carts: Platform type storage cart.
    - 1) Quantity: Provide quantity of storage carts required to store quantity of chairs indicated.
    - 2) Basis of Design:
      - a) Spec Seats - Model TSC106 (6 feet long, 4 casters).
    - 3) Size: 70 inches long x 36 inches wide x 82.5 inches high (88 inches high when loaded with folded chairs).
    - 4) Construction: Steel members designed and assembled to withstand loads imposed when cart is fully loaded and mobile. Cart structure to remain rigid and without racking during mobile use.
      - a) Provide each end of cart with rigid U-shaped handle tubing for pushing and pulling cart from either end.
      - b) Provide intermediate U-shaped tubing with adjustable location along length of cart. This member is to function as an adjustable "bookend" stop for chairs when cart is partially loaded.
    - 5) Casters: Lockable heavy-duty swivel casters; non-maintenance bearings for swivel and wheels; non-marring 3/4 inch tread thickness.
      - a) Minimum 4 casters for carts of length 8 feet or less.
      - b) Minimum 6 casters for carts longer than 8 feet and up to 10 feet.
        - (1) 2 of the 6 casters are to be located at carts mid-length.
    - 6) Finish and Color: Factory applied powder coat; black color.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that field measurements are as required.
- C. Verify that surfaces and conditions are ready to accept the Work of this Section.
- D. Examine products to be installed for damage and other conditions detrimental to completion of the Work.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of Work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.

**3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Products Requiring Installation: Install system components and accessories in accordance with manufacturer's printed instructions.
- C. Products Normally Stored Until Use: Assemble system components and verify functionality prior to demonstration to Owner.

**3.4 ADJUSTING**

- A. Section 01 73 00 - Execution: Starting, testing, adjusting, and balancing.
- B. Adjust operating components to smooth operation without binding.

**3.5 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures.
- B. Clean installed Work in accordance with manufacturer's recommendations including cleaning procedures and materials.

**3.6 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed construction from damage and unauthorized tampering.

**3.7 DEMONSTRATION AND TRAINING**

- A. Section 01 79 00 - Demonstration and Training.
- B. Provide demonstration and training to Owner regarding operation and maintenance of the Work of this Section.

**END OF SECTION**



**SECTION 11 66 23.16**  
**BASKETBALL BACKSTOPS**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Indoor suspended backstops.
- B. Related Requirements:
  - 1. Section - 05 12 00 - Structural Steel.
  - 2. Section - 05 21 00 - Steel Joists.
  - 3. Section - 05 50 00 - Metal Fabrications: Supplementary framing.
  - 4. Division 26 - Electrical: Electrical service for winch operations and Work requirement for electrical work.

**1.2 REFERENCES**

- A. American Society of Civil Engineers (ASCE):
  - 1. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- B. ASTM International (ASTM):
  - 1. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- C. American Welding Society (AWS):
  - 1. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020; Errata 2023.
- D. Athletic Associates: Comply with current requirements.
  - 1. National Association of Intercollegiate Athletics (NAIA).
  - 2. National Basketball Association (NBA).
  - 3. National Collegiate Athletic Association (NCAA).
  - 4. National Federation of State High School Associations (NFHS):
    - a. NFHS - Basketball Rules Book.
  - 5. International Basketball Federation (FIBA).
  - 6. International Olympic Committee (IOC).
- E. National Electrical Manufacturers Association (NEMA):
  - 1. NEMA MG 1 - Motors and Generators; 2021.

**1.3 COORDINATION**

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate backstops with structural system building framing as indicated in Specifications and Drawings to distribute loads to building framing without overloading building framing.
- C. Coordinate backstops and support framing layout to avoid interferences with the following:
  - 1. HVAC equipment, ductwork, outlets, and inlets.
  - 2. Fire suppression system piping and sprinkler heads.
  - 3. Lighting.
- D. Coordinate electrical requirements for the work in this Section with electrical service and connection points provided.

## 1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data:
  - 1. Submit data indicating loads, and materials of construction and thicknesses.
    - a. Indicate data for components and accessories.
    - b. Include manufacturer's full range of the following for selection by Architect:
      - 1) Colors and finishes.
      - 2) Graphics.
    - c. Include operational instructions.
- C. Suspended Backstops.
  - 1. Shop Drawings: Signed and sealed by licensed Professional Engineer.
    - a. Indicate size and location of backstops, mounting details, accessory anchoring members.
    - b. Indicate magnitude and location of loads imposed on building framing.
    - c. Show operable backstops in fully extended and retracted positions.
    - d. Indicate operator locations and mounting details. Include wiring diagrams for electric operators and controls.
  - 2. Design Data: Signed and sealed by licensed Professional Engineer.
    - a. Submit calculations for system, mounting, anchor, and structure design.
      - 1) Include foundation design for in-ground mounted units.
    - b. Submit calculations for supplementary framing required to attach backstops to building framing.
    - c. Indicate location and magnitude of loads imposed on building framing.
    - d. Seismic Design: Provide sealed calculations indicating that design of suspension systems provide compliance with seismic structural requirements indicated in the Performance and Design Requirements in this Section.
- D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

## 1.5 CLOSEOUT SUBMITTALS

- A. Section 01 77 00 - Closeout Procedures.
- B. Operation and Maintenance Data: Include the following.
  - 1. Instructions for operational control systems, adjustments, and safety features.
  - 2. Parts catalog with complete list of replacement parts.
  - 3. Schematic wiring diagrams for electrical components.

## 1.6 QUALITY ASSURANCE

- A. Products Requiring Electrical Connection: Listed and classified by UL or other testing firm acceptable to authority having jurisdiction.
- B. Perform welding in accordance with AWS D1.1/D1.1M.

## 1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three (3) years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum three (3) years documented experience and approved by manufacturer.
- C. Welders and Welding Procedures: AWS qualified within previous twelve (12) months.



- D. Design backstops and support framing under direct supervision of licensed Professional Engineer experienced in design of this Work and licensed in the State in which the project is located.

## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Accept backstops on site in manufacturer's original packaging. Inspect for damage.
- C. Store backstops indoors, protected from weather and contamination until installed.

## 1.9 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Indoor Suspended Backstops: Furnish lifetime manufacturer's warranty for masts and backboards.

## 1.10 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
  - 1. Furnish six (6) of each net type.
  - 2. Furnish four (4) manual crank tools and other tools required for backstop adjustments including adjusting height of backboard for play.

## PART 2 PRODUCTS

### 2.1 INDOOR SUSPENDED BACKSTOPS

- A. Performance And Design Requirements:
  - 1. Design backstops including masts, backboards, and goals to meet requirements of NFHS and the following:
    - a. Withstand loads without damaging backstop.
    - b. Transfer loads to building structural frame to prevent overloading and damage to building.
    - c. Seismic Loads: Design and size components to withstand seismic loads and sway displacement as calculated in accordance with ASCE 7 and applicable codes.
      - 1) Seismic Design is to comply with requirements for the Seismic Design Category as indicated on the Structural Drawings and Section 00 31 00 - Available Project Information.
- B. Manufacturers:
  - 1. American Athletic, Inc.
  - 2. Draper, Inc.
  - 3. Performance Sports Systems.
  - 4. Porter Athletic Equipment Company.
  - 5. Progressive Sports Construction Group.
  - 6. Substitutions: Section 01 60 00 - Product Requirements.
- C. Basis of Design: Porter Athletic Equipment Company - Style 909xxxxx Series.
- D. Backstop systems suspended from building structure above:
  - 1. Suspended and forward folding retraction:
    - a. Operation:

- 1) Electric motorized winch.
  - b. Locations and Quantities:
    - 1) Main Court; two (2) backstop systems.
    - 2) Side Court: four (4) backstop systems.
- E. Masts:
  1. Center Post Masts: Single post at center of backboard with side sway bracing to eliminate sway and vibration during play.
  2. Tubular steel, welded construction.
  3. Overhead Mounting: Mast assembly extending vertically from overhead building structural frame to support backboard at position and height indicated on Drawings.
    - a. Design and provide supplemental steel framing as needed to span between and anchor to building structural frame and support mast at position indicated on Drawings.
  4. For retractable folding backstop systems, provide winches and safety straps with retractor reel.
  5. Furnish manufacturer's standard hardware for mast operation as specified.
- F. Winches - Motorized Operation:
  1. Electric motorized winch; sized to suit application with adjustable upper and lower limit switches.
  2. Geared drive and cables designed to hold backstop at any position.
  3. Motor: NEMA MG 1; 1/2 hp; 115 volts, single phase, 60 Hz; continuous duty rated.
  4. Controls: Provide remote, flush, wall mounted control station three position key switch.
    - a. Gang Control Switch: Provide winch operation control switches as follows.
      - 1) Main Court Backstops:
        - a) Individual switches for each main court backstop.
      - 2) Side Court Backstops:
        - a) One (1) switch for each pair of side court backstops.
  5. Disconnect Switch: Factory mount disconnect switch on equipment.
- G. Backboards:
  1. Glass Backboards: 1/2 inch thick clear shatter proof tempered glass, resiliently mounted in painted welded steel frame; target and border markings fired onto glass.
  2. Rectangular shape; 72 x 42 inches with manufacturer's standard mounting to suit mast; drilled for goal mounting.
  3. Molded safety padding installed along lower edge and corners.
  4. Adjustable Vertical Movement Mounting: Variable height with rim height ranging from 8 to 10 feet above finished floor.
    - a. Manual crank tool operated from floor beneath backboard.
- H. Goals and Nets:
  1. Goals: Steel, removable type; fabricated from 5/8 Inches rod; 18 Inches inside clear diameter; with no-tie style net hooks; painted finish; mounted directly to main mast.
    - a. Breakaway type; single rim, breakaway type; rigid play up to 230 lbs, flexible for forces greater than 230 lbs.
  2. Net: Woven chord, size, and style to fit goal; 15 to 18 inches long.
    - a. Competition Net: Anti-whip nylon.
- I. Shop Finishing:
  1. All metal components, parts, fasteners, and accessories to be powder coat finished.
  2. Color: As selected by Architect from manufacturer's full range.

**2.2 ACCESSORIES**

- A. Mounting Hardware: As designed and recommended by manufacturer.

**2.3 FABRICATION**

- A. Verify field measurements prior to fabrication.
- B. Fabricate components in largest practical sizes for delivery.
- C. Grind exposed welded joints flush and smooth with adjacent finish surface.
- D. Provide fittings and hardware to accommodate site assembly and installation.
- E. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

**PART 3 EXECUTION****3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify building structural frame is ready to receive backstops.
- C. Verify that finishing work, including painting, is complete before installing backstops.
- D. For work requiring electrical power connections, verify electrical power, with correct electrical characteristics, is installed at required locations and available.

**3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.

**3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install backstops in accordance with NFHS requirements.
- C. Assemble components furnished loose for field assembly.
- D. Install masts plumb and rigid at location indicated on Drawings.
- E. Install backboards plumb, level, and parallel to basketball court end line.
- F. Install goals level and adjust rim height to 10 feet above finish floor.
- G. Install safety padding on backboards.
- H. For winch operated backstops, install winches with cables connected to backstops.
- I. For motorized and control components, make electrical connections as required for operation.
- J. Touch up damaged finishes to match shop finish.

**3.4 ADJUSTING**

- A. Section 01 73 00 - Execution: Requirements for starting and adjusting.

- B. Adjust moving components and controls for smooth and proper operation over full range of movement.
- C. For motorized components, adjust limit switches to prevent damage to equipment.

### **3.5 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work and comply with manufacturer's recommendations.
- B. Clean installed work in accordance with manufacturer's recommended materials and procedures.

### **3.6 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Requirements for protecting finished Work.
- B. Fully retract retractable backstops and disable operators until Substantial Completion.
- C. Protect install Work from damage.

### **3.7 DEMONSTRATION**

- A. Section 01 79 00 - Demonstration and Training: Requirements for demonstration and training.
- B. Demonstrate to Owner representatives, operation and maintenance of operating components, and safety features.

**END OF SECTION**

**SECTION 11 66 23.53****WALL PADDING****PART 1 GENERAL****1.1 SUMMARY**

- A. Section includes wall padding and accessories.
- B. Related Requirements:
  - 1. Section 04 20 00 - Unit Masonry: Substrate.

**1.2 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Provide physical characteristics of wall pads and mounting accessories.
- C. Shop Drawings: Indicate dimensioned elevations layout (include cutouts at wall devices), unit sizes and thickness, describe finish method around cutouts at wall devices, mounting details and hardware.
- D. Samples for Initial Selection: Two manufacturer's complete sets of color samples illustrating the full range of finishes and colors available. Submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples to be same product material type indicated for final Work; each sample 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.

**1.3 CLOSEOUT SUBMITTALS**

- A. Section 01 77 00 - Closeout Procedures.
- B. Submit Operation and Maintenance Data.

**PART 2 PRODUCTS****2.1 WALL PADDING**

- A. Manufacturers:
  - 1. American Athletic, Inc.
  - 2. Draper, Inc.
  - 3. Performance Sports Systems.
  - 4. Porter Athletic Equipment Company.
  - 5. Progressive Sports Construction Group.
  - 6. Substitutions: Section 01 60 00 - Product Requirements.

**2.2 COMPONENTS**

- A. Wall Pads: Urethane foam, 3.7 lb. density, 2 inches thick; over 3/8 inch OSB wood panel; flame retardant vinyl coated polyester covering; compliant with state and local codes.

**2.3 ACCESSORIES**

- A. Wall Attachment Clip: Extruded aluminum.
- B. Z-Channels: Extruded aluminum.

- C. Floor Mounting Channel: Extruded aluminum, if Drawings indicate wall pads layout to extend to the floor.
- D. Molded Cutout Inserts: Factory molded and flame retardant rubber inserts for pad cutouts for accessing electrical outlets, switches, and wall devices. Color to be selected by Architect from manufacturer's full range.
- E. Fasteners to be non-corrosive and compatible with components and substrates.

## 2.4 FABRICATION

- A. Wall Pads: Adhere foam to backing board. Wrap finish covering to back of backing board and fasten securely. Provide a one inch fastener margin at top and bottom of backing board covered by finish covering. Fabricate in 2 feet wide by 6 feet tall panels, unless indicated otherwise on Drawings.

## 2.5 FINISHES

- A. Vinyl Coated Polyester Covering: Color as selected by Architect from manufacturer's full range.

# PART 3 EXECUTION

## 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify adequacy of support framing and blocking.

## 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.

## 3.3 INSTALLATION

- A. Install wall pads in accordance with manufacturer's instructions and as indicated on Drawings.
- B. Use anchoring devices to suit conditions and substrate materials encountered.
- C. Set wall pads plumb, square, aligned at top and bottom with adjacent pads, and securely anchored to building structure. Mount 6" above finished floor, centered on basketball backstop.
- D. Provide anchorage to prevent wall pads from sliding laterally on z-clip mounting.
- E. Provide protected and finished cutouts for wall devices such as outlets and switches. Provide reinforced edge support at cutouts.

## 3.4 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Clean wall pad covering and exposed mounting accessories.

**3.5 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.

**END OF SECTION**





**SECTION 11 66 43**  
**INTERIOR SCOREBOARDS**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes: Interior type electronic scoreboards including control center and other accessories for complete functional installation. Equipment to be designed for managing and displaying information for the following sports:
  - 1. Basketball.
  - 2. Volleyball.
  - 3. Wrestling.
- B. Related Requirements:
  - 1. Division 26 - Electrical; electrical related requirements.

**1.2 REFERENCES**

- A. American Society for Testing and Materials (ASTM):
  - 1. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
- B. Federal Communications Commission (FCC):
  - 1. FCC Rules and Regulations, Part 15; Current Edition.
- C. National Electrical Code (NEC).
  - 1. NEC Article 600; Current Edition.
- D. Underwriters Laboratories Inc. (UL):
  - 1. UL 48 - Standard for Safety for Electric Signs; 2011, Revisions 2022.

**1.3 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Data for scoreboards, controls, and accessories shall include descriptions of control functions.
- C. Shop Drawings: Installation drawings, face layout, dimensions, construction, electrical wiring diagrams, and method of anchorage.
- D. Samples: For each component requiring color selection, provide to the Architect samples indicating the manufacturer's full range of colors, textures, and finishes for selection.
- E. Warranty(s) sample.
- F. Manufacturer's installation instructions.

**1.4 QUALITY ASSURANCE**

- A. Source Limitation: All components including scoreboard, control center, control cable, and other accessories and installation hardware shall be products of a single manufacturer.
- B. Manufacturer Qualifications: Company specializing in manufacturing electronic scoreboards with minimum ten (10) years of experience.
- C. Scoreboards and other electrical components shall be certified and labeled in accordance with UL 48 for use in the United States.

- D. Scoreboards and other electrical components are to be electrically grounded in accordance with NEC, Article 600.

## 1.5 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Provide manufacturer's warranty covering defects in materials and workmanship for a period of five (5) years beginning on the date of Substantial Completion.
  - 1. Exceptions:
    - a. Wireless Components: Provide manufacturer's warranty covering defects in materials and workmanship for a period of two (2) years beginning on the date of Substantial Completion.
    - b. Hand-Held Controls: Provide manufacturer's warranty covering defects in materials and workmanship for a period of one (1) year beginning on the date of Substantial Completion.

## PART 2 PRODUCTS

### 2.1 SCOREBOARDS

- A. Manufacturers:
  - 1. Daktronics, Inc.
  - 2. Electro-Mech Scoreboard Company.
  - 3. Nevco Inc.
  - 4. Varsity Scoreboards.
- B. Basis of Design: Daktronics, Inc. - Model BB-2103.
- C. Interior type, multi-purpose basketball/volleyball/wrestling electronic scoreboard with two integral horns, changeable captions, LED displays for time, scores, periods, fouling player number with personal fouls, team fouls, bonus and double bonus indicators, and next possession arrows. Team Name Message Centers (TNMC) are to be provided.
  - 1. Size: 8 feet long x 6 feet high x 8 inches deep.
  - 2. Hanging Weight: Approximately 195 pounds.
  - 3. Captions:
    - a. 6 inches high:
      - 1) "Home"
      - 2) "Guest"
      - 3) Team Name Message Centers (TNMC)
    - b. 3 inches high:
      - 1) T.O.L. captions.
    - c. 4 inches high:
      - 1) All other captions not listed above.
  - 4. LED displays:
    - a. Timing: Super bright amber 13 inches high digits with lit colon.
    - b. Team Scores: Super bright red 13 inches high digits.
    - c. Period: Super bright amber 10 inches high digits.
    - d. Player Number With Personal Fouls, Game, And Weight: Super bright red 10 inches high digits.
    - e. Team Fouls, Games Won, And Match: 10 inches high digits.
    - f. Next possession: Super bright red arrow for each team.
    - g. Include bonus and double bonus as a 4 inch super bright amber LED "B".
    - h. Time Outs Left (T.O.L.): Super bright amber 7 inches high digits.
  - 5. Rear-lit captions are to require no maintenance.

6. Provide suspension anchoring and mounting.
  7. Power Requirement: 158 Watts, MAX, 100-240 Volts AC w/Power Factor Correction.
- D. Accessories:
1. Provide each scoreboard or accessory with control cable of length required. Electrical junction boxes, conduits, mounting hardware, and other accessories as required for installation are to be provided by others.
  2. Provide Upper Corner Logo / Sponsor Panels.
  3. Team Name Message Center (TNMC): "HOME" and "GUEST" caption plates to be replaced with programmable Team Name Message Center as manufactured by Daktronics Inc.
    - a. Specify changeable team names. (TNMC) Shall not require controller upgrade, use of additional accessories or computer.
- E. Control Center:
1. Basis of Design: Daktronics, Inc. - All Sport 5000 Series.
  2. Wireless, battery operated control center with receiver unit mounted at scoreboard.
  3. Handheld wireless type, basic, AA battery operated, sport specific, control center with receiver unit mounted at scoreboard.
    - a. Quantity: One (1) unit.
    - b. Unit is to comply with Part 15 of FCC Rules and Regulations.
    - c. Control Unit: Heavy duty aluminum case.
      - 1) Size: 4.25 x 16.25 x 9 inches.
    - d. Features:
      - 1) Wireless operation within 500 feet.
      - 2) Operate multiple scoreboards simultaneously.
      - 3) System allows multiple controllers to link to individual scoreboards.
      - 4) High visibility LCD display with a sealed keyboard.
      - 5) Provide external battery kit.
        - a) Basis of Design: Daktronics SL-04457.
      - 6) Provide 2.4 GHz spread spectrum radio control.
        - a) Basis of Design: Daktronics SL-04370.
      - 7) Provide Game Clock/Horn controller.
      - 8) Provide Shot Clock controller.
    - e. Receiver: Injection molded case, 5-1/2 by 3-3/4 by 2 inches mounted at scoreboard.
    - f. Maximum Range: 500 feet from control center to receiver.
    - g. Receiver is to require no additional source of power or separate control cable.
    - h. Power Adapters: Provide for each scoreboard receiver.
    - i. Provide carrying cases for control center and all necessary accessories.

## 2.2 MATERIALS

- A. Aluminum face and perimeter frame: Fabricated from 0.050 inch minimum thickness, ASTM B221 aluminum sheet.
- B. Finish: Acrylic polyurethane paint. Color to be as selected by Architect from manufacturer's full range of colors.
- C. Electronics: Low voltage, solid state, 2-wire cable, multiplex system, quartz crystal controlled.
- D. Provide fiber optic communication interface to reduce threat of damage from electrical storms.

- E. LED (Light Emitting Diode) Units: Seven-bar, segmented digits in protective aluminum cover, rated typical life 100,000 hours, and designed to provide excellent visibility from all angles and sides.
- F. Provide location specific universal power cord with plug for world-wide installation.
- G. Control cable where required are to be UL listed, 2-wire, type RG-58/U, coaxial cable, 1/4 inch diameter.
- H. Junction Boxes: Sheet metal box and cover, 4-1/2 x 2-1/8 x 2-1/8 inches minimum. complying with NEMA standards.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify exact scoreboard and control center quantities and locations.
- C. Verify and coordinate equipment electrical requirements to ensure proper power source, conduit, wiring, boxes, points of connectivity are provided and in locations required. Prior to installation, verify type and location of power supply.
- D. Verify that power supplies are as required and that points of connection are located where required.
- E. Verify that field measurements are as required.
- F. Verify that surfaces and conditions are ready to accept the work of this Section.
- G. Verify that building roof structure has been designed for loads of suspended scoreboards.
- H. Examine products to be installed for damage and other conditions detrimental to completion of the Work.
- I. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Coordinate requirements for electrical power, wall blocking, auxiliary framing and supports, suspension cables, and other components to be provided under other Specification Sections to ensure adequate provisions are made for complete, functional installation of scoreboards.

### **3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install the work in compliance with the design requirements, applicable codes, manufacturer's recommendations, and the contract documents.
- C. Before installation, field test scoreboards and accessories for operating functions. Ensure that scoreboards accurately perform all operations. Correct deficiencies.
- D. Rigidly mount scoreboards and accessories level and plumb with brackets and fasteners.
- E. Clean exposed surfaces.

- F. Protect scoreboards and finishes from other construction operations.

### **3.4 ADJUSTING**

- A. Section 01 73 00 - Execution: Starting, testing, adjusting, and balancing.
- B. Test and adjust system operation to function as required.

### **3.5 DEMONSTRATING AND TRAINING**

- A. Section 01 79 00 - Demonstration and Training: Provide demonstration and training to the Owner regarding operation and maintenance of components of the installed Work.

**END OF SECTION**



**SECTION 12 21 13**  
**HORIZONTAL LOUVER BLINDS**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Section includes horizontal metal slat louver blinds and operating hardware.

**1.2 COORDINATION**

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate the Work with window installation and placement of concealed blocking to support blinds.

**1.3 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal requirements.
- B. Product Data: Submit data indicating physical and dimensional characteristics, and operating features.
- C. Shop Drawings: Indicate opening sizes, tolerances required, method of attachment, clearances, and operation.
- D. Samples for Initial Selection: For each finish product specified, submit two sets of samples representing manufacturer's full range of available finishes, colors and patterns for all exposed components of product.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selection. Samples to be presented on actual product sections no less than 12 inches long.
- F. Manufacturer's Installation Instructions: Submit special procedures, perimeter conditions requiring special attention.

**1.4 QUALIFICATIONS**

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five (5) years documented experience.
- B. Installer: Company specializing in installing products specified in this section with minimum five (5) years documented experience.

**1.5 SPARE PARTS AND MAINTENANCE PRODUCTS**

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
  - 1. Extra Blind Assemblies: Two of each size.
  - 2. Extra Slats: 20 of each type and size.
  - 3. Extra Lift Cords, Control Cords, and Wands: One of each type.

**PART 2 PRODUCTS**

**2.1 HORIZONTAL LOUVER BLINDS**

- A. Manufacturers:

1. Bali Window Treatments.
2. Caco, Inc.
3. Hunter Douglas Window Fashions.
4. Levolor Contract.
5. Substitutions: Section 01 60 00 - Product Requirements.

## 2.2 COMPONENTS

- A. Blinds: Horizontal slat louvers hung from full-width headrail with full-width bottom rail; between the window jambs; manual control of raising and lowering by cord with full range locking; variable blade angle adjustable by control wand.
- B. Metal Slats: Spring tempered pre-finished aluminum; radiused slat corners, with manufacturing burrs removed.
  1. Width: 1 inch.
  2. Thickness: 0.008 inch.
  3. Color: As selected by Architect from submitted samples.
- C. Slat Support: Woven polypropylene cord, ladder configuration.
- D. Headrail: Pre-finished, formed aluminum box, with end caps; internally fitted with hardware, pulleys, and bearings for operation; same depth as width of slats; height 1-7/8 inches.
  1. Color: Same as slats.
- E. Bottom Rail: Pre-finished, formed aluminum with top side shaped to match slat curvature; with end caps.
  1. Color: Same as slats.
- F. Lift Cord: Braided polypropylene; continuous loop.
  1. Free end weighted.
  2. Color: As selected by Architect from submitted samples.
- G. Control Wand: Extruded hollow plastic; round shape.
  1. Non-removable type.
  2. Length to be window opening height less 3 inches.
  3. Color: Clear.
- H. Headrail Attachment: Wall brackets, or as otherwise indicated on Drawings.
- I. Accessory Hardware: Type recommended by blind manufacturer.

## 2.3 FABRICATION

- A. Verify field measurements prior to fabrication.
- B. Fabricate blinds to fit within openings with uniform edge clearance of 1/4 inch.
- C. At openings requiring multiple blind units, fabricate separate blind assemblies with space of 1/2 inch between assemblies, occurring at window mullion centers.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify openings are ready to receive work.
- C. Verify structural blocking and supports are correctly placed.



**3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.

**3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install blinds.
- C. Secure in place with flush countersunk concealed fasteners.
- D. Place intermediate head supports at 24 inch o.c., or closer for adequate support of imposed operating loads.

**3.4 ERECTION TOLERANCES**

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation of Gap at Window Opening Perimeter: 1/8 inch.
- C. Maximum Offset From Level: 1/8 inch.

**3.5 ADJUSTING**

- A. Section 01 73 00 - Execution: Starting, testing, adjusting, and balancing.
- B. Adjust blinds for smooth operation.

**3.6 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Clean blind surfaces just prior to occupancy.

**3.7 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protect installed construction.

**3.8 SCHEDULE**

- A. Blind locations and configurations to be as indicated on Drawings.

**END OF SECTION**



## SECTION 12 24 13

### ROLLER WINDOW SHADES

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Section includes roller window shades:
  - 1. Manually operating shades.
  - 2. Electric motorized operating shades.
- B. Related Requirements:
  - 1. Section 06 10 53 - Miscellaneous Rough Carpentry: Wood blocking and grounds for mounting roller shades and accessories.
  - 2. Section 08 41 13 - Aluminum-Framed Entrances and Storefronts.
  - 3. Section 08 44 13 - Glazed Aluminum Curtain Walls.
  - 4. Section 09 21 16 - Gypsum Board Assemblies: Coordination with gypsum board assemblies for installation of shade pockets, closures, and related accessories.
  - 5. Section 09 51 13 - Acoustical Panel Ceilings: Coordination with acoustical ceiling systems for installation of shade pockets, closures, and related accessories.
  - 6. Division 26 - Electrical: Coordination with electric service for motor controls.

##### 1.2 REFERENCES

- A. ASTM International (ASTM):
  - 1. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, Editorial Changes 2021.
- B. National Fire Protection Association (NFPA):
  - 1. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
  - 2. NFPA 701 - Fire Tests for Flame-Resistant Textiles and Films; 2023, Errata 2023.
- C. Window Covering Manufacturers Association (WCMA):
  - 1. WCMA A100.1 - Standard for Safety of Window Covering Products; 2022.

##### 1.3 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this Section. Review the work requirements, project conditions, sequencing, application procedures, quality control, testing and inspection and production schedule.

##### 1.4 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate with electrical contractor for appropriate location for power outlets as required by manufacturer's equipment and installation requirements.
- C. Coordinate with requirements of roller shade installer/dealer to ensure that no inaccessible areas are constructed.

##### 1.5 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Styles, material descriptions, dimensions of individual components, profiles, features, finishes and operating instructions.
  - 3. Storage and handling requirements and recommendations.
  - 4. Mounting details and installation methods.
  - 5. Typical wiring diagrams.
- C. Shop Drawings: Plans, elevations, sections, product details, installation details, operational clearances, wiring diagrams and relationship to adjacent work.
  - 1. Include wiring diagram.
  - 2. Include Shade Schedule indicating size, location, width, and keys to details.
  - 3. Window Treatment Schedule: For all roller shades. Use same room designations as indicated on the Drawings and include opening sizes and key to typical mounting details.
- D. Samples for Initial Selection: For each finish product specified, submit two sets of shade material options and aluminum finish color samples representing manufacturer's full range of available colors and patterns. Include sample of shade material indicating fully fabricated bottom and side edges.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selection of metal finishes, shade system components, unassembled, demonstrating compliance with specified requirements. Include shade material selection samples, 12 x 12 inches with face of material marked to indicate interior faces.
- F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

## 1.6 CLOSEOUT SUBMITTALS

- A. Section 01 78 23 - Operation and Maintenance Data.
- B. Operation and Maintenance Data: List of all components with part numbers, sources of supply, and operation and maintenance instructions; include copy of shop drawings.
- C. Manufacturer's Instructions and Maintenance Data: Methods for maintaining roller shades, precautions and recommendations regarding cleaning methods, cleaning materials and stain removal methods, instructions for operating hardware and controls.

## 1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this Section, with a minimum of five (5) years documented experience in manufacturing products specified in this Section.
- B. Obtain roller shades through one source from a single manufacturer.
- C. Installer Qualifications: Installer trained and certified by the manufacturer. Company specializing in performing the type of work required in this Section, with a minimum of five (5) years documented experience.
- D. Fire-Test-Response Characteristics: Passes NFPA 701 small and large-scale vertical burn. Materials tested shall be identical to products proposed for use.
- E. Electrical Components and System: In accordance with NFPA 70, components and system to be listed and labeled by either UL or ETL or other testing agency acceptable to authorities having jurisdiction, marked for intended use, and tested as a system. Individual testing of components will not be acceptable in lieu of system testing.
- F. Fungal Resistance: No growth when tested according to ASTM G21.

**1.8 MOCK-UP**

- A. Section 01 40 00 - Quality Requirements: Mock-up requirements.
- B. Provide a mock-up of one roller shade assembly for evaluation of mounting, appearance, and accessories.
  - 1. Locate mock-up at location designated by Architect.
  - 2. Do not proceed with remaining work until, mock-up is accepted by Architect.

**1.9 DELIVERY, STORAGE, AND HANDLING**

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Deliver shades in factory-labeled packages, marked with manufacturer and product name, fire-test-response characteristics, and location of installation using same room designations indicated on Drawings and in the submittal Shade Schedule.

**1.10 PROJECT CONDITIONS**

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after installation of Work.
- B. Environmental Limitations: Install roller shades after finish work including painting is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

**1.11 WARRANTY**

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Roller Shade Hardware and Chain Warranty: Manufacturer's standard non-depreciating twenty-five (25) year warranty.
- C. Roller Shade Motors and Motor Control Systems: Manufacturer's standard non-depreciating five (5) year warranty.

**1.12 SPARE PARTS AND MAINTENANCE PRODUCTS**

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
  - 1. Two (2) of each size and type of shade assembly installed.
  - 2. Two (2) of each type of control cord, control chain, and wand.

**PART 2 PRODUCTS****2.1 ROLLER SHADES**

- A. Manufacturers:
  - 1. Carnegie.
  - 2. Draper, Inc.
  - 3. Hunter Douglas Corporation.
  - 4. Lutron Electronics Company, Inc.
  - 5. MechoShade Systems, Inc.
  - 6. Standard Textile.
  - 7. TimberBlindMetroShade.
- B. Basis of Design:
  - 1. MechoShade Systems, Inc.

## 2.2 MANUAL OPERATING SHADES

- A. Mounting:
  - 1. As indicated on Drawings.
  - 2. Provide factory finished headbox with removable fascia to conceal roller(s) and operating mechanisms from view at all sides.
- B. Width and Length:
  - 1. Shades are to cover entire wall opening unless indicated otherwise on Drawings.
- C. Colors: Colors for fabrics and components exposed to view unless indicated otherwise on Drawings.
  - 1. As selected by Architect from manufacturer's full range.
- D. Single Roller Type.
  - 1. Fabric Material Type:
    - a. Blackout material.
  - 2. Locations:
    - a. As indicated on Drawings.
- E. Fabric Material Types:
  - 1. Blackout Material: Opaque.
- F. Clutch Operator: Manufacturer's standard material and design integrated with bracket/brake assembly.
  - 1. Provide a permanently lubricated brake assembly mounted on an oil-impregnated hub with wrapped spring clutch.
  - 2. Brake must withstand minimum pull force of 50 pounds (22.7 kg) in the stopped position.
  - 3. Mount clutch/brake assembly on the support brackets, fully independent of the roller tube components.
- G. Drive Chain: Continuous loop stainless steel beaded ball chain, 95 pound (43 kg) minimum breaking strength. Provide upper and lower limit stops.
  - 1. Chain Retainer: Chain tensioning device complying with WCMA A100.1.

## 2.3 ELECTRIC MOTORIZED OPERATING SHADES

- A. Mounting:
  - 1. As indicated on Drawings.
  - 2. Provide factory finished headbox with removable fascia to conceal roller(s) and operating mechanisms from view at all sides.
  - 3. Fabric Retention System: Manufacturer's system of side channels with fabric retainer and light seal, and shade fabric fabricated with steel stays.
- B. Width and Length:
  - 1. Shades are to cover entire wall opening unless indicated otherwise on Drawings.
- C. Colors: Colors for fabrics and components exposed to view unless indicated otherwise on Drawings.
  - 1. As selected by Architect from manufacturer's full range.
- D. Single Roller Type.
  - 1. Material Type:
    - a. Blackout material.
  - 2. Locations:
    - a. As indicated on Drawings.
- E. Fabric Material Types:

1. Blackout Material: Opaque.
- F. Controls:
1. Provide single, 3-position, keyed switch control operation for raising and lowering of shades in synchronized level of motion and at variable stopping locations between fully open and fully closed positions. Motor operation is to automatically disengage when shades are in fully open and fully closed position as to not damage shade and roller and motorized drive mechanism. Install keyed switch control device at location as indicated on Drawings or as designated by Architect.
  2. Provide wireless hand-held remote control device for each room in which motorized shades are installed. Furnish with each remote device, a wall-mountable device holder for installation by Owner.
- G. Motorized Shade Hardware and Shade Brackets:
1. Provide shade hardware constructed of minimum 1/8 inch thick plated steel, or heavier, thicker, as required to support 150 percent of the full weight of each shade.
  2. Provide shade hardware system that allows for field adjustment of motor or replacement of any operable hardware component without requiring removal of brackets, regardless of mounting position (inside, or outside mount).
- H. Shade Motor Drive System:
1. Shade Motors:
    - a. Tubular motors with built-in reversible capacitor operating at 110v AC (60hz), single phase, temperature Class B, thermally protected, totally enclosed, maintenance free with line voltage power supply equipped with locking disconnect plug assembly furnished with each motor.
    - b. Provide for controlled operation for raising and lowering of shades in synchronized level of motion and at variable stopping locations between fully open and fully closed positions. Motor operation is to automatically disengage when shades are in fully open and fully closed position as to not damage shade and roller and motorized drive mechanism.
    - c. Conceal motors inside shade roller tube.
    - d. Maximum current draw for each shade motor of 2.3 amps.
    - e. Use motors rated at the same nominal speed for all shades in the same room.
  2. Total hanging weight of shade band shall not exceed 80 percent of the rated lifting capacity of the shade motor and tube assembly.

## 2.4 SHADE BAND

- A. Shade Bands: Construction of shade band includes the fabric, the hem weight, hem-pocket, shade roller tube, and the attachment of the shade band to the roller tube. Sewn hems and open hem pockets are not acceptable.
1. Hem Pockets and Hem Weights: Fabric hem pocket with RF-welded seams (including welded ends) and concealed hem weights. Hem weights shall be of appropriate size and weight for shade band. Hem weight shall be continuous inside a sealed hem pocket. Hem pocket construction and hem weights shall be similar, for all shades within one room.
  2. Shade Band and Shade Roller Attachment:
    - a. Use extruded aluminum shade roller tube of a diameter and wall thickness required to support shade fabric without excessive deflection.
    - b. Provide for positive mechanical engagement with drive / brake mechanism.
    - c. Provide for positive mechanical attachment of shade band to roller tube; shade band shall be made removable / replaceable with a "snap-on" "snap-off" spline mounting, without having to remove shade roller from shade brackets.

- d. Mounting spline shall not require use of adhesives, adhesive tapes, staples, and/or rivets.
- e. Any method of attaching shade band to roller tube that requires the use of adhesive, adhesive tapes, staples, and/or rivets are not acceptable.

## 2.5 SHADE FABRICATION

- A. Fabricate units to completely fill existing openings from head to sill and jamb-to-jamb, unless specifically indicated otherwise.
- B. Provide battens in standard shades as required to assure proper tracking and uniform rolling of the shadebands. Contractor shall be responsible for assuring the width-to-height (W:H) ratios shall not exceed manufacturer's standards or, in absence of such standards, shall be responsible for establishing appropriate standards to assure proper tracking and rolling of the shadecloth within specified standards. Battens shall be roll-formed stainless steel or tempered steel, as required.
- C. For railroaded shadebands, provide seams in railroaded multi-width shadebands as required to meet size requirements and in accordance with seam alignment as acceptable to Architect. Seams shall be properly located. Furnish battens in place of plain seams when the width, height, or weight of the shade exceeds manufacturer's standards. In absence of such standards, ensure proper use of seams or battens as required to, and assure the proper tracking of the railroaded multi-width shadebands.
- D. Provide battens for railroaded shades when width-to-height (W:H) ratios meet or exceed manufacturer's standards. In absence of manufacturer's standards, be responsible for proper use and placement of battens to assure proper tracking and roll of shadebands.
- E. Blackout shadebands, when used inside channels, shall have horizontally mounted, roll-formed stainless steel or tempered-steel battens not more than 3 feet on center extending fully into the side channels. Battens shall be concealed in an integrally colored fabric to match the inside and outside colors of the shadeband, in accordance with manufacturer's published standards for spacing and requirements.
  1. Battens shall be roll formed of stainless steel or tempered steel and concave to match the contour of the roller tube.
  2. Batten pockets shall be self-colored fabric front and back RF welded into the shadecloth. A self-color opaque liner shall be provided front and back to eliminate any see through of the batten pocket that shall not exceed 1-1/2 inches high and be totally opaque. A see-through moiré effect, which occurs with multiple layers of transparent fabrics, shall not be acceptable.

## 2.6 COMPONENTS

- A. Access and Material Requirements:
  1. Provide shade hardware allowing for the removal of shade roller tube from brackets without removing hardware from opening and without requiring end or center supports to be removed.
  2. Provide shade hardware that allows for removal and re-mounting of the shade bands without having to remove the shade tube, drive, or operating support brackets.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.



- B. Verify field measurements are as shown on shop drawings.
- C. Examine substrates for conditions detrimental to installation of the Work. Proceed with installation only after unsatisfactory conditions have been corrected.
- D. Examine products to be installed for damage and other conditions detrimental to completion of the Work. Proceed with installation only after unsatisfactory conditions have been corrected.
- E. Verify that required electrical service is available, in proper location, and ready for installation of the work of this Section.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section. Prepare materials to be installed and equipment used during installation.
- B. Clean surfaces thoroughly prior to installation.
- C. Prepare surfaces for installation of the work.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install roller shades level, plumb, square, and true according to components in accordance with manufacturer's written instructions and located so shade band is not closer than 2 inches to interior face of glass. Allow proper clearances for window operation hardware.
- C. Motorized Operating Shades:
  - 1. Turn-Key Single-Source Responsibility: To control the responsibility for performance of motorized roller shade systems, assign the design, engineering, and installation of motorized roller shade systems, motors, controls, and low voltage electrical control wiring specified in this Section to a single manufacturer and their authorized installer/dealer. The Architect will not produce a set of electrical drawings for the installation of control wiring for the motors, or motor controllers of the motorized roller shades. Power wiring (line voltage) shall be provided by the roller shade installer/dealer, in accordance with the requirements provided by the manufacturer. Coordinate the following with the roller shade installer/dealer:
    - a. Contractor shall provide power panels and circuits of sufficient size to accommodate roller shade manufacturer's requirements, as indicated on the mechanical and electrical drawings.
    - b. Contractor shall coordinate with requirements of roller shade installer/dealer to ensure that no inaccessible areas are constructed.
    - c. Roller shade installer/dealer shall run line voltage as dedicated home runs (of sufficient quantity, in sufficient capacity as required) terminating in junction boxes in locations designated by roller shade dealer.
    - d. Roller shade installer/dealer shall provide and run all line voltage (from the terminating points) to the motor controllers, wire all roller shade motors to the motor controllers, and provide and run low voltage control wiring from motor controllers to switch/control locations indicated on Drawings or otherwise designated by the Architect. All above-ceiling and concealed wiring shall be plenum-rated, or installed in conduit, as required by the electrical code having jurisdiction.
    - e. Contractor shall provide conduit with pull wire in all areas, which might not be accessible to roller shade contractor due to building design, equipment location or schedule.

2. Ensure that all wiring is concealed in a tight, uniform installation. Coordinate with electrical contractor for appropriate location for power outlets as required by manufacturer's equipment and installation requirements.

### **3.4 ADJUSTING**

- A. Section 01 73 00 - Execution: Starting, testing, adjusting, and balancing.
- B. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

### **3.5 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Clean roller shade surfaces after installation, according to manufacturer's written instructions.

### **3.6 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed work from damage.

### **3.7 DEMONSTRATION AND TRAINING**

- A. Section 01 79 00 – Demonstration and Training.
- B. Provide demonstration and train to Owner's maintenance personnel to adjust, operate and maintain roller shade systems.

**END OF SECTION**

**SECTION 12 32 16****MANUFACTURED PLASTIC-LAMINATE-CLAD CASEWORK****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Manufactured plastic-laminate-clad casework.
  - 2. Countertops.
  - 3. Casework hardware.
- B. Related Requirements:
  - 1. Section 09 65 00 - Resilient Flooring: Rubber base.
  - 2. Division 22 - Plumbing Fixtures: Sinks set in countertops.

**1.2 DEFINITIONS**

- A. Identification of Casework Parts by Surface Visibility:
  - 1. Unit Body with Open Interior: Storage unit surfaces without solid door or drawer fronts, and units with glass sliding or glass framed doors.
  - 2. Unit Body with Closed Interior: Storage unit surfaces with closable solid door or drawer fronts.
  - 3. Exposed Surface: Surface that is visible.
  - 4. Concealed Surface: Surface that is not visible after installation.

**1.3 REFERENCES**

- A. American National Standards Institute (ANSI):
  - 1. ANSI A135.4 - Basic Hardboard; 2012, Reapproval 2020.
  - 2. ANSI A208.1 - Particleboard; 2022.
- B. ASTM International (ASTM):
  - 1. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- C. Architectural Woodwork Manufacturers Association of Canada (AWMAC) and the Woodwork Institute (WI):
  - 1. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2021, with Errata.
- D. California Department of Public Health (CDPH):
  - 1. CDPH Standard Method VOC V1.2 - Standard Method For The Testing And Evaluation Of Volatile Organic Chemical Emissions From Indoor Sources Using Environmental Chambers - Version 1.2; 2017.
- E. National Electrical Manufacturers Association (NEMA):
  - 1. NEMA LD 3 - High Pressure Decorative Laminates; 2005.

**1.4 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene a preinstallation meeting not less than one week before starting work of this Section; require attendance by all affected installers.

**1.5 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

- B. Product Data: Submit data describing casework finishes and construction.
- C. Shop Drawings:
  - 1. Scale of Drawings: 1-1/2 inch to 1 foot, minimum.
  - 2. Provide the information required by AWMAC/WI (NAAWS) and to include the following:
    - a. Indicate component dimensions, configurations, elevations, cross-sections, construction details, joint details, hardware locations, service run spaces and location of services. Include layout of units with relation to surrounding walls, doors, windows, and other building components.
    - b. Include details for fabrication of vanity and countertop supports, brackets, and finishes.
- D. Samples for Initial Selection: Two manufacturer's color samples illustrating the full range of finishes, patterns, and colors available for each finish surface type, trim and hardware indicated; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish, pattern, and color; minimum 4 x 4 inch samples and actual hinge and pull. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Certificate: Submit labels and certificates required by quality assurance and quality control programs.

## 1.6 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum ten (10) years documented experience.
- B. Installer: Company specializing in the installation of casework with minimum five (5) years documented experience and approved by the manufacturer.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Store completed casework and countertops in a ventilated space with relative humidity range of 20 to 50 percent.

## 1.8 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.
- B. Do not install casework in unconditioned spaces, or in spaces where relative humidity is not within acceptable limits.

## PART 2 PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Work of this Section is to comply with AWMAC/WI (NAAWS), unless indicated otherwise.
- B. AWMAC/WI (NAAWS) Quality Standard:
  - 1. Custom Grade.

## 2.2 MANUFACTURED PLASTIC-LAMINATE-CLAD CASEWORK

- A. Manufacturers:
1. Biggs Casework, Inc.
  2. Blair-Dumond, Inc.
  3. Cabinets by Design, Inc., Duluth GA.
  4. Case Systems.
  5. Cleora Sterling Corporation.
  6. Interior Wood Specialties, Inc.
  7. Kewaunee Scientific Corporation.
  8. Pridgen Cabinetworks.
  9. Stevens Industries Inc.
  10. TMI Systems Design Corporation.
  11. Substitutions: Section 01 60 00 - Product Requirements.

## 2.3 COMPONENTS

- A. Particleboard: ANSI A208.1; 45 pound density, fir, or pine.
1. Interior Composite Wood Products: CDPH Standard Method VOC V1.2.
  2. Use Moisture Resistant Particleboard on countertops in wet areas and at sinks.
- B. Hardboard: ANSI A135.4; prefinished; 1/4 inch thick.
- C. Melamine: Melamine resin laminate sheet; thermally fused to panel core material. Colors indicated in FINISHES article in this Section.
- D. PVC Edging: Extruded PVC, self-locking serrated tongue, of width to match component thickness. Colors indicated in FINISHES article in this Section.
1. Convex face with smooth finish.
- E. Plastic Laminate: High Pressure Decorative Laminate (HPDL) complying with AWMAC/WI (NAAWS) and NEMA LD 3. Colors indicated in FINISHES article in this Section.
- F. Solid Surface Material: Cast polymeric resin.
1. Provide finished products having flame spread index of 35 or less, and smoke developed index of 15 or less, when tested in accordance with ASTM E84 in thickness of 3/4 inch.
  2. Resin: Polyester type, with integral coloring, stain resistant to domestic chemicals and cleaners.
  3. Colors indicated in FINISHES article in this Section.
  4. Polishing Cream: Compatible polishing cream to achieve specified finish sheen.
  5. Adhesive: Type recommended by solid surface manufacturer and coordinated for bonding to substrate type.
- G. Cabinet Hardware:
1. Pulls:
    - a. Attachment:
      - 1) 4 inch centers.
    - b. Finish and Color:
      - 1) Powder coated wire; color as selected by Architect from manufacturer's full range.
  2. Hinges: Heavy duty, exposed 5 knuckle, fixed pin, hospital-tip style.
    - a. Finish and Color:
      - 1) To match Pulls.
  3. Magnetic Catches: Aluminum case with zinc plated steel strike, 6 lb. pull minimum.

4. Door & Drawer Locks: Cam type, disc tumbler capable of being master keyed; stainless steel, satin finish. Each room, keyed alike and separate from other rooms and all locks master keyed.
    - a. Drawers: Lock quantities and locations.
      - 1) Provide keyed locks at locations indicated on Drawings.
    - b. Doors: Lock quantities and locations.
      - 1) Provide keyed locks at locations indicated on Drawings. For double door cabinet units receiving keyed lock, provide interior release/latch for adjacent door.
  5. Coat Hooks: Ceiling and wall surface mounted types.
    - a. Double prong wardrobe design; stainless steel.
    - b. Finish and Color: To match Pulls.
    - c. Hook quantities and locations; to be mounted in casework units as follows:
      - 1) Provide coat hooks at locations indicated on Drawings.
  6. Hardware Fasteners: Exposed fasteners to match material and finish of installed device.
  7. Where door opens against adjacent construction, provide chain or other restraint device to prevent door and door hardware from contacting adjacent construction.
  8. Drawer Slides:
    - a. Standard Drawers: Nylon ball bearing, self-closing; 75 pound capacity.
    - b. File Drawers: Full extension, ball bearing, self-closing; 100 pound capacity.
  9. Adjustable Shelf Supports:
    - a. Heavy duty, polycarbonate; clear; pin type; shelf locking clip.
  10. Casters: Double ball bearing mounting to heavy gage zinc plated fork; 5 inch soft rubber wheels. Provide two brake units per mobile unit.
- H. Fixed Vanity and Countertop Brackets:
1. Brackets to comply with Americans with Disabilities Act (ADA) where applicable.
  2. Material:
    - a. Stainless steel; satin finish.
- I. :Bolts, Nuts, Washers, Lags, Anchors, Pins, Fasteners, and Screws: As indicated on Drawings and otherwise to be of size and type to suit application; galvanized finish in concealed locations and stainless steel in exposed locations.

## 2.4 FABRICATION

- A. Verify field measurements prior to fabrication.
- B. Fabricate laminate clad casework to dimensions, profiles and details shown.
- C. Joinery Dowels: Hardwood dowels, glued and clamped tight.
- D. Construct cabinet bodies with 3/4 inch particleboard for sides, fixed intermediates, subtops, and bottoms. Stretchers, where allowed, to be minimum 4 inch wide.
  1. Subtops to be solid particleboard; no stretchers allowed for subtops.
- E. Construct shelving up to 30 inches wide with 3/4 inch particleboard. Construct shelving greater than 30 inches wide with 1 inch particleboard.
- F. Construct cabinet backs with 1/2 inch particleboard.
- G. Construct drawers with 1/2 inch particleboard for sides, back, and subfront. Construct drawer bottoms with 1/2 inch prefinished hardboard.
- H. Construct doors, and drawer fronts with 3/4 inch particleboard.
- I. Construct countertops as follows:
  1. Use Moisture Resistant Particleboard in wet areas and countertops with sinks.

2. Use 1-1/8 inch particleboard for countertops finished with Plastic Laminate.
  3. Use 3/4 inch particleboard for countertops finished with Solid Surface (Synthetic Surface) type material.
- J. All components to be of balanced construction. Plastic laminate faced particleboard to be balanced with high pressure cabinet liner on opposite side unless otherwise noted. Melamine faced particleboard to be balanced with melamine.
- K. Wall Hung Units:
1. Top surfaces of wall hung units to be finished with same material as visible vertical end panels.
  2. Bottom surfaces of wall hung units to be finished with melamine on surfaces and color matching PVC panel edging.

## 2.5 FINISHES

- A. Doors:
1. Front and Interior: Plastic laminate VGS28 with 3mm PVC edging.
- B. Drawers:
1. Fronts: Plastic laminate VGS28 with 3mm PVC edging.
  2. Interiors: Melamine with 1mm PVC edging.
- C. Unit Body with Closed and Open Interiors:
1. Interior Surfaces: Melamine with 1mm PVC edging.
  2. Exposed Surfaces: Plastic laminate VGS28 with 1mm PVC edging.
  3. Shelves: Melamine on both sides.
    - a. Shelf Edging for Closed Interiors: 1mm PVC edging.
    - b. Shelf Edging for Open Interiors: 3mm PVC edging.
- D. Countertops:
1. Plastic Laminate Clad Type: HGS/HGP48 with 3mm PVC edging.
    - a. Locations: All countertops unless otherwise indicated.
  2. Solid Surface Material Type: Cast polymeric resin.
    - a. Locations: As indicated on Drawings.
- E. Finishes Colors and Textures:
1. Melamine: White.
  2. PVC Edging:
    - a. Colors and textures as selected by Architect from manufacturer's full range.
  3. Plastic Laminate:
    - a. Colors and textures as selected by Architect from manufacturer's full range.
  4. Solid Surface Material:
    - a. Colors and textures as selected by Architect from manufacturer's full range.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify adequacy of backing and support framing.
- C. Verify location and sizes of utility rough-in associated with work of this Section.

**3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.

**3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install work in accordance with AWMAC/WI (NAAWS) requirements for grade indicated.
- C. Set and secure casework in place; rigid, plumb, and level.
- D. Use fixture attachments in concealed locations for wall mounted components.
- E. Use concealed joint fasteners to align and secure adjoining cabinet units and counter tops.
- F. Carefully scribe casework abutting other components and construction, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.
- G. Secure cabinets, brackets and bases to floor and wall substrates using appropriate angles and anchorages.
- H. Seal joints at abutment to other construction with appropriate sealant matching casework finish.
- I. Sequence installation and erection to ensure mechanical and electrical connections are achieved in an orderly and expeditious manner.

**3.4 ADJUSTING**

- A. Section 01 73 00 - Execution: Starting, testing, adjusting, and balancing.
- B. Adjust moving or operating parts to function smoothly, without binding and correctly.
- C. Repair or remove and replace defective work to new condition.

**3.5 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Clean casework, counters, shelves, hardware, fittings, and fixtures.

**3.6 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect Work from damage, including damage from detrimental air temperature and humidity levels.

**END OF SECTION**



**SECTION 12 35 53.19**  
**WOOD LABORATORY CASEWORK**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes: Manufactured wood laboratory casework and accessories.
- B. Related Sections:
  - 1. Section 09 65 00 - Resilient Flooring: Rubber base.
  - 2. Section 12 32 16 - Manufactured Plastic-Laminate-Clad Casework.
  - 3. Division 22 - Plumbing: Plumbing requirements related to the Work of this Section.
  - 4. Division 26 - Electrical: Electrical requirements related to the Work of this Section.

**1.2 REFERENCE STANDARDS**

- A. Factory Mutual Global (FM):
  - 1. FM (AG) - FM Approval Guide; Current Edition.
- B. National Fire Protection Association (NFPA):
  - 1. NFPA 30 - Flammable and Combustible Liquids Code; 2024.
- C. National Hardwood Lumber Association (NHLA):
  - 1. NHLA G-101 - Rules for the Measurement and Inspection of Hardwood and Cypress; 2023.
- D. Underwriters Laboratories (UL):
  - 1. UL (DIR) - Online Certification Directory; Current Edition.
- E. US Occupational Safety and Health Administration (OSHA).

**1.3 DEFINITIONS**

- A. Identification of Casework Parts by Surface Visibility:
  - 1. Unit Body Open Interiors: Any storage unit surface without solid door or drawer fronts and units with glass sliding or glass framed doors.
  - 2. Unit Body Closed Interiors: Any storage unit surface behind solid door or drawer fronts.
  - 3. Unit Body Exposed Side: Any storage unit exterior side surface that is visible after installation.
  - 4. Concealed Surfaces: Any surface not normally visible after installation.

**1.4 COORDINATION**

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate the Work with required services to casework.

**1.5 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit data on casework finishes.
- C. Shop Drawings: Include component dimensions, configurations, elevations, cross-sections, construction details, joint details, service run spaces and location of services. Include layout of units with relation to surrounding walls, doors, windows, and other building components.

- D. Manufacturer's Installation Instructions: Submit special precautions for installation.
- E. Maintenance Data: Submit instructions for cleaning stains from finish of casework and countertops.

## 1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in the manufacturing of products specified in this Section with minimum three (3) years documented experience.
- B. Installer: Company specializing in installing the work of this Section with three (3) years documented experience and approved by the Manufacturer.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Store completed casework and countertops in a ventilated space with relative humidity range of 20 to 50 percent.

## 1.8 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after installation of Work.
- B. Do not install casework in unconditioned spaces, or in spaces where relative humidity is not within acceptable limits.

## PART 2 PRODUCTS

### 2.1 WOOD LABORATORY CASEWORK

- A. Manufacturers:
  - 1. ALC - Collegedale.
  - 2. Campbell Rhea.
  - 3. Diversified Woodcrafts, Inc.
  - 4. Kewaunee Scientific Corporation.
  - 5. Sheldon Labs.
  - 6. Substitutions: Section 01 60 00 - Product Requirements.

### 2.2 COMPONENTS

- A. Hardwood Lumber (Exposed to View): Red oak, NHLA G-101 grade FAS or better, free from defects, maximum moisture content of 6 percent.
- B. Hardwood Lumber (Concealed from View): Any species, NHLA G-101 grade FAS or better, maximum moisture content of 6 percent.
- C. Hardwood Plywood (Exposed to View): Red oak veneer, plain sliced, slip matched, grade A-2, crossbanded with solid core, minimum number of plies as follows:
  - 1. 3/4 Inch: 7 ply.
  - 2. 1/2 Inch: 5 ply.
  - 3. 1/4 Inch: 3 ply.
- D. Hardwood Plywood (Concealed from View): Any species veneer, sound grade, crossbanded with solid core, minimum number of plies same as Oak plywood.
- E. Hardboard: Tempered, exploded wood fibers compressed with natural resins and other binders, 50 pcf density minimum, 1/4 inch thick.

- F. Particleboard: Industrial grade, 45 pcf density minimum.
- G. Glass (When shown in Plan): Double strength; grade B, tempered, 1/8 inch thick.
- H. Leg Shoes (When shown in Plan): Closed bottom style.
- I. Countertops: Molded modified epoxy resin, non-glare, black finish; minimum 1 inch thick with radiused edges.
- J. Sinks: Drop in molded modified epoxy resin, non-glare black finish.
- K. Cabinet Hardware:
  - 1. Hinges: Heavy duty stainless steel construction exposed 5 knuckle type with hospital tip, fixed pin.
  - 2. Catches: Friction roller type, spring cushioned, polyethylene or nylon roller, metal strike plate.
  - 3. Pulls: Extruded aluminum bar type, satin finish, 4 inch centers.
  - 4. Drawer Slides: Heavy duty epoxy coated steel, ball bearing nylon rollers, automatic positive stop levers, non-tool type drawer removal.
    - a. Use full extension slides at file drawers.
  - 5. Adjustable Shelf Supports: Heavy duty, steel pin with nylon caps or polycarbonate with non-tip safety feature.
  - 6. Door and Drawer Locks: Cam type disk tumbler, brass key and tumbler with zinc alloy cylinder; lock capable of being master keyed.

### 2.3 FABRICATION

- A. Verify field measurements prior to fabrication.
- B. Fabricate laboratory casework to dimensions, profiles, and details shown.
- C. Cabinet Joinery: Industrial grade hardwood dowels or screws, glued and clamped tight.
- D. Construct cabinet bodies with 1 inch thick solid red oak top rails and 1 inch thick solid red oak intermediate rails. Cabinet sides to be constructed of 3/4 inch hardwood plywood for concealed surfaces and 3/4 inch thick red oak plywood for semi-exposed and exposed surfaces.
- E. Construct cabinet backs with 1/4 inch thick hardboard for concealed surfaces, 1/4 inch thick red oak plywood for semi-exposed surfaces, and 3/4 inch thick red oak plywood for exposed surfaces.
- F. Construct shelving with 3/4 inch thick hardwood plywood with hardwood edging for unexposed surfaces, and with 3/4 inch thick red oak plywood with solid red oak edging for semi-exposed and exposed surfaces.
- G. Construct doors with solid red oak banding, 3/4 inch thick, encasing particleboard core red oak plywood. All edges to be radiused.
  - 1. Grain for door and drawer fronts to be vertical matched.
- H. Construct drawers with 1/2 inch hardwood lumber for sides and back. Construct drawer bottom with 1/4 inch plywood or hardboard. Construct drawer fronts with minimum 13/16 inch red oak lumber dovetailed into drawer sides. Drawer front edges to be radiused.
- I. Tables (When shown in Plan): Construct tables with 2-1/4 inch square laminated solid red oak legs and minimum 3/4 inch thick solid red oak side and center rails, 4-3/16 inches wide. Exterior rails attached together with corner braces, mortised, and screwed; center rails attached to exterior rails with dowels and glue. Attach legs to table frame with lag or hanger bolts machine driven into legs and attached to corner braces. Provide leg shoes for all legs. Provide solid red oak leg stretchers between all legs.

- J. Sinks to be under-slung type and adhered to bottom of countertop. Provide sink supports on cabinet bodies.
- K. Provide 4 inch high epoxy resin back splashes on all countertops abutting walls. Provide 4 inch high side splashes on side of countertops abutting walls.

## 2.4 FINISHES

- A. Exposed to View Surfaces: One coat stain, to match adjacent entry doors; one coat catalyzed sealer; top coat of clear, catalyzed conversion varnish or catalyzed acrylic.
- B. Semi-Exposed Surfaces: Same as exposed to view surfaces.
- C. Concealed Surfaces: Base coat of catalyzed sealer, top coat of clear, catalyzed conversion varnish or catalyzed acrylic.
- D. Finished surfaces to have chemical resistance performance as follows:
  - 1. Surfaces to exhibit little or no effect to exposure to the following chemicals and solutions:
 

Acetic Acid - 50%	Methyl Ethyl Ketone
Acetone	Naphtha
Ammonium Hydroxide - 28%	Nitric Acid - 10%
Benzene	Phosphoric Acid - 75%
Carbon Tetrachloride	Potassium Hydroxide - 50%
Ethyl Acetate	Sodium Carbonate
Ethyl Alcohol	Sodium Hydroxide - 40%
Ethyl Ether	Sulfuric Acid
Formaldehyde	Toulene
Gasoline	Xylene
Hydrochloric Acid - 37%	

Methanol (Methyl Alcohol)

## 2.5 LABORATORY ACCESSORIES

- A. Solvent (Flammable) Storage:
  - 1. Basis of Design: Campbell Rhea - Model 6778.
  - 2. Design and construct in accordance with OSHA regulations, FM, UL and NFPA 30. Cabinets shall be FM (AG) approved and UL (DIR) listed with UL/FM approval label affixed to inside of cabinet door.
  - 3. Ventilation: Two threaded, two inch pipe vent outlets and flame arrestors on the back of the cabinet. Vent to the exterior and as required by local code.
    - a. Coordinate with the Mechanical Work as described in Division 23.
  - 4. Identification: Two inch high lettering: FLAMMABLE KEEP FIRE AWAY.
  - 5. Room where solvent storage is located shall have a negative pressure rating.
- B. Wall Mounted Peg Board:
  - 1. Basis of Design: Campbell Rhea - Model 6664.
  - 2. Drying rack shall be FM (AG) approved and UL (DIR) listed with UL/FM approval label affixed to inside of cabinet door.
  - 3. Provide phenolic resin back with polypropylene pegs.
  - 4. Provide stainless-steel drip troughs with drain outlet.

**PART 3 EXECUTION****3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify dimensions, tolerances, and methods of attachment with other Work.
- C. Verify adequacy of backing and support framing.

**3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.

**3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install casework in accordance with manufacturer's instructions.
- C. Use anchoring devices for materials encountered and usage expected.
- D. Set casework plumb, square, and true, securely anchored to building structure. Shim as required.
- E. Where casework abuts other finished work, scribe and cut to accurate fit.
- F. Sequence installation and erection to ensure mechanical and electrical connections are achieved in an orderly and expeditious manner.

**3.4 ADJUSTING**

- A. Section 01 73 00 - Execution: Starting, testing, adjusting, and balancing.
- B. Adjust doors, drawers, hardware, fixtures and other moving or operating parts to function smoothly and correctly.
- C. Repair or remove and replace defective Work as directed by Architect.

**3.5 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Clean casework, counters, shelves, hardware, fittings, and fixtures.

**3.6 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect casework from damage until final acceptance.

**END OF SECTION**



**SECTION 12 48 13.13**  
**ENTRANCE FLOOR MATS**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Section Includes: Entrance floor mats.

**1.2 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Provide data indicating properties and characteristics of products.
- C. Shop Drawings: Indicate dimensions and details of product and provide drawings indicating installation locations.
- D. Samples for Initial Selection: Two manufacturer's complete sets of color samples illustrating the full range of colors, textures and pattern designs available; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected colors, textures, and pattern designs; samples to be same product material type indicated for final Work; each sample 12 x 12 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Maintenance Data: Include instructions for cleaning, stain removal, and materials to be used.

**1.3 DELIVERY, STORAGE, AND HANDLING**

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Deliver products in manufacturer's original packaging. Store materials in a dry, protected, well-vented area. Inspect product upon receipt and report damaged material immediately to delivering carrier and note such damage on the carrier's freight bill of lading.

**1.4 SPARE PARTS AND MAINTENANCE PRODUCTS**

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
- B. For each installed floor mat, provide one (1) additional of each size and each color to the Owner in its manufacturer's original packaging.

**PART 2 PRODUCTS**

**2.1 FLOOR MATS**

- A. Manufacturers:
  - 1. Construction Specialties, Inc. (CSI).
  - 2. Pawling Corporation.
  - 3. Waterlock Floor Mats.
  - 4. Substitutions: Section 01 60 00 - Product Requirements.

- B. Basis of Design:
  - 1. Waterlock Floor Mats - Waterhog Classic Mats.
- C. Floor mats are to be designed and fabricated as units to be installed flat to finished floor surface without attachment to floor or other finishes.
  - 1. Flammability: Passes DOC-FF-1-70.
  - 2. Static Coefficient of Friction: Wet - 0.60 minimum when tested in accordance with ASTM D2047.
- D. Floor Mat Size: As indicated on Drawings.
- E. Floor Mat Total Thickness: 1/2 inch.
- F. Floor Mat Surface:
  - 1. Fiber Type: 100% polypropylene; solution dyed polypropylene.
  - 2. Weight: 24 oz/sq yd, minimum.
  - 3. Nub Height: 1/4 inch, minimum.
  - 4. Nub Pattern Design:
    - a. To be selected by Architect from full range.
  - 5. Color:
    - a. To be selected by Architect from full range.
- G. Floor Mat Backing:
  - 1. Type: Non-skid rubber.
  - 2. Thickness: 1/4 inch, minimum.
- H. Floor Mat Border: Mat perimeter to have integral continuous border; permanent bond to mat surface backing; 1-1/2 inch wide, tapered to floor; rubber or vinyl.
  - 1. Border interior edge (adjacent to mat fibers) to be raised to serve a water dam, capable of holding no less than 1 gallon of water per square yard.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that field measurements are as required.
- C. Verify that surfaces and conditions are ready to accept the work of this Section.
- D. Examine products to be installed for damage and other conditions detrimental to completion of the work.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Clean substrate for installation.

### **3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install the work in compliance with the design requirements.



**3.4 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures.
- B. Clean installed work in accordance with manufacturer's recommendations including cleaning procedures and materials.

**3.5 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed construction from damage.

**END OF SECTION**



**SECTION 12 61 00**  
**FIXED AUDIENCE SEATING**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. The Work required under this Section consists of furnishing and installing auditorium seating, accessories, and necessary mounting and installation hardware as indicated on Drawings and in this Section.

**1.2 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings shall be comprehensive layout drawings(s) showing all equipment to be furnished with details of accessories to be supplied including necessary electrical service to be provided by others.
  - 1. Include project-referenced edition of the North Carolina State Building Code compliance calculations for seating rows, back-to-back spacing, aisle widths and ICC A117.1 compliance for complete layout installation.
  - 2. Shop drawings must be sealed and signed by Engineer licensed to practice in the State in which the project is located.
- C. Samples of material and color finish as requested by Architect.
  - 1. Include submission of full range of Upholstery Fabric colors and patterns available.
- D. Installation, operation, and maintenance instructions.
- E. Written warranty to the Owner upon completion.

**1.3 QUALITY ASSURANCE**

- A. Manufacturer: Company specializing in spectator seating with a minimum of ten (10) years experience in manufacturing spectator seating equipment.
- B. Engineer Qualifications: Manufacturer to employ a registered licensed professional engineer to certify that the equipment to be supplied meets or exceeds the design criteria of this specification. Engineer is to be licensed to practice in the State in which the project is located.
- C. Product Improvements: Equipment provided shall incorporate manufacturer's design improvements and materials current at time of shipment, provided that such improvements and materials are consistent with the intent of these specifications.
- D. Welding Processes: To be performed by certified professional welding operators in accordance with AWS D1.1 "Structural Welding Code-Steel".
- E. Installation: Shall be handled directly by the manufacturer or by a factory certified installation subcontractor.

**1.4 WARRANTY**

- A. Contractor shall warranty all work performed under these specifications to be free of defects for a period of one year from the Date of Substantial Completion.
  - 1. Any materials found to be defective within this period will be replaced at no cost to the Owner.
- B. Provide manufacturer's warranty for the following components and durations:

1. Structural Standards/Cast Seat Supports & Brackets/Dual Action Seat Return Springs: Lifetime.
2. Seat & Back Assemblies/Fold-Down & Self-Rising Mechanisms: Five (5) years.
3. Upholstery Stitching & Thread Wear, Plastic, Wood, and Paint Components & Wear: Five (5) years.

## **PART 2 PRODUCTS**

### **2.1 FIXED AUDIENCE SEATING**

- A. Manufacturers:
  1. Hussey Manufacturing, Inc.
  2. American Seating.
  3. Davis Furniture Company.
  4. Irwin Seating Company.
  5. Lancaster Auditorium Seating.
  6. Seating Concepts.
  7. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design: Hussey Manufacturing, Inc.: Quattro Classic Series.
- C. The chair seating system shall be comprised of a multiplicity of chair modules and supportive members.
- D. The dimensional and physical characteristics of the seating, and the seating plan, are to comply with all applicable codes, this Section, and the Drawings.
- E. The seating layout shall be radial to match the curve of the slab and based on a 36 inch back-to-back row spacing and an average 22 inches chair width.

### **2.2 DESIGN CRITERIA**

- A. Seats:
  1. Shall be semi-cantilevered, self-centering, automatic three-quarter lift with over center retract feature.
  2. Shall be tested and professionally certified through an independent testing laboratory to support and withstand an evenly distributed 600 lb. load without failure or irregularities that would impair usefulness.
  3. Shall be tested and professionally certified through an independent testing laboratory to withstand 350,000 operating cycles without added lubrications, failure to gravity-lift return to upright position, adjustment, or measurable bearing wear.
  4. Shall be tested and professionally certified to withstand, without failure, 5,000 impacts of a 40 lb. sandbag dropped on center of seat from a distance of 12 inches at 35 c.p.m.
- B. Backs:
  1. Shall withstand an evenly distributed front or rear load of 450 lbs.
  2. Shall be tested and professionally certified to withstand, without failure, 40,000 alternating swinging impact cycles by each of two opposing 40 lb. sandbags. Sandbags shall be moved horizontally and equally through various distances (6 inches, 8 inches, 10 inches, and 12 inches) at 35 c.p.m.
- C. Materials Flammability shall satisfy applicable test, codes, standards, or requirements as follows:
  1. Polyethylene shall meet the Federal Motor Vehicle Safety Standard No. 302 which specifies a burning rate of less than 4 inches per minute.

2. Upholstery materials meet Class 1 requirements of U.S. Department of Commerce, CS 191-52 as required by the State of California Home Furnishings Act.
3. Cushioning and padding that exceeds 1/2 inch thickness shall be self-extinguishing and shall not exhibit flaming drippings the extent that these drippings ignite a duplicate specimen to foam placed directly underneath the test sample when tested as defined in ASTM 1692-68.

## 2.3 FABRICATION

- A. Arch Spring/Foam Cushion Upholstered Seats:
  1. Seat pan shall be polymer molded with platform cushioned seating OR deep drawn, die formed, 20 gauge one-piece metal compound curved construction with the perimeter edge rolled inward for added strength and appearance. The pan shall be free of buckles, ripples, dimples, and die marks.
  2. Inserted into the steel seat pan shall be a steel seat frame. Steel frames shall be die formed 16 gauge steel channel with integral steel clips welded to the perimeter sides of the seat frame to resist spring tension. The seat frame shall be secured in the seat pan under tension and shall require no additional mechanical fasteners.
  3. Seats shall be of the arch type serpentine spring construction. Not less than five (5) serpentine springs shall be attached laterally by means of integral spring clips to the internal steel frame to assure free and quite movement without fatigue or breakage.
  4. Seat cushions shall be contour molded, high density, inherently fire-retardant virgin urethane foam with integral 3-ply bonded continuous filament polyester fabric buffer to prevent seat springs from cutting, chafing, or otherwise damaging cushion.
  5. Contoured foam cushion shall be 3 inches thick at the front, 2-1/2 inches thick at the rear, with an average overall thickness of 1-1/2 inches over the center.
  6. Seat "Cover" shall be panel side construction without welts stretched and fastened securely to the seat frame by means of upholstery clips.
  7. Tailoring shall evidence a superior level of design workmanship and fit. Seams shall be straight, continuous and neat, without unsightly puckering.
- B. Padded Upholstered Back:
  1. Rear shield shall be one piece injection molded high impact polyethylene plastic. The shield shall be channeled to form lightly textured, easily cleaned decorative closure returning on the front face to enclose the upholstered inner panel for protection.
  2. The upholstered inner panel shall be constructed of the following components:
    - a. The contoured formed inner panel shall be 5/8 inch thick, one piece injection molded high density polyethylene.
    - b. The back padding shall be 2 inches thick, single density polyurethane glued to the inner panel.
    - c. The upholstery shall be on one piece waterfall construction and securely stapled to the rear face of the inner panel.
  3. The upholstered inner panel is inserted into the injection molded rear shield and secured with hidden mechanical fasteners. The finished back shall be attached to the standard with steel wings of cold rolled steel. The design of the wings shall allow for the proper pitch of the back at 21 degrees.
  4. The entire back shall be not less than 27 inches long to provide complete protection of the seat from the rear and back height not less than 32-3/8 inches from the floor.
- C. Steel Standards:
  1. Standards shall be continuously welded, closed seam 1 x 3 inches steel tube, floor mounted.
  2. Attachment of the armrest to standard shall be vandal resistant. Armrests shall be solid wood.

3. Floor mount standards shall have a 14 gauge formed steel foot with four detentes to allow for floor variations during installation. The formed foot shall be full perimeter welded to the upright tubular member. The floor mount standards shall be manufactured to various floor pitches.
  4. Standards shall be designed to be fitted with decorative end panels in accordance with seating plan.
- D. Seat Hinges:
1. Dual seat hinges shall be fully contained within the seat pan and fitted with a pair of independent, permanently lubricated bearings.
  2. Each of the independent seat hinges shall be fitted with neoprene cushioned up and down stops as well as double acting, self-centering, pre-loaded coiled seat return springs with silencer.
  3. Seat hinge and spring installation shall be designed not to require periodic adjustment or lubrication.
- E. Finish:
1. Steel: Shall be chemically cleaned and dipped in an iron phosphate bath and electrostatically spray enameled. Enamel shall be baked 15 minutes in a 300 degree oven.
  2. Blow-molded polyethylene: Shall be pigmented with textured surface.
  3. Fabric: Upholstery material shall be Grade G, 100% Marquesa Lana continuous filament Olefin yarn with 13 fill picks per inch, 13 warp ends per inch, weighing 14.4 oz. per linear yard exclusive of backing.
  4. Color: Shall be per manufacturer's standards. Seating contractor shall submit full range of color samples for Architect's approval prior to manufacture. Manufacturer to offer 22 colors minimum, of plastic and paint for color selection.

## 2.4 FASTENINGS

- A. Chair Assembly:
1. All welds shall be made at the factory by welders that are certified on the equipment and process used.
  2. All structural connections shall be made with S.A.E. Stress rated finish grade plated steel bolts, lock washers, and nuts.
- B. Concrete Floor Attachment:
1. Chair stanchions shall each be attached by means of two 1/4 inch expansion bolts set in holes drilled to a depth of not less than 1-1/4 inches into concrete.
  2. Expansion bolts shall be of approved type lead drive anchor comprised of the following:
    - a. Bolt: 1/4 x 2 inches (or longer to compensate for superficial covering) special flat countersunk head with two fins under head and with hexagon nut.
    - b. Sleeve: 1/2 x 1 inch lead with one end recessed to fit cone.
    - c. Cone: Formed steel.
    - d. Flat washer to be slipped on bolt over the standard and the nut to be permanently secured by means of a lock washer.

## 2.5 ACCESSORIES

- A. Armrests to be secured to standard with a minimum of two (2) unobtrusive screws. Armrests shall be solid Northern Hard Maple or Birch without defects. All edges shall be rounded. Armrests shall be immersed in stain, dried, receive a single coat of sealer and sanded, and receive two final coats of lacquer, sanding between. Stain color shall be selected from manufacturer's standard offerings.

- B. Chair Numbers - Black numbers etched on 5/8 x 1-5/8 inch anodized aluminum plates. Plates fitted in vandal resistant seat nosing recess secured with two rivets.
- C. Row Letters - Black letters etched on 5/8 x 1-5/8 inch anodized aluminum plates. Plates fitted flush and secured on wood armrests with brass band.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that field measurements are as required.
- C. Verify that surfaces and conditions are ready to accept the work of this Section.
- D. Verify that areas to receive products are free of impediments interfering with installation.
- E. Examine products to be installed for damage and other conditions detrimental to completion of the Work.
- F. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Seating contractor shall be responsible for field checking site conditions and dimensions.

### **3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install products in accordance with manufacturer's written instructions and reviewed submittal Drawings.
- C. Install seating in locations indicated and fastened securely to substrates according to manufacturer's written installation instructions.
- D. Install seating with chair end standards aligned from first to last row and with backs and seats varied in width to optimize sightlines.
- E. Install chairs in curved rows at a smooth radius.
- F. Install seating so moving components operate smoothly and quietly.

### **3.4 ADJUSTING**

- A. Section 01 73 00 - Execution: Starting, testing, adjusting, and balancing.
- B. All equipment to be adjusted for smooth and proper operation.
- C. Adjust self-rising seat mechanisms so seats in each row are aligned when in upright position.

### **3.5 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work in accordance with manufacturer's recommendations including cleaning procedures and materials.

- B. Clean work area and remove debris from site.

**3.6 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Do not permit seating to be used or damaged.

**END OF SECTION**



**SECTION 12 66 13**  
**TELESCOPING BLEACHERS**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Telescoping bleachers.
    - a. Electric motor operators, controls, and internal wiring.
    - b. Manual operation.
- B. Related Requirements:
  - 1. Division 09 - Finishes: Sections indicating flooring system on which bleachers set and operate. Refer to COORDINATION article in this Section.
  - 2. Contract Documents related to wall construction adjacent to rear of bleachers system.
  - 3. Division 26 - Electrical: Sections regarding electrical work.

**1.2 REFERENCE STANDARDS**

- A. Americans with Disabilities Act (ADA):
  - 1. ADA Standards - ADA Standards for Accessible Design; Current Edition.
- B. ASTM International (ASTM):
  - 1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
  - 2. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2023.
  - 3. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position; 2022.
  - 4. ASTM D1248 - Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable; 2016.
  - 5. ASTM D1929 - Standard Test Method for Determining Ignition Temperature of Plastics; 2023.
  - 6. ASTM D2843 - Standard Test Method for Density of Smoke from the Burning or Decomposition of Plastics; 2022.
  - 7. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- C. American Welding Society (AWS):
  - 1. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, Errata 2023.
  - 2. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel; 2018, Errata 2022.
- D. International Code Council (ICC); International Building Code (IBC):
  - 1. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
  - 2. ICC 300 - Bleachers, Folding And Telescopic Seating, And Grandstands; 2023.
- E. National Fire Protection Association (NFPA):
  - 1. NFPA 102 - Standard for Grandstands, Folding and Telescopic Seating, Tents, and Membrane Structures; 2021.
- F. National Institute of Standards and Technology (NIST):
  - 1. NIST PS 1 - Structural Plywood; 2023.

### 1.3 COORDINATION

- A. Coordinate requirements of the work of this Section with finish flooring requirements for adequate support and operation of the bleacher system.
  - 1. In the case of a composite finish flooring systems (e.g. wood strip flooring on plywood and sleepers), coordinate flooring and bleachers requirements for solid blocking within the flooring assembly for adequate weight support of retracted, fully extended, and fully loaded bleacher system supports.

### 1.4 SUBMITTALS

- A. See Section 01 33 00 - Submittal Procedures: Submittal Procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used.
- C. Shop Drawings: Indicate layout and dimensions of bleacher units including seat heights, row spacing and rise, aisle widths and locations, overall dimensions in closed and open position, connections, and relationship to adjoining work, accessories, types of materials and finishes.
  - 1. Include data for structural computations, materials properties, and other information needed for structural analysis. Data is to be signed and sealed by a qualified Professional Engineer responsible for preparation of data, and licensed in the State in which the project is located.
  - 2. Provide shop drawings specific to this Project.
  - 3. Graphics Layout Drawings: Indicate pattern of seat colors as indicated on Drawings.
- D. Samples for Initial Selection: For each material for which color selection is required, submit samples, 2 by 2 inches in size, illustrating the full range colors and finishes available; submit for Architect's initial selection.
- E. Samples for Verification: From the Architect's initial selections, submit samples of actual finish or product, for verification of color selection.
- F. Certifications: Provide qualifications certification for the following:
  - 1. Manufacturer.
  - 2. Installer.
  - 3. Engineer.
  - 4. Welders.

### 1.5 CLOSEOUT SUBMITTALS

- A. Section 01 77 00 - Closeout Procedures.
- B. Operation and Maintenance Data: Manufacturer's operation and maintenance instructions, including annual inspection and maintenance and bi-annual inspection by a Professional Engineer or manufacturer factory service personnel.
- C. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

### 1.6 QUALITY ASSURANCE

- A. Design to comply with all applicable code requirements.
- B. Seating Layout: Comply with current ICC 300 for Folding and Telescopic Seating, except where additional requirements are indicated or imposed by authorities having jurisdiction.
- C. Welding Standards & Qualification: Comply with AWS D1.1/D1.1M and AWS D1.3/D1.3M.

## 1.7 QUALIFICATIONS

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section, with not less than ten (10) years of documented experience.
- B. Installer Qualifications: Certified as approved by Manufacturer.
- C. Engineer Qualifications: Bleacher system to be designed, sealed and signed by a Registered Professional Engineer.
- D. Welder Qualifications: Certified by AWS for the processes employed.

## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Accept products in manufacturer's packaging clearly labeled with manufacturer name and content. Inspect for damage.
  - 1. Store, in original packaging, under cover and elevated above grade.

## 1.9 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Manufacturer's five (5) year warranty for all work and materials to be free of defects. Replace parts that fail under normal use at no extra charge to Owner.

## PART 2 PRODUCTS

### 2.1 BLEACHERS

- A. Manufacturers:
  - 1. Hussey Seating Company.
  - 2. Interkal, LLC.
  - 3. Irwin Seating Company.
  - 4. Kodiak Seating by Royal Stewart Ltd.
  - 5. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Basis of Design:
  - 1. As indicated on Drawings.

### 2.2 TELESCOPING BLEACHERS

- A. Telescoping Bleachers: Factory assembled tiered benches that retract horizontally into depth approximately the same as a single row depth, with fixed seats mounted on leading edge of platforms.
  - 1. Bleacher system to be designed, sealed and signed by a licensed Professional Engineer licensed in the State in which the Project is located.
  - 2. Provide a design that has been in use for at least 5 years; submit documentation.
  - 3. Design to comply with applicable requirements of NFPA 102 and requirements of code authorities having jurisdiction; where conflicts between requirements occur, comply with whichever is more stringent.
  - 4. Design with solid seat fronts that conceal interior mechanisms when fully retracted, fitting tightly enough to prevent climbing up face; at front row provide key locked, hinged fascia (skirt) to cover gap between seat riser/fascia and floor.
  - 5. Configurations: As indicated on Drawings.
  - 6. Operation:

- a. Manual operation.
  7. Extension Direction:
    - a. Forward-Fold Extension: Top row fixed to floor, adjacent to wall under overhang, forward extension (away from wall); attachment to wall is acceptable when Registered Engineer's design includes anchorage designed for wall construction.
  8. Wheelchair Viewing Spaces: Provide wheelchair viewing spaces as follows. Provide removable railings at row behind wheelchair spaces. All wheelchair viewing spaces are to comply with ADA Standards.
    - a. Retractable Wheelchair Spaces: Provide manually retractable spaces with operation that does not affect other seating rows. Number of spaces and locations to be as follows:
      - 1) As indicated on Drawings.
    - b. Permanently Open Wheelchair Space: Provide permanently open spaces. Number of spaces and locations to be as follows:
      - 1) As indicated on Drawings.
  9. Cutouts: Fit units to irregular wall surfaces, columns, pilasters, roof drain leaders, and other obstructions; take field measurements prior to fabrication.
- B. Design Loads: Design to withstand the following loading conditions, in addition to its own weight:
1. Live Load on Structural Supports: 100 pounds per square foot minimum, of gross horizontal projection.
  2. Live Load on Seats and Walking Surfaces: 120 pounds per linear foot.
  3. Structural Supports Sway Parallel to Seats: 24 pounds per linear foot of row combined with Uniformly Live Load.
  4. Structural Supports Sway Perpendicular to Seats: 10 pounds per linear foot of row combined with Uniformly Live Load.
- C. Dimensions:
1. Overall dimensions as indicated on Drawings.
  2. Other dimensions unless indicated otherwise on Drawings:
    - a. Rise Per Row:
      - 1) 11-1/2 inches.
    - b. Row Depth:
      - 1) 26 inches from seat front to next seat front (13.2 inches minimum clear aisle. Comply with ICC (IBC)).
    - c. Seat Height Above Tread: 6-1/2 inches.
- D. Structural Supports: Steel or aluminum; wheeled carriages supporting each tier separately, with moving parts permanently lubricated and metal parts cushioned to prevent metal-to-metal contact during operation.
1. Design each row carriage so that it will individually support the design loads and is self-supporting when fully assembled without dependence on platform panels or boards, seats, or fascia.
  2. Vertical columns and deck supports.
  3. Stabilized by sway braces attached to the vertical columns and steel risers for strength and resistance to movement. Sway braces fabricated from steel to resist compression and tension forces created when the bleachers are loaded.
  4. Vertical columns, minimum 2 x 3 inches closed seam, rectangular structural steel tubing. Post size as required for row height and load bearing requirements.
  5. Rigid deck support brackets to prevent sagging and binding during operation.
  6. All deck supports are to incorporate rollers for efficient operation and deck stability.

7. Continuous structural galvanized steel nose-beam to which the seat surface is attached for a uniform understructure providing strength and continuous support for the plywood deck.
8. Low friction flexible rod sliding system with positive engagement of vertical supports without binding. Provide smooth operation over floor. Maintain proper vertical column spacing and eliminate racking damage.
9. Welding: In accordance with AWS D1.1/D1.1M and AWS D1.3/D1.3M.
10. Bolting: Use lock-washers or locknuts.
11. Wheels: Minimum 5 inches diameter by 1-1/8 inch wide, with non-marring heavy duty composition rubber tires; ball, roller, or oil-impregnated metal bearings; minimum of 2 wheels at each floor support.
12. Finish: Manufacturer's standard enamel or powder coating. Color, black.
13. Row Locking: Automatically mechanically lock each carriage to adjacent carriages when fully extended.
14. Unlocking (Manual Operation): Provide single manual release mechanism to allow retraction of all carriages, concealed behind skirt board of first row.
15. Rollers On Each Deck Support: Provide nylon rollers at the top of every deck to reduce friction, provide smooth and quiet operation, provide deck stability, and to eliminate steel-to-steel contact that might hinder the operation of the bleacher.
16. Nose-beam splice, 4-bolt pattern, minimum.
17. Section splice, 8-bolt pattern joint connections, minimum.

### 2.3 MATERIALS

- A. Plywood: NIST PS 1, A-C Exterior Grade.
- B. Structural Steel Shapes, Plates and Bars: ASTM A36/A36M.
- C. Structural Tubing: ASTM A500/A500M, Grade B.
- D. Polyethylene Plastic: ASTM D1248, Type III, Class B.

### 2.4 SEAT AND PLATFORM COMPONENTS

- A. Seat/Fascia Assembly: Continuous, molded UV-stabilized high-density polyethylene plastic, seat minimum 1 inch thick, textured finish, homogeneous color throughout, color as selected from manufacturer's full range color selection; independently removable with tongue-and-groove or rabbeted interlock at end joints; stain and warp resistant.
  1. Attaching clamp for a steel-to-steel connection of the module to the 14-gauge galvanized steel nose beam.
  2. Each module to incorporate full 1/2 inch perimeter interlocks to secure one module to the next for increased strength.
    - a. Minimum five (5) vertical and two (2) lateral ribs inside each module for strength.
    - b. 360 degree interlocking connection.
  3. 18 inches wide interlocking seat module with seat height of 18-1/2 inches.
  4. Seat depth as required by applicable codes and as indicated herein and on Drawings.
  5. Shape: Ergonomically contoured, with internal ribs spaced for natural flexibility; rear edge cantilevered to provide toe room of not less than 3 inches; no openings to trap debris.
  6. Fire Retardance: Self-ignition temperature of 650 degrees F (343 degrees C) or greater when tested in accordance with ASTM D1929; smoke developed index of 450 or less, when tested in accordance with ASTM E84, or 75 or less when tested in thickness intended for use in accordance with ASTM D2843; and burning extent of 1 inch or less when tested in thickness intended for use in accordance with ASTM D635.

7. Provide end caps of same material and finish on each exposed end.
  8. Supports: Internal steel reinforcement of each seat segment bolted to platform nose member; minimum two bolts per segment.
  9. Seat Numbers: Provide each plastic seat module with a 1-3/4 x 1-1/4 inch oval etched polycarbonate plate. Provide black numerals on plate fitted in a vandal resistant recess.
  10. Row Letters: Provide at each row end of plastic seat a 1-3/4 x 1-1/4 inch oval etched polycarbonate plate with black numerals. Plates to be fitted flush in vandal resistant end cap recess.
- B. Platform, Tread, and Step Structure: Plywood continuously supported on front and rear and with aluminum "H" Beam at every plywood joint for continuous support from rear riser to nose-beam.
1. Plywood: PS 1, 5-ply southern pine or polyethylene-overlaid Douglas Fir or Southern Pine, Grade A-C.
  2. Plywood Thickness: 5/8 inch, minimum.
  3. Platform (Deck) Plywood Finish: Exposed wear surfaces to be finished with a layer of High Density polyethylene plastic 0.025 - 0.030 thick, Light Gray in color. Concealed surfaces sealed with manufacturer's standard sealer or urethane sealer.
  4. Front (Nose), Rear, and Intermediate Supports: Steel channel or tube, hot-dipped galvanized.
  5. Nosings: Formed steel, minimum, G60/Z275 hot-dipped galvanized.
  6. Rear Riser: Continuous metal sheet, formed to conceal vertical void from bottom of seat modules to platform (deck). Form bottom edge to continuously receive edge of platform (deck) edge and conceal joint. Form top edge to continuously conceal undercarriage supports for upper platform (deck) framing, but allow continuous access joint for removal of seat modules. Minimum 14-gauge, grade 50, galvanized steel sheet.
  7. Provide end caps of same material and finish on each exposed end.
  8. At aisles provide permanently attached intermediate steps of same construction and finish.
    - a. Designed to comply with applicable code requirements, providing an equal depth and height foot surface between rows.
    - b. Provide safety abrasive tread on all steps with 2 inches wide contrasting stripe at nosing.
  9. At bottom of aisles provide step in front of first riser, hinged to first platform to fold for storage.

## 2.5 HANDRAILS AND RAILINGS

- A. Provide the following railings:
1. Aisle Handrails: Self-Storing Aisle Rails (SSAR). 36 inches high, permanently bolted in position and automatically store in the deck, ensuring that the rails are in place at all times for spectator safety.
  2. End of Row Guardrails: 42 inches high and required on open ends of telescopic seating systems. Self-Storing End Rails designed and tested to meet all current national building code requirements.
  3. Top Row Rear Guardrail: Only required in such conditions where the top row does not abutt to a wall that is a minimum height of 48 inches above the top row. Non-removable self-storing, mounted behind rear seat with tubular supports, running full width of section.
  4. Wheelchair Spaces Guardrails: Removable; 42 inches high.
  5. Height: 42 inches (1067 mm) above adjacent platform or tread.
  6. Removable Railings: Provide steel post sockets attached to platform supports.

- B. Engineer handrail, railing and guardrail systems to withstand the following loads:
  - 1. Handrailings, Posts and Supports:
    - a. Concentrated Load: 200 pounds applied at any point and in any direction.
    - b. Uniform Load: 50 pounds per foot applied in any direction.
  - 2. Guardrailings, Posts and Supports:
    - a. Concentrated Load: 200 pounds applied at any point and in any direction along top rail.
    - b. Uniform Load: 50 pounds per foot applied horizontally at top rail and a simultaneous uniform load of 100 pounds per foot applied vertically downward.
    - c. Guardrailings system shall not allow a 4 inches diameter sphere to pass through.
- C. Railing Construction: Round steel or aluminum pipe or tube, with formed elbows at corners and caps at ends of straight runs.
  - 1. Aluminum: 1.66 inches minimum outside diameter; textured powder coat epoxy finish.
  - 2. Steel: 1-1/2 inch minimum outside diameter, with 11 gage, 0.12 inch minimum wall thickness; textured powder coat epoxy finish.

## 2.6 ACCESSORIES

- A. Fillers and Closures:
  - 1. Ends of Retracted Units: Plywood panels, finished to match platforms.
  - 2. Top Row: Provide seat level rear filler panels to close openings between top row seat and wall; finish to match platforms.
  - 3. Back of Units: Only required in such conditions where the back of the bleacher system is not concealed by a wall.
    - a. Full width plywood panels, finished to match platforms, up to 8 feet above floor; vinyl curtains above to underside of top platform.
  - 4. Sides of Extended Units: Laminated Vinyl Side Curtains to close-off the ends of the bleachers.
    - a. Grommets at every hanger location, chain weight bottom hem.
    - b. Color as selected by Architect from manufacturer's full range of colors.
- B. Removable Timer's Table:
  - 1. 15 inches wide by 96 inches long.
  - 2. High pressure laminated work surface with removable legs for use at any location.
  - 3. Table legs assembly shall be constructed of finished tubular steel and shall be removable for storage within the seating system.
- C. Fasteners: Provide hardware and fasteners in accordance with manufacturer's recommendations.
- D. Anchorage: Provide anchorage hardware in accordance with manufacturer's recommendations and as indicated on Drawings.
- E. Provide manufacturer's tool (device) used as an operating handle for manually extending and retracting the bleachers. Provide total number of tools needed for easy operation, but no less than four (4) such devices.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.



- B. Verify that field measurements are consistent with those on the shop drawings.
- C. Do not begin installation until substrates have been properly prepared and area has been cleared of obstructions.
- D. Verify that flooring support and solid blocking has been stalled where required.
- E. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

### **3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section. Prepare materials to be installed and equipment used during installation.
- B. Clean surfaces thoroughly prior to installation.
- C. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

### **3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install in accordance with manufacturer's instructions.
- C. Do not field cut or alter seats, fascia, or structural members without approval.
- D. Provide manufacturer's field representative to inspect completed installation.

### **3.4 ADJUSTING**

- A. Section 01 73 00 - Execution: Starting, testing, adjusting, and balancing.
- B. Set limit switches to provide fully closed and fully extended positions.
- C. Lubricate, test, and adjust each moving assembly to ensure proper operation in compliance with manufacturer's recommendations.

### **3.5 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Clean and remove excess construction debris from area. Coordinate cleaning of flooring with the flooring installer to avoid improper or damaging cleaning efforts.
- C. Clean exposed and semi-exposed assembly surfaces.
- D. Touch up finishes on damaged or soiled areas.

### **3.6 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed products until completion of project.
- C. Touch-up, repair, or replace damaged products.

### **3.7 DEMONSTRATION AND TRAINING**

- A. Section 01 79 00 - Demonstration and Training.
- B. Provide manufacturer's field representative to provide training and demonstration.



1. Location: On site using installed equipment.
  2. Time: As agreed between Owner and Contractor.
- C. Train Owner's representative on the operation and safety features for fully extending and retracting bleachers.
- D. Identify service requirements and serviceable parts.
- E. Identify remedial procedures for common operational errors such as jammed mechanisms.

**END OF SECTION**



**SECTION 14 21 23.16****MACHINE ROOM-LESS ELECTRIC TRACTION ELEVATORS****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes: Machine room-less electric traction passenger elevators as shown and specified.
  - 1. Gearless electric traction passenger elevators.
  - 2. Elevator car enclosures, hoistway entrances and signal equipment.
  - 3. Operation and control systems.
  - 4. Accessibility provisions for physically disabled persons.
  - 5. Equipment, machines, controls, systems and devices as required for safely operating the specified elevators at their rated speed and capacity.
  - 6. Materials and accessories as required to complete the elevator installation.
- B. Related Requirements:
  - 1. Section 03 30 00 - Cast-in-Place Concrete: Concrete for elevator motor and pump foundation.
  - 2. Section 04 20 00 - Unit Masonry Assemblies: Building-in hoistway door frames; masonry hoistway enclosure.
  - 3. Section 05 50 00 - Metal Fabrications: Pit ladder, sill supports, divider beams, and overhead hoist beams.
  - 4. Division 07 - Waterproofing: Waterproofing of elevator pit walls and floor.
  - 5. Section 09 21 16 - Gypsum Board Assemblies: Gypsum shaft walls.
  - 6. Section 09 65 00 - Resilient Flooring: Floor finish in cab.
  - 7. Division 23 - Mechanical (HVAC): Fans and ventilation and temperature control of elevator equipment room.
  - 8. Division 26 - Electrical: Equipment wiring systems.
    - a. Electrical characteristics and wiring connections.
    - b. Electrical service to main disconnect in elevator machine room including electrical power for elevator installation and testing.
    - c. Electrical service for machine room and machine room convenience outlets.
    - d. Lighting in elevator pit.
    - e. Empty conduit for telephone service to machine room.
  - 9. Division 28 - Electronic Safety and Security:
    - a. Fire and smoke detectors and interconnecting devices.
    - b. Fire alarm signal lines to elevator controller cabinet.
  - 10. Division 33 - Utilities: Storm drainage piping for pit drainage.

**1.2 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Provide standard cab, entrance and signal fixture data to describe product for approval.
- C. Shop Drawings:
  - 1. Provide plans, elevations, sections and details of assembly, erection, anchorage, and equipment location.
  - 2. Indicate elevator system capacities, sizes, performances, safety features, finishes and other pertinent information.

3. Show floors served, travel distances, maximum loads imposed on the building structure at points of support and all similar considerations of the elevator work.
  4. Indicate electrical power requirements and branch circuit protection device recommendations.
  5. Shop drawings must indicate all additional materials required for the complete installation of the alternative elevator system, including but not limited to electrical, mechanical, fire alarm, and structural modifications to the existing Drawings. The shop drawings are to be sealed and signed by an Engineer licensed in the state in which the Project is located for all disciplines required for the installation.
- D. Submit the following for finish selections by Architect:
1. Powder Coat Paint Selection: Submit manufacturer's selection charts of full range of exposed finishes and materials.
  2. Plastic Laminate Selection: Submit manufacturer's selection charts of full range of exposed finishes and materials.
  3. Metal Finishes: Submit manufacturer's samples of full range of metal finishes.

### 1.3 QUALITY ASSURANCE

- A. Manufacturer Qualifications: An approved manufacturer with not less than fifteen (15) years of satisfactory experience in manufacturing, installing, and servicing elevators of the type required for the project.
1. The manufacturer of machines, controllers, signal fixtures, door operators, cabs, entrances, and all other major parts of elevator operating equipment. The major parts of the elevator equipment shall be manufactured by the installing company, and not be an assembled system.
  2. The manufacturer shall have a documented, on-going quality assurance program.
- B. Regulatory Requirements:
1. ASME A17.1 Safety Code for Elevators and Escalators, latest edition or as required by the local building code.
  2. NFPA 70 National Electrical Code.
  3. NFPA 80 Fire Doors and Windows.
  4. Americans with Disabilities Act - Accessibility Guidelines (ADAAG).
  5. ICC A117.1, Section 407, when required by local authorities having jurisdiction.
  6. CAN/CSA C22.1 Canadian Electrical Code
  7. CAN/CSA B44 Safety Code for Elevators and Escalators.
  8. California Department of Public Health Standard Method V1.1-2010, CA Section 01350
- C. Fire-Rated Entrance Assemblies:
1. Opening protective assemblies including frames, hardware, and operation shall comply with ASTM E2074, CAN4-S104 (ULC-S104), UL10 (b), and NFPA 80.
  2. Provide entrance assembly units bearing Class B or 1-1/2 hour label by a Nationally Recognized Testing Laboratory.
- D. Inspection and Testing:
1. Elevator Installer shall obtain and pay for all required inspections, tests, permits and fees for elevator installation. Arrange for inspections and make required tests.
  2. Deliver to the Owner upon completion and acceptance of elevator work.
- E. Product Qualifications:
1. LCA, EPD and HPD data must be provided for all major components of the elevator system. LCA data must be compatible with GaBI Software.
  2. Environmental Product Declaration (EPD): Publicly available, critically reviewed life cycle analysis having at least a cradle-to-gate scope.

## 1.4 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Provide elevator manufacturer's standard written warranty agreeing to repair, restore or replace defects in elevator work materials and workmanship not due to ordinary wear and tear or improper use or care for one (1) year after acceptance thereof by beneficial use.
- C. Provide one (1) year manufacturer warranty for elevator equipment and devices.
- D. Provide one (1) year installer's full service and maintenance agreement.
- E. All use of elevator equipment prior to acceptance thereof by beneficial use is the responsibility of the Contractor.

## 1.5 MAINTENANCE

- A. Furnish maintenance and call back service for a period of twelve (12) months for each elevator after completion of installation or acceptance thereof by beneficial use, whichever is earlier, during normal working hours excluding callbacks.
  - 1. Service shall consist of periodic examination of the equipment, adjustment, lubrication, cleaning, supplies and parts to keep the elevators in proper operation. Maintenance work, including emergency call back repair service, shall be performed by trained employees of the elevator contractor during regular working hours.
  - 2. Submit parts catalog and show evidence of local parts inventory with complete list of recommended spare parts. Parts shall be produced by manufacturer of original equipment.
  - 3. Manufacturer shall have a service office, and full-time service personnel within a 100 mile radius of the project site.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers:
  - 1. ThyssenKrupp Elevator - Synergy Self-Supported Machine Room-Less Elevator. (Basis of Design)
  - 2. Otis Elevator Company.
  - 3. Schindler Elevator Corporation.
  - 4. Substitutions: Section 01 60 00 - Product Requirements.

### 2.2 MATERIALS - GENERAL

- A. All Elevator Cab materials including frame, buttons, lighting, wall and ceiling assembly, laminates and carpet shall have an EPD and an HPD, and shall meet the California Department of Public Health Standard Method V1.1-2010, CA Section 01350.
- B. Colors, patterns, and finishes: As selected by the Architect from manufacturer's full range of standard colors, patterns, and finishes.
- C. Steel:
  - 1. Shapes and Bars: Carbon.
  - 2. Sheet: Cold-rolled steel sheet, commercial quality, Class 1, matte finish.
  - 3. Finish: Factory-applied baked enamel for structural parts, powder coat for architectural parts. Color selection from manufacturer's full range of options.

- D. Plastic Laminate: Decorative high-pressure type, complying with NEMA LD 3, Type GP-50 General Purpose Grade, nominal 0.050 inches thickness. Laminate selection to be based on elevator manufacture's full range of options.

### 2.3 HOISTWAY EQUIPMENT

- A. Platform: Fabricated frame of formed or structural steel shapes, gusseted and rigidly welded with a wood sub-floor. Underside of the platform shall be fireproofed. The car platform shall be designed and fabricated to support one-piece loads weighing up to 25% of the rated capacity.
- B. Sling: Steel stiles bolted or welded to a steel crosshead and bolstered with bracing members to remove strain from the car enclosure.
- C. Guide Rails: Lubricated steel, fastened to the building with steel brackets.
- D. Guides: Slide guides.
- E. Deflector Sheaves: Optamid, yellow cast polyamide material, pressed roller bearings, with removable steel shafts.
- F. Buffers: Provide substantial buffers in the elevator pit. Mount buffers on pit template fastened to the elevator guide rail or securely anchored to the pit floor. Provide extensions if required by project conditions.
- G. Machine: The hoisting machine shall be a compact energy efficient permanent magnet Gearless traction type, consisting of permanent magnet AC motor, brake and driving sheave mounted on counterweight rails and main guide rails located at the top of elevator hoistway.
- H. Drive System: Variable Voltage Variable Frequency (VVVF) Non-Regenerative. The system shall be vector controlled pulse-width modulated AC drive. The variable voltage variable frequency drive shall convert the AC power supply using a two-step process to a variable voltage variable frequency power supply for use by the hoist motor. Speed control shall be by means of vector control providing direct torque current and field excitation is automatically provided by permanent magnet. A digital absolute velocity encoder shall be provided giving feedback to the controller on armature position and motor speed.
- I. Motor/Machine: Permanent magnet AC, totally enclosed, non-ventilated with class "F" insulation. The motor rotor assembly shall be dynamically balanced and supported by roller bearings of ample capacity. The rotor assembly and driving sheave shall be properly balanced for smooth elevator performance. The Machine shall be mounted above the top landing at the top of the hoistway resting on two counterweight rails and main guide rails provided by elevator contractor.
- J. Brake: Spring applied electric brake; held open by an electro-magnet actuated by a digital brake controller and designed to make smooth, positive stops. Designed to automatically apply in the event of interruption of power supply from any cause. Operation and control of the brake shall be all digital. The setting and lifting of the brake shall be software based and all electronic. All adjustments and setup of the brake shall be made using a PC interface. No contactors or resistors shall be used in the actuation of the brake.
- K. Ropes: Provide Steel hoist cables of size and number to ensure proper wear qualities shall be used. Special wedge shackles shall be used. Governor ropes shall be of iron construction. Any special tools, devices, software or equipment required for monitoring the wear of any means of suspension other than standard elevator steel cables shall be included with the installation of the equipment and become the property of the owner at time of elevator completion. This includes special ongoing monitoring systems, special tools and instruction needed to monitor the suspension system.

- L. Counterweight: Counterbalance each elevator for smooth and economical operation by using iron or steel plate weights securely fastened in a steel counterweight frame. Counterweight shall equal the weight of the complete elevator car and approximately 45-50 percent of the specified capacity load.
- M. Safety and Governor: Car safety shall be mounted on the bottom members of the car frame and be operated by a centrifugal speed governor. The governor shall be designed to cut off power to the motor and apply the brake whenever the governor indicates the car has excessive speed. The governor shall function when the car over speeds.
- N. Emergency Terminal Limits: Place electric limit switches in the hoistway near the terminal landings. Limit switches shall be designed to cut off the electric current and stop the car if it runs beyond either terminal landing.
- O. Automatic Self-Leveling: Provide each elevator car with a self-leveling feature to automatically bring the car to the floor landings and correct for over travel or under travel. Self-leveling shall, within its zone, be automatic and independent of the operating device. The car shall be maintained approximately level with the landing irrespective of its load.

## 2.4 HOISTWAY ENTRANCES

- A. Doors and Frames: Provide complete hollow metal type hoistway entrances at each hoistway opening bolted/knock down construction.
  - 1. Manufacturer's standard entrance design consisting of hangers, doors, hanger supports, hanger covers, fascia plates, sight guards, and necessary hardware.
  - 2. Main Landing Door & Frame Finish: Stainless steel panels, # 4 brushed finish.
  - 3. Typical Door & Frame Finish: Stainless steel panels with # 4 brushed finish.
- B. Interlocks: Equip each hoistway entrance with an approved type interlock tested as required by code. Provide door restriction devices as required by code.
- C. Door Hanger and Tracks: Provide sheave type two-point suspension hangers and tracks for each hoistway horizontal sliding door.
  - 1. Sheaves: Polyurethane tires with ball bearings properly sealed to retain grease.
  - 2. Hangers: Provide an adjustable device beneath the track to limit the up-thrust of the doors during operation.
  - 3. Tracks: Drawn steel shapes, smooth surface and shaped to conform to the hanger sheaves.
- D. Hoistway Sills: Extruded metal, with groove(s) in top surface. Provide mill finish on aluminum.

## 2.5 PASSENGER ELEVATOR CAR ENCLOSURE

- A. Car Enclosure:
  - 1. Walls: Finished on both sides with high pressure plastic laminate. Reveals and frieze shall be powder coated.
  - 2. Canopy: Cold-rolled steel with hinged exit.
  - 3. Ceiling: Downlight type, metal pans with suspended LED downlights.
  - 4. Cab Fronts, Return, Transom, Soffit and Strike: Provide panels faced with brushed stainless steel.
  - 5. Doors: Horizontal sliding car doors reinforced with steel for panel rigidity. Hang doors on sheave type hangers with polyurethane tires that roll on a polished steel track and are guided at the bottom by non-metallic sliding guides.
    - a. Door Finish: Stainless steel panels; # 4 brushed finish.
    - b. Cab Sills: Extruded aluminum, mill finish.

6. Handrail: Provide 1.5 inch diameter cylindrical metal on side and rear walls on front opening cars and side walls only on front and rear opening cars. Handrails shall have a stainless steel, # 4 brushed finish.
  7. Ventilation: Manufacturer's standard exhaust fan, mounted on the car top.
- B. Car Top Inspection: Provide a car top inspection station with an "Auto-Inspection" switch, an "Emergency Stop" switch, and constant pressure "Up and Down" direction and safety buttons to make the normal operating devices inoperative. The station will give the inspector complete control of the elevator. The car top inspection station shall be mounted in the door operator assembly.

## 2.6 DOOR OPERATION

- A. Door Operation: Provide a direct or alternating current motor driven heavy duty operator designed to operate the car and hoistway doors simultaneously. The door control system shall be digital closed loop and the closed loop circuit shall give constant feedback on the position and velocity of the elevator door. The motor torque shall be constantly adjusted to maintain the correct door speed based on its position and load. All adjustments and setup shall be through the computer-based service tool. Door movements shall follow a field programmable speed pattern with smooth acceleration and deceleration at the ends of travel. The mechanical door operating mechanism shall be arranged for manual operation in event of power failure. Doors shall automatically open when the car arrives at the landing and automatically close after an adjustable time interval or when the car is dispatched to another landing. AC controlled units with oil checks, or other deviations are not acceptable.
1. No Un-Necessary Door Operation: The car door shall open only if the car is stopping for a car or hall call, answering a car or hall call at the present position or selected as a dispatch car.
  2. Door Open Time Saver: If a car is stopping in response to a car call assignment only (no coincident hall call), the current door hold open time is changed to a shorter field programmable time when the electronic door protection device is activated.
  3. Double Door Operation: When a car stops at a landing with concurrent up and down hall calls, no car calls, and no other hall call assignments, the car door opens to answer the hall call in the direction of the car's current travel. If an onward car call is not registered before the door closes to within 6 inches of fully closed, the travel will reverse and the door will reopen to answer the other call.
  4. Nudging Operation: The doors shall remain open as long as the electronic detector senses the presence of a passenger or object in the door opening. If door closing is prevented for a field programmable time, a buzzer will sound. When the obstruction is removed, the door will begin to close at reduced speed. If the infra-red door protection system detects a person or object while closing on nudging, the doors will stop and resume closing only after the obstruction has been removed.
  5. Limited Door Reversal: If the doors are closing and the infra-red beam(s) is interrupted, the doors will reverse and reopen partially. After the obstruction is cleared, the doors will begin to close.
  6. Door Open Watchdog: If the doors are opening, but do not fully open after a field adjustable time, the doors will recycle closed then attempt to open six times to try and correct the fault.
  7. Door Close Watchdog: If the doors are closing, but do not fully close after a field adjustable time, the doors will recycle open then attempt to close six times to try and correct the fault.
  8. Door Close Assist: When the doors have failed to fully close and are in the recycle mode, the door drive motor shall have increased torque applied to possibly overcome mechanical resistance or differential air pressure and allow the door to close.



- B. Door Protection Device: Provide a door protection system using microprocessor controlled infra-red light beams. The beams shall project across the car opening detecting the presence of a passenger or object. If door movement is obstructed, the doors shall immediately reopen.

## 2.7 CAR OPERATING STATION

- A. Car Operating Station, General: The main car control in each car shall contain the devices required for specific operation mounted in an integral swing return panel requiring no applied faceplate. Swing return shall have a brushed stainless steel finish. The main car operating panel shall be mounted in the return and comply with handicap requirements. Pushbuttons that illuminate using long lasting LED's shall be included for each floor served, and emergency buttons and switches shall be provided per code. Switches for car light and accessories shall be provided.
- B. Emergency Communications System: Integral phone system provided.
- C. Auxiliary Operating Panel: Not Required.
- D. Column Mounted Car Riding Lantern: A car riding lantern shall be installed in the elevator cab and located in the entrance. The lantern, when illuminated, will indicate the intended direction of travel. The lantern will illuminate and a signal will sound when the car arrives at a floor where it will stop. The lantern shall remain illuminated until the door(s) begin to close.

## 2.8 CONTROL SYSTEMS

- A. Controller: Single unit installed in controller closet. The elevator control system shall be microprocessor based and software oriented. The system shall operate in real time, continuously analyzing the car(s) changing position, condition, and work load. All controller and operational circuits including the brake control and drive system shall be digital. Control of the elevator shall be automatic in operation by means of push buttons in the car numbered to correspond to floors served, for registering car stops, and by "Up-Down" push buttons at each intermediate landing and "Call" push buttons at terminal landings.
  - 1. Momentary pressing of one or more buttons shall dispatch the car to the designated landings in the order in which the landings are reached by the car, irrespective of the sequence in which the buttons are pressed. Each landing call shall be canceled when answered.
  - 2. When the car is traveling in the up direction, it shall stop at all floors for which car buttons or "Up" hall buttons have been pressed. The car shall not stop at floors where "Down" buttons have been pressed, unless the stop for that floor has been registered by a car button or unless the down call is at the highest floor for which any buttons have been pressed. Pressing the "Up" button when the car is traveling in the down direction shall not intercept the travel unless the stop for that floor has been registered by a car button or unless the up call is the lowest for which any button has been pressed.
  - 3. When the car has responded to its highest or lowest stop, and stops are registered for the opposite direction, its direction of travel shall reverse automatically and it shall then answer the calls registered for that direction. If both up and down calls are registered at an intermediate floor, only the call corresponding to the direction of car travel shall be canceled upon the stopping of the car at the landing.
  - 4. A car that is stopping for the last hall call in the preference direction and that hall call is for the opposite direction with no onward car calls, shall reverse preference when the selector position advances to the landing at which the car is committed to stop. A car that is stopping for the last hall call in the preference direction, and that hall call is for the same direction, shall hold its preference until the door is almost closed

allowing time for a passenger to register an onward car call which will maintain the preference. If no car call is registered before the door is almost closed, the car will lose its preference and shall be available to accept calls in either direction.

- B. Operation: Selective Collective - ETA based. The system is optimized to get a car to the floor where a hall call has been registered, in the shortest time. The system receives input information from standard call pushbuttons located in the hall, car position and car load information from individual car loadweighers. When group operation is required, the group supervisory operation shall be embedded within selected car controllers. No separate group controller shall be supplied. The microprocessor shall constantly scan the system for hall calls. When hall calls are registered, the control system shall immediately calculate the estimated time for arrival using such information as, number of floors to travel from the current position, the time it takes to travel one floor at top speed, calls assigned to a car, and car reversal time to respond to a call in the opposite direction of travel. When a car's status changes or additional hall calls are registered, the estimated time of arrival shall be recalculated and calls reassigned if necessary.
1. Traffic Pattern: The microprocessor shall provide flexibility to meet well defined patterns of traffic, including up peak, down peak, and heavy interfloor demands, and adjust for indeterminate variations in these patterns which occur in buildings.
  2. Artificial Intelligence: Artificial Intelligence shall be an integral part of the group control system software. The enhanced artificial intelligence will optimize the interfloor traffic performance. Inputs for the artificial intelligence shall include accurate passenger load from an electronic loadweigher, probable car calls generated from each hall call, type of building and observed traffic patterns.
- C. Load Weighing Device: Provide a load weighing device on each car which, when the particular car is filled to an adjustable percentage of the capacity load, shall cause the car to bypass landing calls but not car calls. The passed landing calls shall remain registered for the next following car.
1. The device shall be unaffected by the action of compensating chain or rope. The device shall detect a 50 lb. (23 Kg.) load change under all conditions.
  2. The load sensor shall use a strain gauges attached to the ropes to accurately measure the weight in the car. The information shall be transferred via a serial link to the elevator controller.
- D. Anti-Nuisance Call Control: The microprocessor control system shall evaluate the number of people on the car and compare that value to the number of car calls registered. If the number of car calls exceeds the number of people by a field programmable value, the car calls shall be canceled after the first call has been answered.
- E. Position Selector: The position selector shall be part of the microprocessor system. The car position in the hoistway shall be digitized through a primary position encoder. The microprocessor control system shall store the floor position and slow down points in memory.
- F. Motion Control: The drive control system shall be dual-loop feedback system based primarily on car position. The velocity profile shall be calculated by the microprocessor control system producing extremely smooth and accurate stops. The velocity encoder shall permit continuous comparison of machine speed to velocity profile and to actual car speed. This accurate position/velocity feedback shall permit a fast and accurate control of acceleration and retardation.
- G. Motor Pre-Torque: Current shall be applied to the elevator drive before the brake is released and the speed pattern is dictated to eliminate roll back and sling shot effects of unbalanced loads in the car. The electronic loadweigher shall determine the load on the car determining a pre-torque reference to send to the drive.

- H. Emergency Power Operation: Connect to emergency power system.
- I. Destination Dispatch: Not Applicable
- J. Automatic Light and Fan Shut Down: The control system shall evaluate the system activity and automatically turn off the cab lighting and ventilation fan during periods of inactivity. The settings shall be field programmable.
- K. Special Operation: Not Applicable.

## 2.9 HALL STATIONS

- A. Hall Stations, General: Provide buttons with red-illuminating LED halos to indicate that a call has been registered at that floor for the indicated direction. Provide 1 set of pushbutton risers. Provide one pushbutton riser with faceplates having a brushed stainless steel finish. Phase 1 firefighter's service key switch, with instructions, shall be incorporated into the hall station at the designated level.
- B. Floor Identification Pads: Provide door jamb pads at each floor. Jamb pads shall comply with Americans with Disabilities Act (ADA) requirements.

## 2.10 CONTROLLER CLOSET

- A. A controller closet shall be provided adjacent to the hoistway.
  - 1. The controller closet for simplex cars minimum size to be 3 ft - 6 inches x 1 ft - 8 inches x 7 ft - 6 inches high.
  - 2. The controller closet door minimum width to be 3 ft - 0 inches.
- B. A disconnect shall be provided for each elevator in the controller closet by others.
- C. All lighting must be connected to emergency power for the controller closet.
- D. The operation of the fire service visual indicator (fire hat) shall flash intermittently if the initiating device at one of these locations (control space, control closet, machine space) is activated.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Before starting elevator installation, inspect hoistway, hoistway openings, pits and machine rooms, as constructed, verify all critical dimensions, and examine supporting structures and all other conditions under which elevator work is to be installed. Do not proceed with elevator installation until unsatisfactory conditions have been corrected in a manner acceptable to the installer.
- C. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install elevator systems components and coordinate installation of hoistway wall construction. Work shall be performed by competent elevator installation personnel in accordance with ASME A17.1, manufacturer's installation instructions and approved shop drawing. Comply with the National Electrical Code for electrical work required during installation.
- C. Perform work with competent, skilled workmen under the direct control and supervision of the elevator manufacturer's experienced foreman.
- D. Supply in ample time for installation by other trades, inserts, anchors, bearing plates, brackets, supports, and bracing including all setting templates and diagrams for placement.
- E. Welded Construction: Provide welded connections for installation of elevator work where bolted connections are not required for subsequent removal or for normal operation, adjustment, inspection, maintenance, and replacement of worn parts. Comply with AWS standards for workmanship and for qualification of welding operators.
- F. Coordination: Coordinate elevator work with the work of other trades, for proper time and sequence to avoid construction delays. Use benchmarks, lines, and levels designated by the Contractor, to ensure dimensional coordination of the work.
- G. Install machinery, guides, controls, car and all equipment and accessories to provide a quiet, smoothly operating installation; free from side sway, oscillation, or vibration.
- H. Alignment: Coordinate installation of hoistway entrances with installation of elevator guide rails for accurate alignment of entrances with cars. Where possible, delay final adjustment of sills and doors until car is operable in shaft. Reduce clearances to minimum safe, workable dimensions at each landing.
- I. Erect hoistway sills, headers, and frames before erection of rough walls and doors; erect fascia and toe guards after rough walls finished. Set sill units accurately aligned and slightly above finish floor at landings.
- J. Lubricate operating parts of system, including ropes, as recommended by the manufacturer.

### 3.4 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Monitor quality of installation, inspection and testing.
- B. Acceptance Testing: Upon completion of the elevator installation and before permitting use of elevator, perform acceptance tests as required and recommended by Code and governing regulations or agencies. Perform other tests, if any, as required by governing regulations or agencies.
- C. Advise Owner, Contractor, Architect, and governing authorities in advance of dates and times tests are to be performed on the elevator.

### 3.5 ADJUSTING

- A. Section 01 73 00 - Execution: Starting, testing, adjusting, and balancing.
- B. Make necessary adjustments of operating devices and equipment to ensure elevator operates smoothly and accurately.

### 3.6 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work and comply with manufacturer's recommendations. Clean installed work in accordance with manufacturer's recommended materials and procedures.
- B. Before final acceptance, remove protection from finished surfaces and clean and polish surfaces in accordance with manufacturer's recommendations for type of material and finish provided. Stainless steel shall be cleaned with soap and water and dried with a non-abrasive surface; it shall not be cleaned with bleach-based cleansers.
- C. At completion of elevator work, remove tools, equipment, and surplus materials from site. Clean equipment rooms and hoistway. Remove trash and debris.

### 3.7 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. At time of Substantial Completion of elevator work, or portion thereof, provide suitable protective coverings, barriers, devices, signs, or other such methods or procedures to protect elevator work from damage or deterioration. Maintain protective measures throughout remainder of construction period.

### 3.8 DEMONSTRATION AND TRAINING

- A. Section 01 79 00 - Demonstration and Training: Provide demonstration and training to the Owner regarding operation and maintenance of components of the installed Work.
- B. Instruct Owner's personnel in proper use, operations, and daily maintenance of elevators. Review emergency provisions, including emergency access and procedures to be followed at time of failure in operation and other building emergencies. Train Owner's personnel in normal procedures to be followed in checking for sources of operational failures or malfunctions.
- C. Make a final check of each elevator operation, with Owner's personnel present, immediately before date of substantial completion. Determine that control systems and operating devices are functioning properly.

### 3.9 ELEVATOR SCHEDULE

- A. Elevator:
  - 1. Elevator Type: Gearless Traction Machine Room-Less; Passenger Type.
  - 2. Elevator Model: Evolution 100.
  - 3. Rated Capacity: 3500 lbs.
  - 4. Rated Speed: 200 ft./min.
  - 5. Operation System: TAC32T.
  - 6. Travel: 16'-0".
  - 7. Landings: 2, total.
  - 8. Openings:
    - a. Front: 2.
    - b. Rear: 0.
  - 9. Clear Car Inside: 6'-8" wide x 5'-5" deep.
  - 10. Inside clear height: 7'-4" standard.
  - 11. Door clear height: 7'-0" standard.
  - 12. Hoistway Entrance Size: 3'-6" wide x 7'-0" high.
  - 13. Door Type: One-speed, LH Side opening.
  - 14. Power Characteristics: 460 volts, 3 Phase, 60 Hz.

- a. Isolation Transformer required for jobs with less than 480vac, 3 Phase building power.
- 15. Seismic Requirements: Zone 1.
- 16. Hoistway Dimensions: 8'-6" wide x 6'-11" deep.
- 17. Pit Depth: 5'-0".
- 18. Button & Fixture Style: Traditional Signal Fixtures.
- 19. Special Operations: Limited Access with card readers by others.

**END OF SECTION**

**I think SECTION 21 05 00****FIRE PROTECTION SYSTEM GENERAL****PART 1 - GENERAL****1.1 SCOPE**

- A. Design, fabricate, install, and secure required approvals for a complete fire protection automatic sprinkler [and standpipe] system where shown on the Drawings, as specified herein, and as needed for a complete and proper installation in accordance with pertinent requirements of NFPA 13 and local governmental agencies having jurisdiction.
- B. Work includes providing design services; furnishing all labor, material, equipment and installation as necessary and reasonably incidental to the proper completion and proper operation of the fire protection systems. The work shall consist of but shall not necessarily be limited to the following:
  - 1. Automatic wet-pipe sprinkler system as specified in Section 21 13 13.

**1.2 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 (General Requirements) sections of the Project Manual apply to this Section.
- B. The General Conditions shall be carefully examined before proposals for any work are submitted. Division 21 shall not be interpreted as waiving or overruling any requirements expressed in the General Conditions unless Division 21 specifications contain statements more definitive or more restrictive.

**1.3 DEFINITIONS**

- A. Words and phrases used throughout the Contract Documents shall be interpreted as indicated below:
  - 1. Construction Documents – the basis for the work. It includes both the Drawings (plans) and Project Manual (specifications).
  - 2. Contractor – The person or organization awarded the contract for fire protection design and construction services.

In the case of a construction project administered as a multiple-prime contract, the term shall be further defined as the Contractor holding a prime contract for fire protection design and construction work.

The terms “Fire Protection Contractor” and “Sprinkler Contractor” may be used interchangeably with the term Contractor.
  - 3. Provide – To furnish and install materials, equipment or systems.
  - 4. Submittals – Submittals shall include Manufacturer’s Catalog Data, Shop Drawings, Calculations, Certificates of Compliance, Testing Reports, Samples, and Operation and Maintenance Manuals.



5. Professional – The Architect and/or Engineer of record.
6. Work By Others – Work provided by a person or organization other than the Contractor.

#### 1.4 CODES, REFERENCES, AND STANDARDS

- A. The Contractor shall comply with all laws, ordinances, and regulations of all Authorities Having Jurisdiction, including those of all applicable City, County, State, Federal and Public Utility entities. All licenses, permits, fees, connection fees, tapping fees, inspection fees, etc., shall be obtained by the Contractor and the cost shall be included in the Contract price.
- B. The minimum standard of work under this contract shall be in accordance with the following model building codes and standards:
  1. International Code Council (ICC)
    - a. International Building Code with North Carolina Amendments
    - b. International Fire Prevention Code with North Carolina Amendments
  2. National Fire Protection Association
    - a. NFPA 13 – Standard for the Installation of Sprinkler Systems
    - b. NFPA 24 – Standard for the Installation of Private Fire Service Mains and Their Appurtenances
- C. Other publications listed throughout Division 22 form a part of this specification to the extent referenced. All publications shall be the latest edition as adopted by the Authority Having Jurisdiction. The publications are referred to in the text by basic designation only.

#### 1.5 QUALITY ASSURANCE, WORKMANSHIP AND COORDINATION

- A. The Contractor must coordinate his work with that of the other trades so that all work will be performed in an orderly manner and with the least possible interference. Where coordination with other trades is required, the Professional shall make the final decision regarding changes to be made in the work.
- B. The Contractor must thoroughly familiarize himself with all specifications and drawings for the project so that he clearly understands his responsibility in relationship to the work to be performed. The Contractor must plan and perform his work to permit the use of the building as soon as possible.
  1. Sprinklers shall be referred to on drawings, submittals, and other documentation, by the sprinkler identification or model number as specifically published in the appropriate agency listing or approval. Trade names or other abbreviated designations shall not be allowed.
- C. The Contractor shall guarantee the workmanship, materials and equipment, furnished against defects, leaks, performance and non-operation for a period of one (1) year after the date of final acceptance. Defective workmanship shall be construed as meaning defective materials and unsatisfactory installation and not intended to apply to ordinary wear and tear. The Contractor shall pay for any repairs or replacements caused by defective workmanship as construed herein within the period covered by the Guarantee, including all incidental work required to correct the deficiency.



- D. The Contractor shall expressly and completely follow all manufacturers' instructions required for validation of the manufacturer's warranty agreement including but not limited to service, maintenance and adjustments of the equipment.
- E. The Contractor will be held responsible for the proper installation of all materials and equipment required for a complete installation within the intent and meaning of the Contract Documents.
  - 1. All grooved joint couplings, fittings, valves, and specialties shall be the products of a single manufacturer. Grooving tools shall be of the same manufacturer as the grooved components.
  - 2. All castings used for coupling housings, fittings, valve bodies, etc., shall be date stamped for quality assurance and traceability.
- F. The grooved coupling manufacturer's factory trained representative shall provide on-site training for contractor's field personnel in the use of grooving tools and installation of grooved joint products. The representative shall periodically visit the jobsite and review contractor is following best recommended practices in grooved product installation. (A distributor's representative is not considered qualified to conduct the training or jobsite visit(s).)

## **1.6 PROJECT RECORD DRAWINGS**

- A. Deviations from the Contractor's approved Design and Fabrication Drawings necessary to coordinate the work with other trades, to conform to the building conditions or to conform to the rules and regulations of Authorities Having Jurisdiction shall be made only after obtaining written permission from the Professional.
- B. The Contractor shall keep a record of construction changes and deviations from the original Design and Fabrication Drawings. All changes shall be recorded on a separate set of prints which shall be kept at the job site specifically for that purpose. The record shall be made immediately after the work is completed. Documentation shall include:
  - 1. changes in pipe routing location
  - 2. valve locations
  - 3. Equipment locations, etc.
  - 4. actual capacities and values of equipment provided as indicated in equipment schedules
- C. The marked-up record set of drawings shall be submitted to the Professional for review and approval before final acceptance of the Fire Protection Contract work.

## **1.7 FIELD MEASUREMENTS**

- A. Before ordering any equipment and material, or performing any work, the Contractor shall verify all measurements and dimensions at the job site and shall be held responsible for the correctness of same.
- B. No extra compensation will be allowed because differences between actual dimensions and measurements and those indicated on the Contractor's drawings.

## **1.8 PROTECTION OF SERVICES AND EQUIPMENT**

- A. The Contractor, at his own expense, shall repair, replace and maintain in service any utilities, facilities or services (underground, aboveground, interior or exterior) damaged, broken, or otherwise rendered inoperative during construction due to activities on the part of the

Contractor. The method used by the Contractor in repairing, replacing or maintaining the services shall be approved by the Professional.

- B. The Contractor shall protect, at his own expense, such of his work, materials or equipment that is subject to damage during the project duration. All openings into any piping, ducts or equipment must be securely covered, or otherwise protected, to prevent injury due to carelessly or maliciously dropped tools or materials, grit, dirt, or any foreign material. The Contractor shall be held responsible for all damage so done until his work is fully and finally accepted.
- C. It shall be the responsibility of the Contractor to protect motors, pumps, electrical equipment, and all similar items of equipment from dirt, grime, plaster, water, etc. during all phases of construction. This protection shall be provided by covering equipment with transparent plastic sheeting and/or locating the materials and equipment in an area free from the elements.

## **1.9 INTERRUPTION OF SERVICES**

- A. The Contractor shall schedule his work to avoid any major interruption of any utility services.
- B. Existing utilities serving facilities occupied and used by the Owner or others shall not be interrupted except when such interruptions have been authorized in writing by the Owner or the Professional. Interruptions shall occur only after acceptable temporary utility services have been provided. The Contractor shall provide a minimum of ten (10) working days notice to the Professional and receive written notice to proceed before interrupting any utility.

## **1.10 CLEANUP**

- A. The Contractor shall maintain buildings, grounds, and public properties free from accumulations of waste materials, debris and rubbish. At reasonable intervals during the progress of work, and when directed by the Owner's Authorized Representative, the site and public properties shall be cleaned and waste materials, debris and rubbish shall be disposed of in appropriate manner. The Contractor shall provide containers for collection of waste materials, debris and rubbish. Waste materials, debris and rubbish shall be removed from the job site and legally disposed of at a landfill area in accordance with all applicable regulations. Burning or burying waste materials, debris or rubbish on project site shall not be permitted.
- B. At the completion of the Project, remove waste materials, rubbish, tools, equipment, machinery, surplus materials, etc., and clean all sight-exposed fire protection fixtures and equipment. Remove grease, dust, dirt, stains, labels, fingerprints and other foreign materials from sight-exposed fire protection fixtures and equipment. Broom clean paved and concrete surfaces; rake clean other ground surfaces. Repair, patch and touch up marred surfaces to specified finish or to match adjacent surfaces.

## **1.11 SUBMITTALS**

- A. Submittals shall be in accordance with Division 01 of the Project Manual.
- B. General
  - 1. The Contractor shall provide to the Professional for review six (6) copies of required submittals, unless noted otherwise. All Catalog Data, Shop Drawings, Design (hydraulic) Calculations, and Certificates of Compliance shall be submitted as a single package. All delays to the job resulting from the Contractor's failure to provide submittals at one time will be the responsibility of the Contractor. Four (4) copies will be returned to the Contractor.

2. Submittals provided for review shall clearly and completely describe the specific product(s) they represent. Where differences exist between the item specified and that submitted for review, the submittal shall be highlighted.
3. Shop Drawings shall be prepared by a Certified NICET Level III technician. The plans should bear the signature, stamp and certificate number of the technician.
4. Submittals shall bear the review stamp of the Contractor. The review stamp of the Contractor shall be affixed to shop drawings to indicate:
  - a. The Contractor has coordinated the electrical characteristics of the equipment.
  - b. The Contractor has verified that the equipment submitted will physically fit into the space allocated with adequate clearances for maintenance, access, and egress requirements.
  - c. The Contractor shall bear all associated costs that may accrue due to failure to completely represent a given product.
5. Material and equipment shown on the drawings or specified herein shall not be incorporated in the work of this Contract until shop drawings, hydraulic calculations, engineering data and catalog information have been reviewed and accepted by the Professional.
6. Grooved joint couplings and fittings shall be shown on drawings and product submittals, and shall be specifically identified with the applicable style or series designation.

#### C. Operation and Maintenance Manuals

1. Submit one electronic pdf sixty (60) days prior to operator training/pre-final inspection for review by the Professional.
2. Prepare binder covers with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS – FIRE PROTECTION SYSTEMS", title of project, and subject matter of binder when multiple binders are required.
3. Internally subdivide the binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.
4. Contents: Prepare a Table of Contents for each volume, with each Product or system description identified type on thirty (30) pound white paper.
  - a. Part 1: Directory, listing names, addresses, and telephone numbers of Contractor, Subcontractors, and equipment suppliers.
  - b. Part 2: Operation and maintenance instructions arranged by system or process flow and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
    - 1) Significant design criteria.
    - 2) List of equipment.
    - 3) Parts list for each component.
    - 4) Maintenance instructions for equipment and systems.
    - 5) Maintenance instructions for finishes, including recommended cleaning methods and materials and operating instructions.
    - 6) Special precautions identifying detrimental agents.
    - 7) Special Requirements of other sections of this specification noted to be included in the operating and maintenance manual.

- 8) Original copy (reproductions will not be accepted) of NFPA 25 – Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems.
- c. Part 3: Project documents and certificates, including the following:
- 1) All approved Submittals
  - 2) Shop Drawings
  - 3) Hydraulic Calculations
  - 4) Certificates of Compliance
  - 5) Photocopies of warranties and bonds
  - 6) Material safety data sheets
5. Submit two (2) copies of completed volumes in final form fifteen (15) days prior to owner training. These copies will include Professional's previous review comments.

### **1.12 CONCRETE**

- A. Concrete shall comply with Division 3 of the Project Manual.
- B. Reinforcing shall conform to ASTM A-615, Grade 60. Concrete exposed to freezing and thawing, salts, sulfates and corrosion shall comply with International Building Code with North Carolina amendments.
- C. All concrete shall be of minimum 3000 pounds per square inch (psi) strength in 28 (twenty-eight) days. All concrete shall be mixed by machine. No wet or moistened mixture containing cement shall remain unplaced for a period exceeding 30 (thirty) minutes and shall not be used after its initial set. Retempering after initial set is prohibited. Exposed surfaces shall be protected from drying for at least 7 (seven) days. All forms shall be built true and rigid. Form removal shall not injure the concrete.
- D. All concrete is to be finished with a hard, smooth troweled finish and is to be faced smooth with rounded corners.

### **1.13 INSPECTION AND TESTING**

- A. General
  1. New fire protection systems shall be tested to disclose leaks and defects.
  2. The Contractor shall notify the Professional a minimum of 5 (five) working days prior to testing to coordinate the testing and inspection procedures.
  3. If the Professional determines that the fire protection systems do not pass the prescribed tests, then the Contractor shall be required to make the necessary repairs, at his own expense, and the Contractor shall re-inspect and re-test the systems. Repairing, inspection and testing shall be continued until all systems pass as determined by the Professional.
  4. All new, altered, extended or replaced fire protection shall be left uncovered and unconcealed until it has been inspected, tested and accepted by the Professional. Where such work has been covered or concealed before it has been inspected, tested and accepted, it shall be uncovered by the Contractor, at his own expense as directed by the Professional.
  5. All equipment, material, labor, etc., required for testing the fire protection systems shall be furnished by the Contractor.

### **1.14 INSTRUCTION OF THE OWNER**

- A. After acceptance of the Project, the Contractor shall furnish the services of personnel thoroughly familiar with the completed installation to instruct the Owner in the proper operation and maintenance of all equipment and appurtenances provided.
- B. The Contractor shall provide the Owner with two weeks' notice before the instruction session.

### **1.15 CHASES AND OPENINGS**

- A. All chases and openings required for the installation of the work shall be coordinated with the other trades. The Contractor shall provide the other trades with sufficient time (1 (one) week minimum) for coordination of all chases and openings. The contractor shall be responsible for all work required to cut and patch the required openings. The work shall be performed to the satisfaction of the Professional.
- B. Penetrations made in fire rated chases, partitions, floors, etc., shall be sealed with an approved material and method as required to maintain the integrity of the fire separation.
- C. The Contractor shall provide all sleeves, hangers, and anchors required for installation of work in chases and openings.

### **1.16 PAINTING**

- A. Painting shall be in accordance with Division 09.

### **1.17 RELATED WORK**

- A. All work related to providing complete fire protection systems and equipment shall be the responsibility of the Contractor. The following related work shall be provided as indicated in other specification Divisions, unless noted otherwise, but shall remain the responsibility of the Contractor for workmanship and completeness:
  - 1. General Contractor
    - a. Installation of access panels.
    - b. Concrete housekeeping pads for fire protection equipment.
    - c. Removal of existing concrete housekeeping pads.
  - 2. Food Service Equipment Contractor
    - a. Kitchen hood fire extinguishing systems.

### **1.18 MISCELLANEOUS STEEL AND ACCESSORIES**

- A. The contractor shall provide all necessary steel angles, channels, pipe, rods, nuts, bolts, etc., as shown on plans, as specified, or as may be required for complete and proper installation of sprinkler piping, systems and equipment. All material and workmanship shall be of the best quality and shall be installed in accordance with the best practices of the trade.

### **1.19 ACCESS PANELS**

- A. The Contractor shall furnish access doors to the General Contractor for installation in ceilings, walls, partitions and floors for access to valve and other appurtenances.

- B. Access panels shall be of sufficient size to permit removal or access to equipment, except that the minimum size shall be 12-inches by 16-inches.
- C. Access door locations shall be as determined by field conditions for optimum access to equipment, and shall be reviewed by the Professional before final installation
- D. Access doors shall be suitable for installation in the finish material of the ceilings, walls, partitions and floors.
- E. Frame and panel access doors in restrooms, kitchens and as indicated shall be stainless steel.
- F. Access doors with UL Listing shall be provided in rated construction assemblies. Access doors shall be "B-Label" and shall have a UL one and one-half (1-1/2) hour rating at 250 degrees F rating for both door and frame. Maximum size shall be 20" x 20" or 400 square inches in area. Frame shall be sixteen (16) gauge minimum steel, panel shall be twenty (20) gauge minimum steel. Access doors shall be provided with a baked-on enamel finish (prime coat), continuous type hinge on one side, flush-face type lock with key operation and self-latching cylinder locks.
- G. Access doors without UL label shall be provided in all non-rated construction assemblies: Frame shall be sixteen (16) gauge minimum steel, panel shall be fourteen (14) gauge minimum steel. Access doors shall be provided with a baked-on enamel finish (prime coat), concealed spring type hinges and flush-face type lock with key operation and self-latching cylinder locks. Door shall open 175 degrees (minimum).
- H. All access doors shall be keyed alike.

## **PART 2 - PRODUCTS**

### **2.1 GENERAL**

- A. All materials used on fire protection systems shall meet the requirements of applicable codes, standards, and requirements of Local Authorities Having Jurisdiction and the Owner's Insurance Carrier.

### **2.2 SPRINKLER PIPING, ABOVE GROUND**

- A. Piping: black steel meeting ASTM A53, ASTM A135, or ASTM A795.
  - 1. Piping 2-1/2" and larger shall be Schedule 10 with roll-grooved, flanged or welded connections.
  - 2. Piping 2" and smaller shall be Schedule 40 with threaded or welded connections.
  - 3. Piping shall be hot-dipped galvanized where specified herein or noted on the drawings.
- B. Fittings: UL-listed, standard weight suitable for pressures up to 250 psig, cast iron meeting ASTM A126 or malleable iron meeting ASTM A197. Threaded cast iron fittings shall meet ANSI B16.4; flanged cast iron fittings shall meet ANSI B16.1. Threaded malleable iron fittings shall meet ANSI B16.3. Grooved fittings and couplings shall be UL-listed and shall be of ductile iron meeting ASTM A536, utilizing an EDPM gasket. Fittings shall be short pattern, with flow equal to standard pattern fittings. Plain-end fittings and couplings, or welded-segmented fittings shall not be used. Changes in pipe diameter shall be made using tapered reducing fittings. Bushings or grooved-end reducing couplings shall not be used unless standard reducing fittings are not regularly available.

1. Grooved joint couplings shall be:
  - a. Rigid Type: Housings shall be cast with offsetting angle-pattern bolt pads to provide rigidity and system support and hanging in accordance with NFPA-13. Couplings shall be fully installed at visual pad-to-pad offset contact. (Tongue and recess type couplings, or any coupling that requires exact gapping of bolt pads on each side of the coupling at specified torque ratings, are not allowed.)
    - 1) 1-½" through 4": Installation-Ready, for direct stab installation without field disassembly.
  - b. Flexible Type: For use in locations where vibration attenuation and stress relief are required, and for seismic applications.

2. Gaskets:

Fire Protection Service	Temp. Range	Gasket Recommendation
Freezer Applications	-40°F to 0°F	FlushSeal®, Grade L, Silicone
Water/Wet Systems	Ambient	Grade EPDM, Type A

## 2.3 VALVES FOR FIRE PROTECTION SYSTEMS

- A. Gates Valves: Class 125, comply with MSS SP-80, bronze body, screwed bonnet, rising stem, solid wedge. 3" and larger; comply with MSS SP-70, iron body, bronze trim, rising stem, hand wheel, OS&Y, flanged or grooved ends.
- B. Butterfly Valves:
  1. Comply with MSS SP-67, lug type, cast or ductile iron body, chrome plated ductile iron disk, EPDM seat, extended neck, handwheel and gear drive and integral indicating device, built-in tamper proof switch, 200 PSI rating.
  2. Grooved end type with ductile iron body, EPDM coated ductile iron disk with integrally cast stem, handwheel and gear drive and integral indicating devices, with weatherproof actuator and supervisory switches, 300 PSI rating.
- C. Spring-Actuated Check Valves: 250 PSI rating, grooved end ductile iron one-piece body, stainless steel spring and shaft, suitable for vertical or horizontal installations.
- D. Check Valves: Class 125, comply with MSS SP-80 bronze body, screwed cap. "Y" pattern swing, bronze disc. 3" and larger, comply with MSS SP-71, class 125, iron body, bronze mounted, horizontal swing, cast iron disc.

## 2.4 DRAIN VALVES

- A. Provide bronze compression stop with hose thread nipple and cap.

## PART 3 - EXECUTION

### 3.1 GENERAL

- A. All materials and equipment used shall be installed in strict accordance with the Standards under which the materials are accepted and approved, and in strict accordance with the manufacturer's instructions.
- B. The Contractor's Drawings shall indicate every bend, offset, change in direction and appurtenance required to provide a complete and workable system.



- C. Grooved joints shall be installed in accordance with the manufacturer's latest published installation instructions. Grooved ends shall be clean and free from indentations, projections, and roll marks in the area from pipe end to groove. Gaskets shall be of an elastomer grade suitable for the intended service and shall be molded and produced by the coupling manufacturer. The grooved coupling manufacturer's factory trained representative shall provide on-site training for contractor's field personnel in the use of grooving tools and installation of grooved joint products. The representative shall periodically visit the jobsite and review contractor is following best recommended practices in grooved product installation. (A distributor's representative is not considered qualified to conduct the training or jobsite visit(s).)

### 3.2 INSTALLATION OF EQUIPMENT

#### A. Aboveground Pipe

1. Run pipe parallel to column centerlines. Install pipe as high as possible in unfinished areas to maintain maximum headroom. Piping shall bear evenly on hangers and supports.
2. Provide means to drain entire piping system. Pitch dry pipe system branch lines and mains to drain in accordance with NFPA 13.
3. Threads on fittings and bolts shall be fully engaged. Pipe threads shall be made up using joint compound or Teflon tape.
4. Pipe drains and discharges from relief valves and automatic ball drip valves to spill directly over the nearest floor drain or outside the building. Pipe main drain and test connections to discharge at a safe point outside the building unless indicated otherwise on the Drawings.
5. Torch cutting and field welding are not permitted in sprinkler systems.
6. System layout shall follow the layout and minimum sizes indicated on the Drawings. Provide additional fittings and offsets as required to coordinate with other trades.
7. Piping shall not be supported from ductwork or other equipment.

#### B. Control Valves and Accessories

1. Install gate valves with stems pointing at or above the pipe centerline.

#### C. Alarm and Supervisory Devices

1. Tamper switches shall not interfere with valve operation and shall be adjusted to initiate a signal before the valve stem moves more than 20% of its total travel or two handwheel revolutions from its normal position. Valves shall be monitored in the normally open positions unless indicated as normally closed on the Drawings.
2. Adjust retard mechanisms of vane-type water flow switches for a 20-second delay.
3. Provide an inspector's test connection with site glass, orifice, and shutoff valve for each water flow switch in each system.

#### D. Accessories

1. Install sprinkler cabinet near the sprinkler water entrance or as directed by the Owner.



2. Install valve identification signs as required by NFPA 13. Install hydraulic nameplates on system risers. Record all hydraulic data on each nameplate as required by NFPA 13.

### 3.3 SEISMIC RESTRAINTS

- A. The Sprinkler Contractor shall coordinate with the General Contractor to determine site classification and seismic requirements for this project. Where required, the Sprinkler Contractor shall be responsible for providing restraints to resist the earthquake effects on the Sprinkler system(s). The requirements for these restraints are found in the 2009 North Carolina Building Code.
- B. The Sprinkler Contractor shall refer to the latest edition of the “Seismic Restraint Manual Guidelines for Mechanical Systems” published by SMACNA for guidelines to determine the correct restraints for piping.
- C. The Sprinkler Contractor shall include shop drawings of the specific methods of seismic restraint to be used for this project before installation of piping, ductwork, and equipment.
- D. Any required anchorage of the equipment and materials for this project shall be an integral part of the design and specification of such equipment and materials. Manufacturers of all equipment shall provide anchorage details, isolators, seismic mounts and restraints, etc. necessary to comply with Code requirements.
- E. The Sprinkler Contractor shall retain the services of a Professional Structural Engineer licensed in the State of North Carolina to design seismic restraint elements required for this project. The engineer’s computations, bearing his professional seal, shall accompany shop drawings which show Code compliance. Computations and shop drawings shall be submitted for review prior to the purchasing of materials, equipment, systems and assemblies.
- F. Internal seismic restraint elements of manufactured equipment shall be certified by a Professional Engineer retained by the manufacturer. Such certificate applies only to internal elements of the equipment. All equipment anchorage requirements shall be coordinated with the building structure and shall be compatible thereto. All such anchorage shall be reviewed by the project’s structural engineer.
- G. The professional engineer retained by the Sprinkler Contractor for seismic restraint calculations shall visit the job site upon completion of the seismic restraint installation. This Engineer shall provide in writing verification of compliance with the approved seismic submittal. This verification shall bear the Engineer's professional seal. Job site inspection by other than this Engineer is not acceptable. This engineer shall also be responsible for any required special inspections and associated documentation.
- H. Review of the seismic design and shop drawings by the Engineer/Architect or his agent shall not relieve the Sprinkler Contractor of his responsibility to comply with the seismic or any other requirements of the International Building Code.

### END OF SECTION



**SECTION 21 13 13****WET-PIPE SPRINKLER SYSTEMS****PART 1 GENERAL****1.1 SUMMARY**

- A. Section includes wet-pipe sprinkler system guidelines for system design, installation, and certification.
- B. Related Sections:
  - 1. Section 26 05 03 - Equipment Wiring Connections: Execution requirements for electric connections to equipment specified by this section.

**1.2 REFERENCES**

- A. National Fire Protection Association:
  - 1. NFPA 13 - Installation of Sprinkler Systems.

**1.3 SYSTEM DESCRIPTION**

- A. System to provide coverage for entire building.
- B. Provide a hydraulically designed system to NFPA 13 occupancy requirements.
- C. Obtain up-to-date flow test data. Determine volume and pressure of incoming water supply from water flow test data. Provide flow test data on the Shop Drawings.
- D. Interface sprinkler system with building fire and smoke alarm system.
- E. For new systems, provide fire department connections as indicated on Drawings.

**1.4 PERFORMANCE REQUIREMENTS**

- A. Standard-Pressure Piping System Component: Listed for 175-psig (1200-kPa) minimum working pressure.
- B. Delegated Design: Design sprinkler system(s), including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated
  - 1. Provide fire-hydrant flow test records to indicate the following conditions:
    - a. Time of test
    - b. Name and Company of person performing the test
    - c. Location of Residual Fire Hydrant
    - d. Location of Flow Fire Hydrant
    - e. Static Pressure at Residual Fire Hydrant
    - f. Measured Flow at Flow Fire Hydrant
    - g. Residual Pressure at Residual Fire Hydrant
- C. Sprinkler system design shall be approved by authorities having jurisdiction.

1. Margin of Safety for Available Water Flow and Pressure: 10 percent, including losses through water-service piping, valves, and backflow preventers.
2. See Fire Protection drawings for recommended Sprinkler Occupancy Hazard Classifications:
3. See Fire Protection drawings for recommended Minimum Density for Automatic-Sprinkler Piping Design:
4. Maximum Protection Area per Sprinkler: Per UL listing.
5. Total Combined Hose-Stream Demand Requirement: Per NFPA 13 unless otherwise indicated:
  - a. Light-Hazard Occupancies: 100 gpm for 30 minutes.
  - b. Ordinary-Hazard Occupancies: 250 gpm for 60 to 90 minutes.
6. Seismic Performance: Refer to section 21 05 00

## 1.5 SUBMITTALS

- A. Division 01 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Provide layout of finished ceiling areas indicating sprinkler locations coordinated with ceiling installation and the work of other trades (ductwork, lights and any other ceiling mounted devices). Show detailed pipe layout, hangers and supports, sprinklers, components and accessories. Indicate system controls.
- C. Product Data: Submit data on sprinklers, valves, and specialties, including manufacturers catalog information. Submit performance ratings, rough-in details, weights, support requirements, and piping connections.
- D. Design Data: Submit design calculations signed and sealed by a professional engineer.
- E. Sprinklers shall be referred to on drawings, submittals, and other documentation, by the sprinkler identification or model number as specifically published in the appropriate agency listing or approval. Trade names or other abbreviated designations shall not be allowed.

## 1.6 CLOSEOUT SUBMITTALS

- A. Division 01 - Execution and Closeout Requirements: Closeout procedures.
- B. Project Record Documents: Record actual locations of sprinklers and deviations of piping from drawings. Indicate drain and inspector's test locations.
- C. Operation and Maintenance Data: Submit components of system, servicing requirements, record drawings, inspection data, replacement part numbers and availability, and location and numbers of service depot.

## 1.7 QUALITY ASSURANCE

- A. Perform Work in accordance with NFPA 13.

**1.8 QUALIFICATIONS**

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.
- C. Design system under direct supervision of Professional Engineer experienced in design of this Work and licensed at Project location (state).

**1.9 DELIVERY, STORAGE, AND HANDLING**

- A. Division 01 - Product Requirements: Product storage and handling requirements.
- B. Store products in shipping containers until installation.
- C. Furnish piping with temporary inlet and outlet caps until installation.

**1.10 WARRANTY**

- A. Division 01 - Execution and Closeout Requirements: Product warranties and product bonds.
- B. Furnish five (5) year manufacturer warranty for system components.

**1.11 EXTRA MATERIALS**

- A. Division 01 - Execution and Closeout Requirements: Spare parts and maintenance products.
- B. Furnish extra sprinklers under provisions of NFPA 13.
- C. Furnish suitable wrenches for each sprinkler type.
- D. Furnish metal storage cabinet in location designated by Architect, adjacent to system riser.

**PART 2 PRODUCTS****2.1 SPRINKLERS**

- A. Suspended Ceiling Type:
  - 1. Type: Concealed pendant type with coverplate.
  - 2. Color of coverplate: Coordinate with Architect.
  - 3. Fusible Link: temperature rated for specific area hazard.
- B. Exposed Area Type:
  - 1. Type: Standard upright type.
  - 2. Finish: Brass.
  - 3. Fusible Link: temperature rated for specific area hazard.
- C. Side wall Type:

1. Type: Recessed horizontal side wall type with matching escutcheon plate.
2. Finish: Chrome plated.
3. Escutcheon Plate Finish: Chrome plated.
4. Fusible Link: temperature rated for specific area hazard.

D. Guards: Finish to match sprinkler finish.

## 2.2 PIPING SPECIALTIES

- A. Wet Pipe Sprinkler Riser Check Valve: Ductile iron body, swing check type valve with brass seat and rubber-faced or aluminum-bronze clapper with elastomer seal. Provide complete with main drain valve and pressure gauges. Rated for 250 psi working pressure. Valve internal components shall be replaceable without removing from the installed position.
- B. Electric Alarm: Electrically operated gong with pressure alarm switch.
- C. Water Flow Switch: Vane type switch for mounting horizontal or vertical, with two contacts; rated 10 amp at 125 volt AC and 2.0 amp at 24 volt DC.
- D. Fire Department Connections:
1. Flush mounted wall type with chrome plated finish.
  2. Outlets: Two-way with fire department thread size. Threaded dust-cap and chain of matching material and finish.
  3. Drain: 3/4-inch automatic drip, outside or connected to drain.
  4. Label: "Sprinkler - Fire Department Connection"

## PART 3 EXECUTION

### 3.1 INSTALLATION

- A. Install in accordance with NFPA 13.
- B. Locate fire department connection with sufficient clearance from walls, obstructions, or adjacent fire department connectors to allow full swing of fire department wrench handle.
- C. Locate outside alarm-gong on building wall as indicated on Drawings.
- D. Place pipe runs to minimize obstruction to other work.
- E. Install piping in concealed spaces above finished ceilings.
- F. Center sprinklers in two directions in ceiling tile and install piping offsets.
1. A stainless steel flexible drop system may be used to properly locate sprinkler heads. The drop system shall be braided type and supplied with required supporting members and bracing. Unbraided piping system will not be accepted.
- G. Do not install sprinklers that have been dropped, damaged, or show a visible loss of fluid. Never install sprinklers with cracked bulbs.

- H. Sprinkler bulb protector shall be removed by hand after installation. Do not use tools or any other device(s) to remove the protector that could damage the bulb in any way.
- I. Connect to fire pump system in accordance with Section 21 30 00 and NFPA 13.
- J. Install guards on sprinklers where required to protect sprinklers from physical damage.
- K. Hydrostatically test entire system.
- L. Require test be witnessed by authority having jurisdiction.

### **3.2 INTERFACE WITH OTHER PRODUCTS**

- A. Verify signal devices are installed and connected to fire alarm system.

### **3.3 CLEANING**

- A. Section 01 70 00 - Execution and Closeout Requirements: Final cleaning.
- B. Flush entire piping system of foreign matter.

### **3.4 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 70 00 - Execution and Closeout Requirements: Protecting installed construction.
- B. Apply masking tape or paper cover to protect concealed sprinklers, cover plates, and sprinkler escutcheons not receiving field paint finish. Remove after painting. Replace painted sprinklers with new.

**END OF SECTION**





**SECTION 22 01 00****PLUMBING GENERAL REQUIREMENTS****PART 1 GENERAL****1.1 STIPULATIONS**

- A. General provisions of the contract documents including general and supplementary conditions apply to all work in this division.
- B. The general conditions shall be carefully examined before proposals for any work are submitted. Division twenty-two shall not be interpreted as waiving or overruling any requirements expressed in the general conditions unless division twenty-two specifications contain statements more definitive or more restrictive.
- C. Nothing herein contained shall be so construed as to relieve the contractor from performing their work according to the true intent and meaning of the contract drawings and specifications. The contractor will be held responsible to provide all materials and equipment and shall provide all labor necessary for the complete, prompt, and satisfactory execution of the work. The contractor is also responsible for the proper coordination of their work with all other trades.
- D. The contractor shall bear all expenses incidental to the satisfactory completion of the work contained in the contract drawings and specifications.

**1.2 DEFINITIONS**

- A. Where words and phrases used throughout the contract documents are not specifically defined below or in the reference standards, they shall be interpreted by the meanings given to them in the latest edition of the Merriam-Webster dictionary.
- B. Words and phrases used throughout the contract documents shall be interpreted as indicated below:
  - 1. Contractor: The person or organization awarded the contract for construction services. In the case of a construction project administered as a multiple-prime contract, the term shall be further defined as the contractor holding a prime contract for plumbing construction work.
  - 2. Others: A person or organization other than the contractor, owner, or professional.
  - 3. Owner: The person or organization that awards the construction contract, or their designated representative.
  - 4. Professional: The engineer of record.
  - 5. Provide: To furnish and install materials, equipment, or systems.
  - 6. Submittals: Industry standards, manufacturer's data, manufacturer's warranties, operation and maintenance instructions, shop drawings, and test reports.
  - 7. Work: All labor, materials, equipment, and services necessary and reasonably incidental to the proper completion and proper operation of the plumbing systems.

**1.3 REFERENCES**

- A. The contractor shall comply with all laws, ordinances, and regulations of all authorities having jurisdiction, including those of all applicable city, county, state, federal, and public utility entities. The contractor shall obtain all licenses, permits, etc. and shall pay

all associated connection fees, tapping fees, inspection fees, etc. These costs shall be included in the contract price.

- B. The publications listed below form a part of this specification. All publications shall be the latest edition as adopted by the authority having jurisdiction at the date of bid advertisement. The minimum standard of work under this contract shall be in accordance with the following model building codes or standards:
1. ASTM International:
    - a. ASTM C33 – Standard Specification for Concrete Aggregates.
    - b. ASTM C94 – Standard Specification for Ready-Mixed Concrete.
    - c. ASTM C150 – Standard Specification for Portland Cement.
    - d. ASTM C618 – Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
    - e. ASTM C989 – Standard Specification for Slag Cement for Use in Concrete and Mortars.
    - f. ASTM D1557 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup>).
    - g. ASTM D1556 – Standard Test Method for Density and Unit Weight of Soil in Place by the Sand Cone Method.
  2. International Building Code (IBC) with North Carolina Amendments:
    - a. North Carolina Building Code.
    - b. North Carolina Energy Conservation Code.
    - c. North Carolina Fire Prevention Code.
    - d. North Carolina Fuel Gas Code.
    - e. North Carolina Mechanical Code.
    - f. North Carolina Plumbing Code.
  3. National Fire Protection Association:
    - a. NFPA 70 – National Electric Code.

#### 1.4 SCOPE

- A. Domestic water systems: The domestic water systems shall be extended to all equipment and accessories, including those provided by others as determined in the construction contract. For systems with piping outside of the building, the systems shall be extended from a point five (5) feet beyond the exterior face of the building. Final installation at the point of utility connection shall be made by the contractor.
- B. Sanitary waste systems: The sanitary waste systems shall be extended to all equipment and accessories including those provided by others as determined in the construction contract. For systems with piping outside of the building, the systems shall be extended from a point five (5) feet beyond the exterior face of the building. Final installation at the point of utility connection shall be made by the contractor.
- C. Fuel gas systems: The fuel gas systems shall be extended to all equipment and accessories, including those provided by others as determined in the construction contract. For systems with piping outside of the building, the systems shall be extended

from a point five (5) feet beyond the exterior face of the building. Final installation at the point of utility connection shall be made by the contractor.

## 1.5 RELATED WORK

- A. All work related to providing complete plumbing systems and equipment shall be the responsibility of the contractor. The following related work shall be provided as indicated in other specification divisions:
1. General contractor:
    - a. Downspouts and gutters.
    - b. New catch basins and foundation drains.
    - c. The contractor shall furnish access panels to the general contractor for installation.
    - d. The contractor shall make all final connections to owner supplied equipment. The contractor shall be responsible for coordination of plumbing services with the equipment.
    - e. The contractor shall furnish and/or install casework mounted fixtures and equipment where not furnished and/or installed by others. Where fixtures and equipment are furnished by others, the contractor shall install these items in accordance with the contract drawings and specifications. Rough-in plumbing work shall be in accordance with rough-in drawings provided by others. The contractor shall make the final connections to all fixtures and equipment. The contractor shall be responsible for coordination of plumbing services with the fixtures and equipment.
    - f. Concrete housekeeping and structural pads for equipment.
    - g. Cast-in-place concrete sumps, interceptors, and receivers.
    - h. Cutting and patching: The general contractor shall perform cutting and patching of floors, exterior walls, and roofs when necessary for the installation of the work.
    - i. The general contractor shall provide final painting of walls, floors, and ceilings where the surfaces are new, refinished, and remodeled under the general contract. The general contractor shall perform all required painting of piping provided by the contractor.
  2. Electrical contractor:
    - a. Verification of the proper rotation of three-phase equipment, and any modifications required to correct improper rotation.
    - b. Installation of all combination starters/disconnects and overload protectors.
    - c. Installation of all line side junction boxes and/or receptacles servicing low voltage control transformers.
  3. HVAC contractor:
    - a. HVAC makeup water connections downstream of contractor provided backflow prevention devices.
    - b. Condensate drain piping associated with HVAC equipment.

- c. The contractor shall install pipeline mounted metering and control devices furnished by the HVAC contractor for connection to the building automation system, or similar monitoring system(s), located in systems provided by the contractor. All control wiring shall be provided by the HVAC contractor.

## 1.6 QUALITY ASSURANCE

- A. The contractor shall become thoroughly familiarized with all specifications and drawings for the project such that they clearly understand their responsibility in relationship to the work to be performed. The contractor shall plan and perform their work so as to permit the use of the building at the earliest possible date.
- B. The contractor shall coordinate their work with that of the other trades. Where interference with other trades occurs, the contractor shall present their solution to the professional. The professional shall make the final decision regarding changes to be made in the work.
- C. The contractor is responsible for the proper installation of all materials and equipment required for a complete installation within the intent and meaning of the contract documents.
- D. The contractor shall expressly and completely follow the manufacturer's instructions required for validation of the manufacturer's warranty, including but not limited to service, maintenance, and adjustment of the equipment.
- E. The contractor shall guarantee all work, materials, and equipment furnished against defects, leaks, performance, and nonoperation for a period of one (1) year after the date of the owner's final acceptance, or as indicated in the general conditions. Defects shall be interpreted as defective materials or equipment or unsatisfactory installation and are not intended to apply to ordinary wear and tear. The contractor shall pay for any repairs or replacements caused by these defects within the period covered by the guarantee, including all incidental work required to fix the deficiency.

## 1.7 MATERIALS

- A. Each length of pipe and each pipe fitting, trap, fixture, material, and device utilized in all plumbing systems shall bear the identification of the manufacturer and the applicable standard to which it was manufactured.
- B. All plumbing products and materials shall comply with the referenced standards, specifications, and performance criteria of the contract documents. Where required, plumbing products and materials shall either be tested by an approved third-party testing agency or certified by an approved third-party certification agency.
- C. All piping materials exposed within plenums shall comply with the provisions of the North Carolina Mechanical Code.
- D. Equipment efficiencies shall be in accordance with the North Carolina Energy Conservation Code.
- E. Solders with lead content exceeding two-tenths (0.2) percent are prohibited. Brass and bronze materials with lead content two (2) percent or greater are prohibited.
- F. Provide products requiring electrical connections listed and classified by Underwriters Laboratories, Inc. (UL), as suitable for the purpose specified and indicated.

**1.8 FIELD MEASUREMENTS**

- A. The contractor is responsible to verify the location of any and all existing underground utilities in the vicinity of their work. When it has been indicated that these utilities are to remain in place, the contractor shall provide adequate means of support and protection during excavation operations.
- B. Before ordering any equipment and material or performing any work, the contractor shall verify all measurements and dimensions at the job site. The contractor is responsible for the correctness of this information.
- C. Any difference identified by the contractor shall be submitted to the professional for consideration before proceeding with the work.
- D. No extra compensation will be considered based on differences between actual dimensions or measurements and those indicated on the drawings.

**1.9 PROTECTION OF UTILITIES**

- A. All existing service utilities shall remain active during construction. Any service underground, aboveground, interior, or exterior that is damaged, broken, or otherwise rendered inoperative during the course of construction due to activities on the part of the contractor shall be properly repaired by the contractor at their own expense. The method used in repairing, replacing, or maintaining the services shall be submitted to the professional for review and approval.
- B. Ashes, cinders or rags; flammable, poisonous or explosive liquids or gases; oil, grease or any other insoluble material capable of obstructing, damaging or overloading the building drainage or sewer system, or capable of interfering with the normal operation of the sewage treatment process or private disposal system, shall not be deposited into such systems.

**1.10 INTERRUPTION OF UTILITIES**

- A. The contractor shall schedule their work to avoid interruption of any utility services.
- B. Existing utilities serving occupied facilities shall not be interrupted, except when such interruptions have been authorized by the owner and the professional. Interruptions may occur only after acceptable temporary utility services have been provided. The contractor shall provide a minimum of ten (10) working days' notice to the owner and receive written notice to proceed before interrupting any utility.

**1.11 STRUCTURAL SAFETY**

- A. The work shall be installed with due regard to preservation of the strength of structural members and prevention of damage to wall and other surfaces through fixture usage.
- B. In the process of installing or repairing any part of a plumbing system, the finished floors, walls, ceilings, tile work, or any other part of the building or premises that must be changed or replaced shall be left in a safe structural condition in accordance with the North Carolina Building Code.
- C. The cutting, notching, and boring of holes in structural steel framing members shall be as prescribed by the structural engineer.
- D. Flanges and lips of load-bearing cold-formed steel framing members shall not be cut or notched. Holes in webs of load-bearing cold-formed steel framing members shall be permitted along the centerline of the web of the framing member and shall not exceed the dimensional limitations, penetration spacing, or minimum hole edge distance as

prescribed by the structural engineer. Cutting, notching, and boring holes of steel floor or roof decking shall be as prescribed by the structural engineer.

- E. Flanges and lips of nonstructural cold-formed steel wall studs shall not be cut or notched. Holes in webs of nonstructural cold-formed steel wall studs shall be permitted along the centerline of the web of the framing member, shall not exceed one-and-one-half (1-1/2) inches in width or four (4) inches in length, and the holes shall not be spaced less than twenty-four (24) inches center to center from another hole or less than ten (10) inches from the bearing end.
- F. Truss members and components shall not be cut, drilled, notched, spliced, or otherwise altered in any way without written concurrence and approval of the structural engineer. Alterations resulting in the addition of loads to any member shall not be permitted without verification that the truss is capable of supporting such additional loading.
- G. Trenches installed parallel to footings shall not extend below the forty-five (45) degree bearing plane of the footing or wall.

### **1.12 RODENTPROOFING**

- A. All strainer plates on drain inlets shall be designed and installed so that all openings are not greater than one-half (1/2) inch in least dimension.
- B. Where openings have been made in walls, floors, or ceilings for the passage of pipes, such openings shall be closed and protected by the installation of approved metal collars or other approved materials that are securely fastened to the adjoining structure.
- C. Annular spaces around pipes, electric cables, conduits, or other openings in the foundation or exterior walls shall be protected against the passage of rodents by closing such openings with cement mortar, concrete masonry, silicone caulking, or noncorrosive metal.

### **1.13 PROTECTION OF WORK**

- A. Plumbing systems shall not be located in an elevator shaft or in an elevator equipment room. Floor drains, sumps, and sump pumps shall be permitted at the base of an elevator shaft when intended for the specific purpose of dewatering and are installed in accordance with the North Carolina Department of Labor requirements.
- B. Pipes passing through or under walls shall be protected from breakage.
- C. Piping shall be installed so as to prevent strains and stresses that exceed the structural strength of the pipe. Where necessary, provisions shall be made to protect piping from damage resulting from expansion, contraction, and structural settlement.
- D. Any pipe that passes within twelve (12) inches under a footing or through a foundation wall shall be provided with a relieving arch, or a pipe sleeve pipe shall be built into the foundation wall. The sleeve shall be two (2) pipe sizes greater than the pipe passing through the wall. Piping shall not be run under pier footings.
- E. The top of water pipes, installed below grade outside the building, shall be below the frost line or a minimum of twelve (12) inches below finished grade, whichever is greater. Water pipes installed in a wall exposed to the exterior shall be installed on the heated side of the wall insulation. Water piping installed in an unconditioned space shall have insulation with a minimum R-factor of six-and-one-half (6.5) determined at seventy-five (75) degrees Fahrenheit in accordance with ASTM C177.
- F. No traps of soil or waste pipe shall be installed or permitted outside of a building, or concealed in outside walls, or in any place where they may be subjected to freezing



temperatures, unless adequate provision is made to protect them from freezing. Waste and soil piping leaving the building shall have a minimum cover of three (3) inches.

- G. In concealed locations where piping, other than cast iron or galvanized steel, is installed through holes or notches in studs, joists, rafters, or similar members less than one-and-one-half (1-1/2) inches from the nearest edge of the member, the pipe shall be protected by steel shield plates. Such shield plates shall have a thickness of not less than sixteen (16) gauge. Such plates shall cover the area of the pipe where the member is notched or bored and shall extend a minimum of two (2) inches above sole plates and below top plates.
- H. Components of plumbing systems installed along alleyways, driveways, parking garages, or other locations exposed to damage shall be recessed into the wall or otherwise protected in an approved manner.
- I. At their own expense, the contractor shall protect their work, materials, or equipment that is subject to damage during the project duration. All openings into any piping, ducts, or equipment shall be securely covered, or otherwise protected, to prevent injury due to carelessly or maliciously dropped tools or materials, grit, dirt, or any foreign material. The contractor is responsible for all damage until their work is fully and finally accepted.
- J. The use of plumbing fixtures prior to final acceptance by the owner is prohibited.

#### **1.14 CHASES AND OPENINGS**

- A. All chases and openings required for the installation of the work shall be coordinated with the work of other trades. The contractor shall provide the other trades with sufficient time for coordination of all chases and openings. The contractor shall be responsible for cutting and patching all openings in walls and ceilings necessary for their work.
- B. The contractor shall provide all sleeves, hangers, and anchors required for installation of the work in chases and openings.
- C. Pipes passing through concrete or cinder walls and floors or other corrosive material shall be protected against external corrosion by a protective sheathing or wrapping or other means that will withstand any reaction from the lime and acid of concrete, cinder, or other corrosive material. Sheathing or wrapping shall allow for movement including expansion and contraction of piping. Minimum wall thickness of material shall be twenty-five-one-thousandths (0.025) inch.
- D. Annular spaces between sleeves and pipes shall be filled in an approved manner. Annular spaces between sleeves and pipes in fire-resistance-rated assemblies shall be firestopped in accordance with specification section 22 05 32.
- E. Joints at the roof and around vent pipes, shall be made water-tight by the use of lead, copper, galvanized steel, aluminum, plastic, or other approved flashings or flashing material. Exterior wall openings shall be made water tight.

#### **1.15 MISCELLANEOUS STEEL AND ACCESSORIES**

- A. The contractor shall provide all necessary steel angles, channels, pipes, rods, nuts, bolts, etc. as shown on plans, as specified, or as may be required for the complete and proper installation of plumbing fixtures, systems, and equipment. All material and workmanship shall be of the best quality and shall be installed in accordance with the best practices of the trade.

**1.16 CROSS CONNECTION CONTROL**

- A. The contractor shall coordinate water service requirements in accordance with the local water utility regulations, including required permits, backflow preventers, meters, piping, valves, bypasses, supports, and other accessories.
- B. Where these services are provided by others, the contractor shall verify that they are complete and have been inspected prior to making final connection(s).

**1.17 CLEANUP**

- A. The contractor shall provide containers for collection of waste materials, debris, and rubbish. Waste materials, debris, and rubbish shall be removed from the job site and legally disposed of at a landfill area in accordance with all applicable regulations. Burning or burying waste materials, debris, or rubbish on project site is not permitted.
- B. The contractor shall maintain buildings, grounds, and public properties free from accumulations of waste materials, debris, and rubbish. At reasonable intervals during the progress of work, and when directed by the owner, the site and public properties shall be cleaned and waste materials, debris, and rubbish disposed of in an appropriate manner.
- C. At the completion of the project, the contractor shall remove waste materials, rubbish, tools, equipment, machinery, surplus materials, etc., and clean all sight-exposed plumbing fixtures and equipment; remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from sight-exposed plumbing fixtures and equipment; broom clean paved and concrete surfaces; rake clean other ground surfaces; repair, patch, and touch-up marred surfaces to the specified finish or to match adjacent surfaces.

**1.18 PROJECT CLOSEOUT DOCUMENTATION**

- A. Changes from the contract documents necessary to coordinate the work with other trades, to conform to the building conditions, or to conform to the rules and regulations of authorities having jurisdiction shall be made only after obtaining written permission from the professional.
- B. The contractor shall keep a record of construction changes and deviations from the original contract documents. All changes shall be recorded on a separate set of prints, which shall be kept at the job site specifically for that purpose. The record shall be made immediately after the work is completed. Documentation shall include:
  - 1. Location and elevation of new utility lines.
  - 2. Changes in pipe size and routing location.
  - 3. Valve locations.
  - 4. Equipment locations.
  - 5. Actual capacities and values of equipment provided as indicated in equipment schedules or specifications.
- C. The marked-up record set of construction documents shall be delivered to the professional before final acceptance of the work.
- D. The contractor shall deliver operation and maintenance manuals per section 22 01 05 to the professional before instruction of the owner and after final acceptance of the work.



**1.19 INSTRUCTION OF THE OWNER**

- A. After acceptance of the project, the contractor shall provide the services of personnel thoroughly familiar with the completed installation to instruct the owner in the proper operation and maintenance of all equipment and appurtenances provided.
- B. The contractor shall provide the owner with ten (10) business days' advance notice before the instruction session(s).

**PART 2 PRODUCTS****2.1 ACCESS PANELS**

- A. The contractor shall furnish access doors to the general contractor for installation in ceilings, walls, partitions, and floors for access to valves, traps, fittings, and all appurtenances.
- B. Access panels shall be of sufficient size to permit removal or access to equipment, except that the minimum size shall be twelve (12) by sixteen (16) inches.
- C. Access door locations shall be as determined by field conditions for optimum access to equipment and shall be reviewed by the owner before final installation. Access door locations shall be subject to the following:
  - 1. Bottom of access doors shall not be lower than the top of the partition base, or a minimum of six (6) inches above floor.
  - 2. Tops and/or sides of access panels shall be a minimum of six (6) inches from the ceiling or opening of from the edge of a wall.
- D. Access doors shall be suitable for installation in the finish material of the ceilings, walls, partitions, and floors.
- E. Frame and panel access doors in restrooms, kitchens, and as indicated shall be stainless steel.
- F. Access doors with UL listing shall be provided in fire-rated construction assemblies. Access doors shall be "B-Label" and shall have a UL rating for both door and frame matching that of the wall in which it is installed. Maximum size shall be twenty (20) inches by twenty (20) inches or four hundred (400) square inches in area. Frame shall be sixteen (16) gauge minimum steel, panel shall be twenty (20) gauge minimum steel.
- G. Access doors without UL label shall be provided in all non-fire-rated construction assemblies. Frames shall be sixteen (16) gauge minimum steel, panel shall be fourteen (14) gauge minimum steel.
- H. Access doors shall be provided with a baked-on enamel finish (prime coat), continuous type hinge on one side, flush-face type lock with key operation, and self-latching cylinder locks.
- I. Door shall open one-hundred-seventy-five (175) degrees minimum.
- J. All access doors shall be keyed alike.

**PART 3 EXECUTION****3.1 GENERAL**

- A. The contract documents are diagrammatic and are indicative of the work to be performed. It is not intended that they show every pipe, fitting, offset, change in direction, or appurtenance required for a complete installation.

- B. All materials used shall be installed in strict accordance with the standards under which the materials are accepted and approved. In the absence of such installation procedures, the manufacturer's installation instructions shall be followed.

### 3.2 EXCAVATION, BACKFILLING, COMPACTION, AND RESURFACING

A. General:

1. The contractor shall notify "ONE CALL" prior to any work.
2. The contractor shall perform all excavation, backfilling, compaction, and necessary finishing for all piping, equipment, and accessories. Piping installation shall be in accordance with local water, sewer, and gas utility regulations and applicable state and local codes.
3. The contractor shall provide all bracing, sheathing, and shoring necessary to perform and protect their excavations. The contractor shall provide safety rails, lights, signs, etc. as necessary or required for safety, or as required to conform to governing codes and laws.
4. The contractor shall provide, maintain, and operate pumping equipment of sufficient capacity to ensure that all their excavations and trenches are kept free of water at all times.
5. The contractor shall protect existing structures, utilities, sidewalks, pavements, and other facilities not indicated for removal from damage caused by settlement, lateral movement, undermining, washout, and other hazards from excavation operations.
6. Existing utility lines shown on the contract documents do not indicate the exact location of the lines. The location and depth of all utilities shall be marked and recorded prior to any excavation. Should uncharted or incorrectly charted piping or other utilities be uncovered during excavation, the contractor shall contact the professional for directions before proceeding further with work in this area.
7. All surfaces of streets, walkways, seeded areas, or finished grade areas disturbed by the excavation shall be restored to their original condition and/or as indicated in the contract documents.
8. The presence of explosives on the project site or the use of explosives in the execution of the work under this contract is prohibited.
9. Buried piping shall be supported throughout its entire length.

B. Trenching and bedding:

1. All plumbing excavation is unclassified.
2. If trench excavation operations are performed when the atmospheric temperature is less than thirty-five (35) degrees Fahrenheit, the contractor shall provide cold weather protection as required to protect excavated trench bottoms from freezing. Piping shall not be placed in a trench containing water or on a subgrade containing frost.
3. Take up and relay pipe that is not laid true to required alignment or grade. Pipe that has had its joints disturbed after installation shall be taken up and relayed. Deviation from the required lines and grades will not be permitted unless approved by the professional.
4. Trenches shall be dug to uniform width not less than twelve (12) inches and not more than sixteen (16) inches wider than the bell diameter of the piping. Trench

sides shall be vertical. Carry depth of trenches for piping as required to establish required slopes and invert elevations. Beyond building perimeter, keep bottom of trenches sufficiently below finished grade to protect against frost. The bottom of trenches shall be accurately graded to provide uniform and smooth flow throughout.

5. Where trenches are excavated such that the bottom of the trench forms the bed for the pipe, solid and continuous load-bearing support shall be provided between joints. Bell holes, hub holes, and coupling holes shall be provided at points where piping is joined. Such pipe shall not be supported on blocks to grade.
6. Where trenches are excavated below the installation level of the pipe such that the bottom of the trench does not form the bed for the pipe, the trench shall be backfilled to the installation level of the bottom of the pipe with sand or fine gravel placed in layers of six (6) inches maximum depth and such backfill shall be compacted after each placement.
7. Where rock is encountered in trenching, the rock shall be removed to a minimum of three (3) inches below the installation level of the bottom of the pipe, and the trench shall be backfilled to the installation level of the bottom of the pipe with sand tamped in place so as to provide uniform load-bearing support for the pipe between joints. The pipe, including joints, shall not rest on rock at any point.
8. If soft materials of poor load-bearing quality are found at the bottom of the trench, stabilization shall be achieved by over-excavating a minimum of two (2) pipe diameters and backfilling to the installation level of the bottom of the pipe with fine gravel, crushed stone, or a concrete foundation. The concrete foundation shall be bedded with sand tamped into place so as to provide uniform load-bearing support for the pipe between joints.
9. All underground piping shall be laid on first class granular bedding. The bedding shall be a minimum depth of six (6) inches or one-fourth (1/4) the pipe diameter, whichever is greater. The bedding shall provide uniform longitudinal support to the pipe and shall be laid to provide the grade and line as shown on the drawings or as directed by the professional. Hand-tamp the embedment materials under the haunches and around the pipe to the spring-line of the pipe to a compaction density of ninety-five (95) percent. Final embedment for ferrous pipe materials shall extend from the spring-line of the pipe to a depth of six (6) inches minimum above the top of the pipe. Final embedment for nonmetallic pipe shall extend from the spring-line of the pipe to a depth of eighteen (18) inches minimum above the top of the pipe.

C. Backfilling:

1. Backfilling shall not be undertaken until all tests and inspections have been made.
2. When the type of backfill, material is not indicated on the plans or is not specified, the excavated material may be used, provided that such material consists of loam, clay, sand, gravel, or other material that is suited for backfilling. From one (1) foot above the top of the pipe to subgrade, material containing stones greater than three (3) inches in their greatest dimension may not be used.
3. Backfill shall be free from discarded construction material and debris. Loose earth free from rocks, broken concrete, and frozen chunks shall be placed in the trench in six (6) inch layers and tamped in place until the crown of the pipe is covered by twelve (12) inches of tamped earth. The backfill under and beside the

pipe shall be compacted for pipe support. Backfill shall be brought up evenly on both sides of the pipe so that the pipe remains aligned.

4. Backfill trenches to a depth of twelve (12) inches above the top of the outside barrel of the pipe. Continue thereafter with the backfill in twelve (12) inch lifts.

D. Compaction:

1. Compaction shall be accomplished by approved equipment suited to the soil being compacted. Material shall be moistened or aerated as necessary to provide the moisture content that will readily facilitate obtaining the specified compaction with the equipment used.
2. Compacting of this backfill by puddling or jetting will not be permitted. Use mechanical tampers to compact backfill materials in trench refill operations to produce a density of backfill at the bottom of each layer of not less than ninety-five (95) percent of the maximum density obtained at optimum moisture content, in accordance with ASTM D1557, method D and ASTM D1556, sand cone method.
3. The use of specialty equipment for compaction of backfill is prohibited.

E. Resurfacing:

1. All trenches backfill shall be brought to subgrade, ready for base material or topsoil. After the initial aggregate backfill, layer has been placed, refill the remainder of the trench using backfill materials as follows:
  - a. Lawns: Successive six (6) inch layers of clean earth backfill material shall be deposited after initial aggregate backfill. This backfill shall consist of excavated material free from large clods of earth and stone. If stones greater than three (3) inches are encountered, remove stones from the site and haul in clean earth backfill. The entire trench shall be uniformly tamped after each successive layer is deposited. Replace topsoil to its original depth and crown to such height as required.
  - b. Walks and parking areas: Clean earth backfill compacted in six (6) inch layers to a depth of eight (8) inches below the adjacent existing surfaces. Refill the remaining eight (8) inches with compacted stone and replace walk or paving as required.
  - c. Paved areas: When working within the right-of-way limits of all state highways, backfilling must be in accordance with the requirements of the State Department of Transportation. Trenches located within the areas described above shall be backfilled with aggregate material from the top of the pipe bedding to the bottom elevation of the pavement structure and must be spread and compacted in layers not to exceed four (4) inches when using a mechanical damper. The contractor is to understand that payment for special backfilling material shall not be made unless specifically provided in the form of a proposal.

### 3.3 INSPECTION AND TESTING

A. General:

1. New plumbing systems and parts of existing systems, which have been altered, extended, or repaired, shall be tested to disclose leaks and defects.
2. The contractor shall notify the professional a minimum of five (5) working days prior to testing to coordinate the testing and inspection procedures.

3. The contractor shall provide all equipment, material, labor, etc. required for testing the plumbing systems.
  4. All new, altered, extended, or replaced plumbing systems shall be left uncovered and unconcealed until it has been inspected, tested, and accepted by the professional. Where such work has been covered or concealed before it has been inspected, tested, and accepted, it shall be uncovered by the contractor at their own expense as directed by the professional.
  5. If the professional determines that the plumbing systems do not pass the prescribed tests, the contractor shall be required to make the necessary repairs at their own expense. The contractor shall inspect and retest the systems. Repairing, inspection, and testing shall be continued until all systems pass as determined by the professional.
- B. Test gauges:
1. Tests requiring a pressure of ten (10) psi or less shall utilize a testing gauge having increments of one-tenth (0.1) psi or less.
  2. Tests requiring a pressure of greater than ten (10) psi but less than or equal to one hundred (100) psi shall utilize a testing gauge having increments of one (1) psi or less.
  3. Tests requiring a pressure of greater than one hundred (100) psi shall utilize a testing gauge having increments of two (2) psi or less.

**END OF SECTION**



**SECTION 22 01 05****PLUMBING SUBMITTAL REQUIREMENTS****PART 1 GENERAL****1.1 STIPULATIONS**

- A. General provisions of the contract documents including general and supplementary conditions apply to all work in this division.
- B. Submittals shall be made in separate packages containing all the required documentation indicated in each specification section. Only one (1) submittal package shall be made for each specification section. Partial submissions will not be addressed.
- C. Failure of the contractor to provide a complete submittal package may result in delay in processing time. All such delays to the project resulting from the contractor's failure to provide submittals in a timely fashion will be the responsibility of the contractor.

**1.2 DEFINITIONS**

- A. Industry standard: Printed copies of the current standards recognized in the industry. Current means the latest issue as of the date of these specifications; within the text of these specifications the date suffix frequently shown with identification numbers has been omitted.
- B. Manufacturer's data: Product manufacturer's standard printed product information, including promotional brochures, product specifications, installation instructions and diagrams, statements of compliance with standard performance charts or curves, and similar information concerning the standard portions of manufacturer's products.
- C. Manufacturer's warranty: Manufacturer's standard printed commitment in reference to a specific product and normal application, stating that certain acts of restitution will be performed for the purchaser or owner by the manufacturer, when and if the product fails within certain operational conditions and time limits.
- D. Operation and maintenance instructions: The written instructions by the manufacturer, fabricator, or installer of equipment or systems, detailing the procedures to be followed by the owner in operation, control, and shutdown of each operating item of the equipment.
- E. Shop drawings: Project shop drawings and other data prepared specifically for fulfillment of the project requirements. Shop drawings include fabrication, layout, setting, installation, coordination, and similar drawings and diagrams, and include performance data associate therewith, including weights, capacities, speeds, outputs, consumption, efficiencies, voltages, amperages, cycles, phases, noise levels, operating ranges, and similar information.
- F. Test reports: Specific reports prepared by independent testing laboratories and others, showing the results of specified testing on either the material or equipment provided or on identical material or equipment.

**1.3 SUBSTITUTIONS**

- A. Submittals are not opportunities for gaining acceptance of substitutions. Where three or more manufacturers are specified by name or by catalog reference, the contractor shall select for use any of those so specified.
- B. Should the contractor desire to substitute another manufacturer's equipment for one specified by name, the contractor shall apply in writing at least ten (10) business days

prior to bid date for such permission. The contractor shall provide supporting data for the professional's consideration. No substitution shall be made for any material, article, or process under the contract unless approved by the professional.

- C. Any time that is required by the professional for a request to review submittals for substitute equipment after the award of bids will be billed to the contractor at the professional's current hourly billing rate. The professional's review time will be billed to the contractor whether the proposed substitution is accepted or rejected.

#### **1.4 SUBMITTAL FORM AND PROCEDURES**

- A. Submittals shall be assembled as single file electronic submittals. Transmittals shall be included within the file as the first page.
- B. Submittals shall be made in separate packages containing all the required documentation indicated in each specification section. A separate submittal package shall be made for each specification section.
- C. Submittals shall be complete and clearly identified and cross-referenced to the appropriate specification section defining the submitted item.
- D. After checking and verifying all field measurements, the contractor shall submit copies of all submittals to the professional for review. The data shown on the submittals shall be complete with respect to dimensions, design criteria, materials of construction, and the like to enable the professional to review the information as required.
- E. The contractor shall stamp the submittals and verify by signature that the submittals have been checked for compliance with the contract documents and appropriate means have been taken to ensure that the material or equipment will fit into the space available.
- F. At the time of each submission, the contractor shall in writing call the professional's attention to any deviations that the submittal may have from the requirements of the contract documents.
- G. The submittals shall be clearly marked indicating which specific options are being considered and with all related information.
- H. The professional's review of submittals is for general conformance with design concept only. Corrections or comments made on the submittals during review do not relieve the contractor from compliance with requirements of the contract documents.
- I. The contractor is responsible for all quantities, dimensions, and coordination of the work of all trades. The contractor is responsible for selecting fabrication processes and techniques of construction and for performing all work in a safe and satisfactory manner.
- J. No work requiring a submittal shall be commenced until the submittal has been reviewed by the professional.
- K. A copy of each approved submittal shall be kept in good order by the contractor and shall be made available at the site.

#### **1.5 OPERATION AND MAINTENANCE MANUALS**

- A. Submit after final inspection for review by the professional.
- B. The contents of the submittal shall be prepared as follows:
  - 1. Table of contents.
  - 2. A directory listing names, addresses, and telephone number of professional, contractor, subcontractors, and equipment suppliers.



3. Project documents and certificates:
    - a. Certificates of compliance.
    - b. Photocopies of warranties and bonds.
    - c. Material safety data sheets (MSDS).
  4. Operation and maintenance instructions subdivided by specification section. For each item, identify the following:
    - a. Significant design criteria.
    - b. List of equipment.
    - c. Parts list for each component.
    - d. Maintenance instructions for equipment and systems.
    - e. Maintenance instructions for finishes including recommended cleaning methods and materials and operating instructions.
    - f. Special precautions identifying detrimental agents.
    - g. Special requirements of other sections of this specification noted to be included in the operation and maintenance manual.
- C. Submit five (5) copies for review by the owner ten (10) business days prior to owner training.

**END OF SECTION**



**SECTION 22 05 29****HANGERS AND SUPPORTS FOR PLUMBING SYSTEMS****PART 1 GENERAL****1.1 SUMMARY**

- A. Section includes:
  - 1. Pipe hangers and supports.
  - 2. Inserts.
  - 3. Flashing.
  - 4. Sleeves.
  - 5. Mechanical sleeve seals.

**1.2 REFERENCES**

- A. Manufacturers Standardization Society:
  - 1. MSS SP 58 – Pipe Hangers and Supports – Materials, Design, Manufacture, Selection, Application, and Installation.

**1.3 SUBMITTALS**

- A. Refer to specification section 22 01 05 for submittal requirements, definitions, and procedures.
- B. Submit manufacturer's data for the following:
  - 1. Pipe hangers and supports.
  - 2. Inserts.
  - 3. Flashing.
  - 4. Sleeves.
  - 5. Mechanical sleeve seals.

**1.4 OPERATION AND MAINTENANCE MANUALS**

- A. Refer to specification section 22 01 05 for submittal requirements, definitions, and procedures.
- B. Submit manufacturer's data, manufacturer's warranties, and operation and maintenance instructions for the following:
  - 1. Pipe hangers and supports.
  - 2. Inserts.
  - 3. Flashing.
  - 4. Sleeves.
  - 5. Mechanical sleeve seals.

**PART 2 PRODUCTS****2.1 PIPE HANGERS AND SUPPORTS**

- A. Conform to applicable portions of MSS SP 58.
- B. Provide copper or copper-plated supports for copper piping.
- C. Design hangers for pipe movement without disengagement of supported pipe.
- D. Obtain permission from the professional before using powder-actuated anchors.
- E. Suspended supports:
  - 1. Two (2) inches or less: Carbon steel, adjustable swivel, split ring.
  - 2. Two (2) to four (4) inches: Carbon steel, adjustable, clevis.
  - 3. Trapeze hangers: Steel channels with welded supports or spacers and hanger rods.
- F. Wall supports:
  - 1. Three (3) inches or less: Cast iron hooks.
  - 2. Four (4) inches to six (6) inches: Welded steel bracket and wrought steel clamps.
- G. Floor supports:
  - 1. Four (4) inches or less: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
- H. Vertical supports: Steel riser clamp.
- I. Hanger rods: Mild steel threaded both ends, threaded on one end, or continuous threaded.
- J. Hangers, anchors, and supports shall support the piping and the contents of the piping. Hangers and strapping material shall be of approved material that will not promote galvanic action.

**2.2 INSERTS**

- A. Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

**2.3 FLASHING**

- A. Metal flashing: twenty-six (26) gauge galvanized steel.
- B. Metal counter-flashing: twenty-two (22) gauge galvanized steel.
- C. Lead flashing:
  - 1. Waterproofing: five (5) lb/ft<sup>2</sup> sheet lead.
  - 2. Soundproofing: one (1) lb/ft<sup>2</sup> sheet lead.
- D. Flexible flashing: forty-seven (47) mil sheet butyl; compatible with roofing.
- E. Caps: twenty-two (22) gauge steel; sixteen (16) gauge at fire-rated assemblies.

**2.4 SLEEVES**

- A. Non-fire-rated floors: Eighteen (18) gauge galvanized steel.

- B. Non-fire-rated beams, walls, footings, and potentially wet floors: Steel pipe or eighteen (18) gauge galvanized steel.
- C. Sealant: Acrylic.

## 2.5 MECHANICAL SLEEVE SEALS

- A. Modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill annular space between object and sleeve, connected with bolts and pressure plates causing rubber sealing elements to expand when tightened, providing watertight seal and electrical insulation.

## PART 3 EXECUTION

### 3.1 PIPE HANGER AND SUPPORT INSTALLATION

- A. Conform to applicable portions of MSS SP 58.
- B. Hangers and anchors shall be attached to the building construction in an approved manner.
- C. Bases of stacks shall be supported by the building structure, virgin or compacted earth, or other material suitable to support the weight of the piping.
- D. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.
- E. Use hangers with one-and-one-half (1-1/2) inch minimum vertical adjustment.
- F. Provide clearance in hangers and from structure and other equipment for installation of insulation. Refer to specification section 22 07 00.
- G. Install hangers with minimum one-half (1/2) inch space between finished covering and adjacent work.
- H. Place hangers within twelve (12) inches of each horizontal elbow.
- I. Where piping is installed in parallel and at same elevation, provide trapeze hangers.
- J. Support vertical piping independently of connected horizontal piping.
- K. Support vertical piping at every floor. Support vertical cast iron pipe at each floor at hub.
- L. Piping shall be supported in accordance with the following:

PIPING MATERIAL	MAXIMUM HORIZONTAL SPACING (ft)	MAXIMUM VERTICAL SPACING (ft)
Cast Iron Pipe	5 <sup>[1]</sup>	15
Copper or Copper-Alloy Pipe	12	10
Copper or Copper-Alloy Tubing (less than 1-1/2")	6	10
Copper or Copper-Alloy Tubing (more than 1-1/4")	10	10

1. The maximum horizontal spacing of cast iron pipe hangers shall be increased to ten (10) feet where ten (10) foot lengths of pipe are installed.

**3.2 INSERT INSTALLATION**

- A. Install inserts for placement in concrete forms.
- B. Install inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
- C. Provide hooked rod to concrete reinforcement section for inserts carrying pipe four (4) inches and larger.
- D. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
- E. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut recessed into and grouted flush with slab.

**3.3 FLASHING INSTALLATION**

- A. Provide flexible flashing and metal counterflashing where piping penetrates weather or waterproofed walls, floors, and roofs.
- B. Flash vent and soil pipes projecting three (3) inches minimum above finished roof surface with lead worked one (1) inch minimum into hub, eight (8) inches minimum clear on sides with twenty-four (24) by twenty-four (24) inches sheet size. For pipes through outside walls, turn flanges back into wall and caulk, metal counter-flash, and seal.
- C. Flash floor drains in floors with topping over finished areas with lead, ten (10) inches clear on sides with minimum thirty-six (36) by thirty-six (36) inch sheet size. Fasten flashing to drain clamp device.
- D. Seal floor, shower, mop sink, etc. drains watertight to adjacent materials.

**3.4 SLEEVE INSTALLATION**

- A. Verify openings are ready to receive sleeves.
- B. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter affecting bond of sealant material.
- C. Install backing or damming materials to arrest liquid material leakage.
- D. Exterior watertight entries: Seal with mechanical sleeve seals.
- E. Set sleeves in position in forms. Provide reinforcing around sleeves.
- F. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.
- G. Extend sleeves through floors two (2) inches above finished floor level. Caulk sleeves.
- H. Where piping penetrates floor, ceiling, or wall, close off space between pipe and adjacent work with stuffing insulation and caulk airtight. Provide close fitting metal collar or escutcheon covers at both sides of penetration.
- I. Install chrome-plated steel escutcheons at finished surfaces.

**END OF SECTION**

**SECTION 22 05 32****FIRESTOPPING FOR PLUMBING SYSTEMS****PART 1 GENERAL****1.1 SUMMARY**

- A. Section includes:
  - 1. Firestopping relating to plumbing work.
  - 2. Firestopping accessories.

**1.2 REFERENCES**

- A. ASTM International:
  - 1. ASTM E84 – Test Method for Surface Burning Characteristics of Building Materials.
  - 2. ASTM E814 – Test Method of Fire Tests of Through Penetration Firestops.
- B. Underwriters Laboratories, Inc.:
  - 1. UL 723 – Tests for Surface Burning Characteristics of Building Materials.
  - 2. UL 1479 – Fire Tests of Through-Penetration Firestops.

**1.3 DEFINITIONS**

- A. Firestopping (through-penetration protection system): Sealing or stuffing material or assembly placed in spaces between and penetrations through building materials to arrest movement of fire, smoke, heat, and hot gases through fire-rated construction.

**1.4 SUBMITTALS**

- A. Refer to specification section 22 01 05 for submittal requirements, definitions, and procedures.
- B. Submit manufacturer's data for the following:
  - 1. Firestopping relating to plumbing work.
  - 2. Firestopping accessories.
- C. Submit a schedule of opening locations and sizes, penetrating items, and required listed design numbers to seal openings to maintain fire resistance rating of adjacent assembly.
- D. Submit manufacturer's preparation and installation instructions for each listed design number.

**1.5 QUALITY ASSURANCE**

- A. Through-penetration firestopping of fire-rated assemblies: UL 1479, ASTM E814; with one-tenth (0.1) inch water gauge minimum positive pressure differential to achieve fire F-ratings and temperature T-ratings as indicated on life safety drawings, but not less than 1-hour.
- B. Surface burning characteristics: Flame spread index of twenty-five (25) and smoke developed index of fifty (50) when tested in accordance with UL 723 or ASTM E84.

- C. Perform work in accordance with the latest edition of the North Carolina Fire Prevention Code and any local codes, ordinances, or construction standards.

## **1.6 ENVIRONMENTAL REQUIREMENTS**

- A. Do not apply firestopping materials when temperature of substrate material and ambient air is below sixty (60) degrees Fahrenheit.
- B. Maintain this minimum temperature before, during, and for minimum three (3) days after installation of firestopping materials.
- C. Provide ventilation in areas to receive solvent cured materials.

## **PART 2 PRODUCTS**

### **2.1 FIRESTOPPING**

- A. Product description: Different types of products by multiple manufacturers are acceptable as required to meet specified system description and performance requirements; provide only one type for each similar application.
  - 1. Silicone/elastomeric firestopping: Single component silicone elastomeric compound and compatible silicone sealant.
  - 2. Foam firestopping compounds: Single component foam compound.
  - 3. Formulated firestopping compound of incombustible fibers: Formulated compound mixed with incombustible non-asbestos fibers.
  - 4. Fiber stuffing and sealant firestopping: Composite of mineral fiber stuffing insulation with silicone elastomer for smoke stopping.
  - 5. Intumescent firestopping: Intumescent putty compound which expands on exposure to surface heat gain.
- B. Color: As selected from manufacturer's full range of colors to match adjacent surfaces.

### **2.2 FIRESTOPPING ACCESSORIES**

- A. Primer: Type recommended by firestopping manufacturer for specific substrate surfaces and suitable for required fire ratings.
- B. Installation accessories: Provide clips, collars, fasteners, temporary stops or dams, and other devices required to position and retain materials in place.
- C. General:
  - 1. Furnish UL listed products.
  - 2. Select products with rating not less than rating of wall or floor being penetrated.

## **PART 3 EXECUTION**

### **3.1 GENERAL INSTALLATION REQUIREMENTS**

- A. Verify openings are ready to receive firestopping.
- B. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter affecting bond of firestopping material.
- C. Remove incompatible materials affecting bond.
- D. Install backing or damming materials to arrest liquid material leakage.



### **3.2 INSTALLATION**

- A. Install material at fire-rated construction perimeters and openings containing penetrating sleeves, piping and other items, requiring firestopping.
- B. Apply primer where recommended by manufacturer for type of firestopping material and substrate involved, and as required for compliance with required fire ratings.
- C. Apply firestopping material in sufficient thickness to achieve required fire and smoke rating to uniform density and texture.

**END OF SECTION**



**SECTION 22 05 48****VIBRATION CONTROLS FOR PLUMBING PIPING AND EQUIPMENT****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. Elastomeric isolation pads.
  2. Elastomeric isolation mounts.
  3. Restrained elastomeric isolation mounts.
  4. Elastomeric hangers.
  5. Snubbers.
  6. Restraints - rigid type.
  7. Restraints - cable type.
  8. Restraint accessories.
  9. Post-installed concrete anchors.
  10. Concrete inserts.

**1.3 DEFINITIONS**

- A. IBC: International Building Code.
- B. OSHPD: Office of Statewide Health Planning and Development (for the State of California).

**1.4 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
1. Include rated load, rated deflection, and overload capacity for each vibration isolation device.
  2. Include load rating for each wind-load-restraint fitting and assembly.
  3. Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of vibration isolation device component.
  4. Annotate to indicate application of each product submitted and compliance with requirements.
  5. Interlocking Snubbers: Include ratings for horizontal, vertical, and combined loads.
- B. Shop Drawings:
1. Detail fabrication and assembly of equipment bases. Detail fabrication including anchorages and attachments to structure and to supported equipment. Include adjustable motor bases, rails, and frames for equipment mounting.

## 1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Show coordination of vibration isolation device installation for fire-suppression piping and equipment with other systems and equipment in the vicinity, including other supports and restraints, if any.
- B. Qualification Data: For professional engineer.
- C. Welding certificates.
- D. Field quality-control reports.

## 1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.
- B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Consequential Damage: Provide additional restraints for suspended fire-suppression system components or anchorage of floor-, roof-, or wall-mounted fire-suppression system components as indicated in ASCE/SEI 7-10 so that failure of a non-essential or essential fire-suppression system component will not cause the failure of any other essential architectural, mechanical, or electrical building component.
- B. Fire/Smoke Resistance: All devices and components that are not constructed of ferrous metals must have a maximum flame-spread index of 25 and maximum smoke-developed index of 50 when tested by an NRTL in accordance with ASTM E84 or UL 723, and be so labeled.
- C. Component Supports:
  - 1. Load ratings, features, and applications of all reinforcement components must be based on testing standards of a nationally recognized testing agency.
  - 2. All component support attachments must comply with force and displacement resistance requirements of ASCE/SEI 7-10 Section 13.6.

### 2.2 ELASTOMERIC ISOLATION PADS

- A. Elastomeric Isolation Pads:
  - 1. Fabrication: Single or multiple layers of sufficient durometer stiffness for uniform loading over pad area.
  - 2. Size: Factory or field cut to match requirements of supported equipment.
  - 3. Pad Material: Oil and water resistant with elastomeric properties. Neoprene rubber, silicone rubber, or other elastomeric material.
  - 4. Surface Pattern: Smooth, ribbed, or waffle pattern.

### **2.3 ELASTOMERIC ISOLATION MOUNTS**

- A. Double-Deflection, Elastomeric Isolation Mounts:
1. Mounting Plates:
    - a. Top Plate: Encapsulated steel load transfer top plates, factory drilled and threaded with threaded studs or bolts.
    - b. Baseplate: Encapsulated steel bottom plates with holes provided for anchoring to support structure.
  2. Elastomeric Material: Molded, oil and water-resistant neoprene rubber, silicone rubber, or other elastomeric material.

### **2.4 RESTRAINED ELASTOMERIC ISOLATION MOUNTS**

- A. Restrained Elastomeric Isolation Mounts:
1. Description: All-directional isolator with seismic restraints containing two separate and opposing elastomeric elements that prevent central threaded element and attachment hardware from contacting the housing during normal operation.
    - a. Housing: Cast-ductile iron or welded steel.
    - b. Elastomeric Material: Molded, oil-resistant rubber, neoprene, or other elastomeric material.

### **2.5 ELASTOMERIC HANGERS**

- A. Elastomeric Mount in a Steel Frame with Upper and Lower Steel Hanger Rods:
1. Frame: Steel, fabricated with a connection for an upper threaded hanger rod and an opening on the underside to allow for a maximum of 30 degrees of angular lower hanger-rod misalignment without binding or reducing isolation efficiency.
  2. Damping Element: Molded, oil-resistant rubber, neoprene, or other elastomeric material with a projecting bushing for the underside opening preventing steel-to-steel contact.

### **2.6 SNUBBERS**

- A. Description: Factory fabricated using welded structural-steel shapes and plates, anchor bolts, and replaceable resilient isolation washers and bushings.
1. Post-Installed Concrete Anchor Bolts: Secure to concrete surface with post-installed concrete anchors. Anchors to be seismically prequalified in accordance with ACI 355.2 testing and designated in accordance with ACI 318-14 Ch. 17 for 2015 or 2018 IBC.
  2. Preset Concrete Inserts: Seismically prequalified in accordance with ICC-ES AC446 testing.
  3. Anchors in Masonry: Design in accordance with TMS 402.
  4. Resilient Isolation Washers and Bushings: Oil- and water-resistant neoprene.
  5. Resilient Cushion: Maximum 1/4-inch air gap, and minimum 1/4 inch thick.

### **2.7 RESTRAINTS - RIGID TYPE**

- A. Description: Shop- or field-fabricated bracing assembly made of AISI S110-07-S1 slotted steel channels, ANSI/ASTM A53/A53M steel pipe as per NFPA 13, or other rigid steel brace

member. Includes accessories for attachment to braced component at one end and to building structure at the other end and other matching components and with corrosion-resistant coating; rated in tension, compression, and torsion forces.

## 2.8 RESTRAINTS - CABLE TYPE

- A. Seismic-Restraint Cables: ASTM A492 stainless steel cables. End connections made of steel assemblies with thimbles, brackets, swivel, and bolts designed for seismic-restraining cable service; with fittings attached by means of poured socket, swaged socket or mechanical (Flemish eye) loop.
- B. Restraint cable assembly with cable fittings must comply with ASCE/SEI 19. All cable fittings and complete cable assembly must maintain the minimum cable breaking force. U-shaped cable clips and wedge-type end fittings do not comply and are unacceptable.

## 2.9 RESTRAINT ACCESSORIES

- A. Hanger-Rod Stiffener: Steel tube or steel slotted-support-system sleeve with internally bolted connections to hanger rod. Non-metallic stiffeners are unacceptable.
- B. Hinged and Swivel Brace Attachments: Multifunctional steel connectors for attaching hangers to rigid channel bracings and restraint cables.
- C. Bushings for Floor-Mounted Equipment Anchor Bolts: Neoprene bushings designed for rigid equipment mountings and matched to type and size of anchor bolts and studs.
- D. Bushing Assemblies for Wall-Mounted Equipment Anchorage: Assemblies of neoprene elements and steel sleeves designed for rigid equipment mountings and matched to type and size of attachment devices used.
- E. Resilient Isolation Washers and Bushings: One-piece, molded, oil- and water-resistant neoprene, with a flat washer face.

## 2.10 POST-INSTALLED CONCRETE ANCHORS

- A. Mechanical Anchor Bolts:
  - 1. Drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E488/E488M.
- B. Adhesive Anchor Bolts:
  - 1. Drilled-in and capsule anchor system containing PVC or urethane methacrylate-based resin and accelerator, or injected polymer or hybrid mortar adhesive. Provide anchor bolts and hardware with zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E488/E488M.
- C. Provide post-installed concrete anchors that have been prequalified for use in wind-load applications. Post-installed concrete anchors must comply with all requirements of ASCE/SEI 7-10, Ch. 13.

1. Prequalify post-installed anchors in concrete in accordance with ACI 355.2 or other approved qualification testing procedures.
2. Prequalify post-installed anchors in masonry in accordance with approved qualification procedures.

### **2.11 CONCRETE INSERTS**

- A. Provide preset concrete inserts that are seismically prequalified in accordance with ICC-ES AC466 testing.
- B. Comply with ANSI/MSS SP-58.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine areas and equipment to receive vibration isolation devices for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in of reinforcement and cast-in-place anchors to verify actual locations before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 APPLICATIONS**

- A. Multiple Pipe Supports: Secure pipes to trapeze member with clamps approved for application by an agency acceptable to authorities having jurisdiction.
- B. Hanger-Rod Stiffeners: Install where indicated or scheduled on Drawings to receive them and where required to prevent buckling of hanger rods due to high wind forces.
- C. Strength of Support and Restraint Assemblies: Where not indicated, select sizes of components so strength is adequate to carry static and wind load within specified loading limits.

### **3.3 INSTALLATION OF VIBRATION-CONTROL DEVICES**

- A. Provide vibration-control devices for systems and equipment where indicated in Equipment Schedules or Fire-Suppression Vibration Isolation Schedule, where indicated on Drawings, or where the Specifications indicate they are to be installed on specific equipment and systems.
- B. Coordinate location of embedded connection hardware with supported equipment attachment and mounting points and with requirements for concrete reinforcement and formwork specified in Section 033000 "Cast-in-Place Concrete."
- C. Installation of vibration isolators must not cause any stresses, misalignment, or change of position of equipment or piping.
- D. Equipment Restraints:
  1. Install snubbers on fire-suppression equipment mounted on vibration isolators. Locate snubbers as close as possible to vibration isolators and bolt to equipment base and supporting structure.

2. Install resilient bolt isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inch.
- E. Piping Restraints:
1. Comply with all requirements in NFPA 13.
  2. Design piping sway bracing according to NFPA 13.
    - a. Maximum spacing of all sway bracing to be no greater than indicated in NFPA 13.
    - b. Design loading of all sway bracing not to exceed values indicated in NFPA 13.
- F. Install bushing assemblies for anchor bolts for floor-mounted equipment, arranged to provide resilient media between anchor bolt and mounting hole in concrete base.
- G. Install bushing assemblies for mounting bolts for wall-mounted equipment, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.
- H. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.
- I. Post-Installed Concrete Anchors:
1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
  2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
  3. Mechanical-Type Anchor Bolts: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
  4. Adhesive-Type Anchor Bolts: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.
  5. Set anchors to manufacturer's recommended torque, using a torque wrench.
  6. Install zinc-coated steel anchors for interior and stainless steel anchors for exterior applications.

### **3.4 ACCOMMODATION OF DIFFERENTIAL STRUCTURAL MOTION**

- A. Install flexible connections in piping where they cross structural construction joints and other points where differential movement may occur, where adjacent sections or branches are supported by different structural elements, and where the connections terminate with connection to equipment that is anchored to a different structural element from the one supporting the connections as they approach equipment.

### **3.5 ADJUSTING**

- A. Adjust isolators after system is at operating weight.



- B. Adjust limit stops on restrained-spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.

### **3.6 FIELD QUALITY CONTROL**

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- C. Tests and Inspections:
  - 1. Provide evidence of recent calibration of test equipment by a testing agency acceptable to authorities having jurisdiction.
  - 2. Schedule test with Owner, through Architect, before connecting anchorage device to restrained component (unless postconnection testing has been approved), and with at least seven days' advance notice.
  - 3. Obtain Architect's approval before transmitting test loads to structure. Provide temporary load-spreading members.
  - 4. Test at no fewer than four of each type and size of installed anchors and fasteners.
  - 5. Test to 90 percent of rated proof load of device.
  - 6. Measure isolator restraint clearance.
  - 7. Measure isolator deflection.
  - 8. Verify snubber minimum clearances.
- D. Remove and replace malfunctioning units and retest as specified above.
- E. Units will be considered defective if they do not pass tests and inspections.
- F. Prepare test and inspection reports.

**END OF SECTION**



**SECTION 22 05 53****IDENTIFICATION FOR PLUMBING SYSTEMS****PART 1 GENERAL****1.1 SUMMARY**

- A. Section includes:
  - 1. Pipe identification.
  - 2. Valve tags.
  - 3. Ceiling tacks.
  - 4. Nameplates.
  - 5. Labels.
  - 6. Lockout devices.

**1.2 REFERENCES**

- A. ASME International:
  - 1. ASME A13.1 – Scheme for the Identification of Piping Systems.

**1.3 SUBMITTALS**

- A. Refer to specification section 22 01 05 for submittal requirements, definitions, and procedures.
- B. Submit manufacturer's data for the following:
  - 1. Pipe identification.
  - 2. Valve tags.
  - 3. Ceiling tacks.
  - 4. Nameplates.
  - 5. Labels.
  - 6. Lockout devices.

**1.4 OPERATION AND MAINTENANCE MANUALS**

- A. Refer to specification section 22 01 05 for submittal requirements, definitions, and procedures.
- B. Submit manufacturer's data, manufacturer's warranties, and operation and maintenance instructions for the following:
  - 1. Pipe identification.
  - 2. Valve tags.
  - 3. Ceiling tacks.
  - 4. Nameplates.
  - 5. Labels.
  - 6. Lockout devices.

**PART 2 PRODUCTS****2.1 PIPE IDENTIFICATION**

- A. Font and symbols conforming to ASME A13.1.
- B. Colors shall match owner's standard.
- C. With clean cut symbols and letters of following size:
  - 1. Outside diameter two (2) inches or less: one-half (1/2) inch.
  - 2. Outside diameter two-and-one-half (2-1/2) to six (6) inches: one (1) inch.
- D. Plastic pipe markers:
  - 1. Factory fabricated, flexible, semi-rigid plastic, preformed to fit around pipe or pipe covering. Larger sizes may have maximum sheet size with spring fastener.
- E. Plastic underground pipe tape:
  - 1. Bright colored continuously printed plastic ribbon tape manufactured for direct burial service, minimum six (6) inches wide by four (4) mil.

**2.2 VALVE TAGS**

- A. Font size conforming to ASME A13.1.
- B. Colors shall match owner's standard.
- C. Metal:
  - 1. Brass with stamped letters, minimum one-and-one-half (1-1/2) inches diameter with finished edges.
- D. Tag chart:
  - 1. Typewritten list of applied tags and locations in anodized aluminum frame with polycarbonate cover.

**2.3 CEILING TACKS**

- A. Font size conforming to ASME A13.1.
- B. Colors shall match owner's standard.
- C. Three-quarters (3/4) inch steel.
- D. Adhesive attachment is prohibited.

**2.4 NAMEPLATES**

- A. Font size conforming to ASME A13.1.
- B. Colors shall match owner's standard.
- C. Laminated three (3) layer plastic with engraved letters on contrasting background color.

**2.5 LABELS**

- A. Font size conforming to ASME A13.1.
- B. Colors shall match owner's standard.
- C. Laminated Mylar adhesive backed with printed identification.
- D. Two (2) by three-quarters (3/4) inches.

## **2.6 LOCKOUT DEVICES**

- A. Hasps:
  - 1. Anodized aluminum hasp with erasable label surface.
  - 2. Seven (7) by three (3) inches.
- B. Valves:
  - 1. Steel device preventing operation with lock-accepting shackle.

## **PART 3 EXECUTION**

### **3.1 GENERAL INSTALLATION REQUIREMENTS**

- A. Degrease and clean surfaces to receive adhesive for identification materials.
- B. Install identifying devices after completion of coverings and painting.

### **3.2 PIPE IDENTIFICATION INSTALLATION**

- A. Identify all piping with plastic pipe markers.
- B. Identify service, flow direction, and pressure.
- C. Install in clear view and align with axis of piping.
- D. Locate identification as follows:
  - 1. On every straight run, including risers and drops.
  - 2. Every twenty (20) feet on straight runs.
  - 3. Adjacent to each valve and tee.
  - 4. At each side of wall and floor penetrations.
  - 5. At the underside of roof penetrations.
  - 6. Not less than once in each room.
- E. Install underground plastic pipe markers six (6) inches below finished grade, directly above buried pipe.

### **3.3 VALVE TAG INSTALLATION**

- A. Identify valves in main and branch piping with valve tags.
- B. Install valve tags using corrosion resistant chain.
- C. Number tags consecutively by location.

### **3.4 CEILING TACK INSTALLATION**

- A. Provide ceiling tacks to locate valves above T-bar type panel ceilings.
- B. Locate in corner of ceiling panel closest to equipment.

### **3.5 NAMEPLATE INSTALLATION**

- A. Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive.
- B. Identify all equipment with plastic nameplates.
- C. Identify all disconnects provided by the contractor with nameplates.

**3.6 LABEL INSTALLATION**

- A. Install labels with sufficient adhesive for permanent adhesion and seal with clear lacquer.
- B. Identify inline specialties and other small devices with labels.

**3.7 LOCKOUT DEVICE INSTALLATION**

- A. Install lockout devices on all disconnects.
- B. Install lockout devices on all circuit breakers when used as the primary disconnect.
- C. Install lockout devices on all service valves to equipment.

**END OF SECTION**

**SECTION 22 07 00**  
**INSULATION FOR PLUMBING SYSTEMS**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section includes:
  - 1. Pipe insulation.
  - 2. Pipe insulation jackets.
  - 3. Pipe insulation shields and inserts.

**1.2 REFERENCES**

- A. ASTM International:
  - 1. ASTM C547 – Standard Specification for Mineral Fiber Pipe Insulation.

**1.3 SUBMITTALS**

- A. Refer to specification section 22 01 05 for submittal requirements, definitions, and procedures.
- B. Submit manufacturer's data for the following:
  - 1. Pipe insulation.
  - 2. Pipe insulation jackets.
  - 3. Pipe insulation shields and inserts.

**1.4 OPERATION AND MAINTENANCE MANUALS**

- A. Refer to specification section 22 01 05 for submittal requirements, definitions, and procedures.
- B. Submit manufacturer's data, manufacturer's warranties, and operation and maintenance instructions for the following:
  - 1. Pipe insulation.
  - 2. Pipe insulation jackets.
  - 3. Pipe insulation shields and inserts.

**1.5 ENVIRONMENTAL REQUIREMENTS**

- A. Do not install insulation and related products when ambient temperatures and conditions do not meet manufacturer's requirements.
- B. Maintain required temperature and humidity before, during, and after installation for at least twenty-four (24) hours.

**PART 2 PRODUCTS****2.1 PIPE INSULATION**

- A. Mineral fiber: ASTM C547; rigid molded, noncombustible, formaldehyde free.
  - 1. K-factor: Twenty-seven-one-hundredths (0.27) at seventy-five (75) degrees Fahrenheit.
  - 2. Maximum service temperature: Eight hundred (800) degrees Fahrenheit.

3. Vapor retarder jacket: Kraft paper with glass fiber yarn and bonded to all-service jacket, secured with self-sealing longitudinal laps and butt strips or with outward clinch expanding staples and vapor retarder mastic.

## 2.2 PIPE INSULATION JACKETS

- A. Polyvinyl chloride (PVC) plastic:
  1. One-piece molded type fitting covers and sheet material.
  2. Ten (10) mil with brush on welding adhesive.
- B. Canvas:
  1. Underwriters Laboratories, Inc. listed fabric.
  2. Six (6) ounces per square yard, plain weave cotton treated with dilute fire-retardant lagging adhesive.

## 2.3 PIPE INSULATION SHIELDS AND INSERTS

- A. Shields:
  1. Twenty-two (22) gauge galvanized steel.
- B. Inserts:
  1. Cork or other high density insulating material, not less than six (6) inches long.

## PART 3 EXECUTION

### 3.1 GENERAL INSTALLATION REQUIREMENTS

- A. Verify piping and equipment has been tested before applying insulation materials.
- B. Verify surfaces are clean and dry, with foreign material removed.
- C. Neatly finish insulation at supports, protrusions, and interruptions.
- D. Locate insulation and cover seams in least visible locations where not specified below.
- E. Insulate complete systems conveying fluids below ambient temperature, including fittings, valves, unions, flanges, strainers, flexible connections, etc. Provide vapor barrier jackets for mineral fiber insulation.
- F. Insulate complete systems conveying fluids above ambient temperature, including fittings, valves, unions, flanges, strainers, flexible connections, etc. Insulate flanges and unions with removable sections and jackets.

### 3.2 PIPING INSULATION INSTALLATION

- A. Continue insulation vapor barrier through penetrations.
- B. For exposed piping, finish with canvas jacket sized for finish painting. Provide PVC jacket and fitting covers in exposed locations in kitchens and mechanical rooms.
- C. For buried piping, insulate only where insulation manufacturer recommends insulation product may be installed in trench, tunnel, or direct buried. Install factory fabricated assembly with inner all-purpose service jacket with self-sealing lap, and asphalt impregnated open mesh glass fabric, with one (1) mil aluminum foil sandwiched between three (3) layers of bituminous compound. Outer surface shall be faced with polyester film.



- D. Insulate piping systems in accordance with the following:

PIPING SYSTEM	PIPE SIZE RANGE	INSULATION SIZE
Domestic Cold-Water Supply	½" – 1¼"	½"
Domestic Cold-Water Supply	1½" – 4"	1"
Domestic Hot Water Supply	½" – 1¼"	1"
Domestic Hot Water Supply	1½" – 4"	1½"
Domestic Hot Water Return	½" – 1¼"	1"
Domestic Hot Water Return	1½" – 4"	1½"

### 3.3 PIPE INSULATION SHIELD AND INSERT INSTALLATION

- A. Provide shields on piping or equipment one-and-one-half (1-1/2) inches diameter or larger.
- B. Install inserts on piping two (2) inches diameter or larger. Install between support shield and piping and under finish jacket.

**END OF SECTION**



**SECTION 22 11 00**  
**DOMESTIC WATER SYSTEMS**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Section includes:
  - 1. Piping.
  - 2. Valves.
  - 3. Strainers.
  - 4. Pressure gauges.
  - 5. Thermometers.
  - 6. Hydrants.
  - 7. Recessed valve boxes.
  - 8. Thermal expansion tanks.
  - 9. Inline circulator pumps.
  - 10. Water pressure booster systems.

**1.2 REFERENCES**

- A. American National Standards Institute (ANSI):
  - 1. ANSI Z21.22 – Relief Valves for Hot Water Supply Systems.
- B. American Society of Mechanical Engineers (ASME):
  - 1. ASME B16.15 – Cast Copper Alloy Threaded Fittings: Classes 125 and 250.
  - 2. ASME B16.18 – Cast Copper Alloy Solder Joint Pressure Fittings.
  - 3. ASME B16.22 – Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
  - 4. ASME B40.1 – Pressure Gauges and Gauge Attachments.
- C. ASSE International:
  - 1. ASSE 1003 – Performance Requirements for Water Pressure Reducing Valves.
  - 2. ASSE 1017 – Performance Requirements for Temperature Actuated Mixing Valves for Hot Water Distribution Systems.
- D. ASTM International:
  - 1. ASTM E1 – Standard Specification for Liquid-in-Glass Thermometers.
- E. American Water Works Association (AWWA):
  - 1. AWWA C651 – Disinfecting Water Mains.
- F. Manufacturer’s Standardization Society of the Valves and Fittings Industry (MSS):
  - 1. MSS SP 67 – Butterfly Valves.
  - 2. MSS SP 71 – Gray Iron Swing Check Valves, Flanged and Threaded Ends.
  - 3. MSS SP 80 – Bronze Gate, Globe, Angle, and Check Valves.

4. MSS SP 110 – Ball Valves Threaded, Socket Welding, Solder Joint, Grooved, and Flared Ends.
- G. NSF International:
1. NSF 61 – Drinking Water System Components – Health Effects.

### 1.3 SUBMITTALS

- A. Refer to specification section 22 01 05 for submittal requirements, definitions, and procedures.
- B. Submit manufacturer's data for the following:
  1. Piping.
  2. Valves.
  3. Strainers.
  4. Pressure gauges.
  5. Thermometers.
  6. Hydrants.
  7. Recessed valve boxes.
  8. Thermal expansion tanks.
  9. Inline circulator pumps.
  10. Water pressure booster systems.

### 1.4 OPERATION AND MAINTENANCE MANUALS

- A. Refer to specification section 22 01 05 for submittal requirements, definitions, and procedures.
- B. Submit manufacturer's data, manufacturer's product warranties, and operation and maintenance instructions for the following:
  1. Piping.
  2. Valves.
  3. Strainers.
  4. Pressure gauges.
  5. Thermometers.
  6. Hydrants.
  7. Recessed valve boxes.
  8. Thermal expansion tanks.
  9. Inline circulator pumps.
  10. Water pressure booster systems.

## PART 2 PRODUCTS

### ~~2.1 PIPING~~

- ~~A. Copper Tubing: ASTM B88, Type L, drawn temper (hard).~~
  - ~~1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.~~

- ~~2. Press Fittings: ASME B16.18, cast copper, or ASME B16.22, wrought copper and performance criteria of ASME b16.51, with EPDM rubber O-rings at each end.~~
- ~~3. Joints shall be one of the following:
 
  - ~~a. Solder, lead free, ASTM B32, 95-5 tin-antimony, or tin and silver, with melting range 430 to 535 degrees F.~~
  - ~~b. Braze, AWS A5.8 BCuP silver/phosphorus/copper alloy with melting range 1190 to 1480 degrees F.~~
  - ~~c. Pressure Seal Joints, lead free, minimum 200 psig working pressure rating at 250 degrees F.~~~~
- ~~B. Water distribution pipe shall conform to NSF 61. All water distribution pipe and tubing shall have a minimum pressure rating of one hundred (100) psi at one hundred eighty (180) degrees Fahrenheit.~~
- ~~C. Pipe fittings shall be approved for installation with the piping material installed. All pipe fittings utilized in water supply systems shall also comply with NSF 61. The fittings shall not have ledges, shoulders, or reductions capable of retarding or obstructing flow in the piping.~~

## 2.2 DOMESTIC WATER PIPING, BURIED WITHIN 5 FEET OF BUILDING

### Pipe 4 inch and larger:

- A. **Ductile Iron Pipe: AWWA C151.**
  1. **Fittings: AWWA C110, ductile or gray iron, standard thickness.**
  2. **Joints: AWWA C111, rubber gasket with rods.**

### Pipe 3 inch and smaller:

- B. **Copper Tubing: ASTM B88, Type K, drawn-temper (hard) or soft annealed-temper (soft).**
  1. **Fittings: ASME B16.18, cast copper, or ASME B16.22, wrought copper.**
  2. **Press Fittings: ASME B16.18, cast copper, or ASME B16.22, wrought copper and performance criteria of ASME b16.51, with EPDM rubber O-rings at each end.**
  3. **Joints shall be one of the following:**
    - a. **Solder, lead free, ASTM B32, 95-5 tin-antimony, or tin and silver, with melting range 430 to 535 degrees F.**
    - b. **Braze, AWS A5.8 BCUP silver/phosphorus/copper alloy with melting range 1190 to 1480 degrees F.**
    - c. **Pressure-Seal-Joints, lead free, minimum 200-psig working pressure rating at 250 degrees F.**

## 2.3 DOMESTIC WATER PIPING, ABOVE GRADE

### Pipe 3" and smaller:

- A. **Copper Tubing: ASTM B88, Type L, drawn-temper (hard).**
  1. **Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.**

2. **Press Fittings: ASME B16.18, cast copper, or ASME B16.22, wrought copper and performance criteria of ASME b16.51, with EPDM rubber O-rings at each end.**
3. **Joints shall be one of the following:**
  - a. **Solder, lead free, ASTM B32, 95-5 tin-antimony, or tin and silver, with melting range 430 to 535 degrees F.**
  - b. **Braze, AWS A5.8 BCUP silver/phosphorus/copper alloy with melting range 1190 to 1480 degrees F.**
  - c. **Pressure-Seal-Joints, lead free, minimum 200-psig working pressure rating at 250 degrees F.**

## 2.4 VALVES

- A. **Ball:**
  1. Four (4) inches or less: MSS SP 110; 600 psi CWP; two-piece cast brass body; replaceable Teflon seats; full port; blowout proof stems; chrome-plated brass ball; threaded, soldered, or compression ends; locking lever handle operated.
  2. Provide extended stems for valves in insulated piping.
- B. **Swing check:**
  1. Two (2) inches or less: MSS SP 80; class 125; 200 psi CWP; cast bronze body and cap; threaded, soldered or compression ends; Y-pattern swing type nitrile rubber disc.
  2. Two-and-one-half (2-1/2) inches or more: MSS SP 71; class 125; 200 psi CWP; cast iron body, bronze mounted, and bolted bonnet; flanged or threaded ends; swing type nitrile rubber disc; nonasbestos gasket.
- C. **Spring-loaded check:**
  1. Two (2) inches or less: MSS SP 80; class 125; 200 psi CWP; cast bronze body and cap; threaded, soldered or compression ends; inline spring lift check; silent closing nitrile rubber disc; integral seat.
  2. Two-and-one-half (2-1/2) inches or more: MSS SP 71; class 125; 200 psi CWP; cast iron body, bronze mounted, and bolted bonnet; flanged or threaded ends; wafer style; center guided bronze disc; stainless steel springs and screws.
- D. **Flow control:**
  1. Construction: Class 125; bronze body; union on inlet and outlet; temperature and pressure test plug on inlet and outlet; combination blow-down drain.
  2. Calibration: Control flow within five (5) percent of selected rating; over operating pressure range of ten (10) times minimum pressure required for control; maximum minimum pressure five (5) psi.
- E. **Pressure relief:**
  1. ANSI Z21.22; bronze body; Teflon seat; stainless steel stem and springs; automatic; direct pressure actuated.
- F. **Temperature and pressure relief:**
  1. ANSI Z21.22; bronze body; Teflon seat; stainless steel stem and springs; automatic; direct pressure actuated; temperature relief maximum 210 degrees F; capacity ASME certified and labeled.

- G. Master thermostatic mixing valves.
  - 1. Valve: Chrome-plated cast brass body; programmable digital controller with integral pressure and temperature sensors, with connections to building automation system for monitoring and control; fully factory piped and assembled on a wall-mount rack frame, including test connections and valves.
  - 2. Capacity: As specified in thermostatic mixing valve schedule on drawings.
  - 3. Temperature actuated mixing valves, which are installed to reduce water temperatures to defined limits, shall comply with ASSE 1017.
- H. All valves shall be of an approved type and compatible with the type of piping material installed in the system. Ball valves, gate valves, globe valves, and plug valves intended to supply drinking water shall meet the requirements of NSF 61.

## 2.5 STRAINERS

- A. Two (2) inches or less: Class 150; 300 psi CWP; bronze body; Y-pattern with 1/32 inch stainless steel perforated screen; threaded, soldered or compression ends.
- B. Two-and-one-half (2-1/2) inches to four (4) inches: Class 125; 200 psi CWP; cast iron body, bronze fitted; Y-pattern with 1/16-inch stainless steel perforated screen; flanged or threaded ends.

## 2.6 PRESSURE GAUGES

- A. Gauge: ASME B40.1; with bourdon tube; rotary brass movement; brass socket; front calibration adjustment; black scale on white background.
  - 1. Case: Cast aluminum.
  - 2. Bourdon tube: Brass.
  - 3. Dial size: four (4) inches diameter.
  - 4. Mid-scale accuracy: One (1) percent.
  - 5. Scale: Psi.
  - 6. Pressure gauge taps:
    - a. Needle valve: Brass, 1/4-inch NPT for 300 psi.
    - b. Pulsation damper: Pressure snubber, brass with 1/4-inch NPT connections.

## 2.7 THERMOMETERS

- A. Thermometer: ASTM E1; adjustable angle; red appearing mercury; lens front tube; cast aluminum case with enamel finish; cast aluminum adjustable joint with positive locking device.
  - 1. Size: 7-inch scale.
  - 2. Window: Clear Lexan plastic.
  - 3. Stem: Brass, 3/4 inch NPT, 3-1/2 inch long.
  - 4. Accuracy: Two (2) percent.
  - 5. Calibration: Degrees F.

## 2.8 HYDRANTS

- A. As specified in plumbing fixture schedule on drawings.

**2.9 RECESSED VALVE BOXES**

- A. As specified in plumbing fixture schedule on drawings.

**2.10 THERMAL EXPANSION TANKS**

- A. Construction: Welded steel, tested and stamped in accordance with ASME Section VIII; supplied with National Board Form U-1, rated for working pressure of 125 psig, with flexible EPDM diaphragm sealed into tank, and steel legs or saddles.
- B. Accessories: Pressure gauge and air-charging fitting, tank drain; pre-charge to forty (40) psig.
- C. Size: As specified in thermal expansion tank schedule on drawings.

**2.11 INLINE CIRCULATOR PUMPS**

- A. Casing: Bronze rated for 125 psig working pressure with stainless steel rotor assembly.
- B. Impeller: Bronze.
- C. Shaft: Alloy steel with integral thrust collar and two, oil lubricated bronze sleeve bearings.
- D. Seal: Carbon rotating against stationary ceramic seat.
- E. Drive: Flexible coupling.
- F. Performance: As specified in pump schedule on drawings.
- G. Electrical characteristics: As specified in pump schedule on drawings.

**PART 3 EXECUTION****3.1 PIPING INSTALLATION**

- A. Piping shall be neatly arranged – straight, parallel, or at right angles to walls – and cut accurately to established measurements.
- B. Group piping whenever practical at common elevations.
- C. Pipes shall be worked into place without springing or forcing.
- D. Sufficient headroom shall be provided to enable the clearing of light fixtures, ductwork, sprinklers, aisles, passageways, windows, doors, and other openings.
- E. Pipes shall not interfere with access to maintain equipment.
- F. Pipes shall be clean, free of cuttings and foreign matter inside, and exposed ends shall be covered during site storage and installation. Split, bent, flattened, or otherwise damaged pipe or tubing shall not be used.
- G. Sufficient clearance shall be provided from walls, ceilings, and floors to permit the welding, soldering, or connecting of joints and valves. No less than six (6) inches of clearance shall be provided.
- H. Installation of pipe inside electrical equipment rooms, telecommunications or data rooms, elevator machine rooms, elevator hoistways, and stairwells is prohibited.
- I. Piping systems shall not interfere with the proper operation and maintenance of safety or relief valves.
- J. Means of draining the entire facility water distribution system shall be provided. A hose thread hydrant with vacuum breaker shall be placed at each low point in the system for this purpose. Constant grades to the low points shall be maintained for proper drainage. Piping shall be free of pockets due to changes in elevations.



- K. Install brass male adapters each side of valves in copper piped system.
- L. Install unions downstream of valves and at equipment or apparatus connections.
- M. Provide access doors where union, valves, or similar inline pipe accessories are not accessible. Refer to section 22 01 00.
- N. Sleeve pipes passing through partitions, walls, and floors. Refer to section 22 05 29.
- O. Install firestopping at fire-rated construction perimeters and openings containing penetrating sleeves and piping. Refer to section 22 05 32.
- P. Prepare exposed, unfinished pipe and fittings for finish painting. Refer to section 22 05 53.
- Q. Water service pipe and the building sewer shall be separated by five (5) feet of undisturbed or compacted earth.
  - 1. Exceptions:
    - a. The required separation distance shall not apply where the bottom of the water service pipe within five (5) feet of the sewer is a minimum of twelve (12) inches above the top of the highest point of the sewer and the pipe materials conform to Table 702.3 of the North Carolina Plumbing Code.
    - b. Water service pipe is permitted to be located in the same trench with a building sewer, provided such sewer is constructed of materials listed in Table 702.2 of the North Carolina Plumbing Code.
    - c. The required separation distance shall not apply where a water service pipe crosses a sewer pipe, provided the water service pipe is sleeved at least five (5) feet horizontally from the sewer pipe centerline on both sides of such crossing with pipe materials listed in Table 605.3, 702.2, or 702.3 of the North Carolina Plumbing Code.
- R. Potable water service pipes shall not be located in, under, or above cesspools, septic tanks, septic tank drainage fields, or seepage pits.
- S. The installation of a water service or water distribution pipe shall be prohibited in soil and ground water contaminated with solvents, fuels, organic compounds, or other detrimental materials causing permeation, corrosion, degradation, or structural failure of the piping material. Where detrimental conditions are suspected, a chemical analysis of the soil and ground water conditions shall be required to ascertain the acceptability of the water service or water distribution piping material for the specific installation. Where detrimental conditions exist, approved alternative materials or routing shall be required.
- T. Joints between copper or copper-alloy pipe or fittings shall comply with the following:
  - 1. Soldered joints: Soldered joints shall be made in accordance with the methods of ASTM B828. All cut tube ends shall be reamed to the full inside diameter of the tube end. All joint surfaces shall be cleaned. A flux conforming to ASTM B813 shall be applied. The joint shall be soldered with a solder conforming to ASTM B32. The joining of water supply piping shall be made with lead-free solders and fluxes. "Lead-free" shall mean a chemical composition equal to or less than 0.2-percent lead.
  - 2. Threaded joints: Threads shall conform to ASME B1.20.1. Pipe-joint compound or tape shall be applied on the male threads only.

### 3.2 VALVE INSTALLATION

- A. Provide temporary protective coating on cast iron and steel valves.
- B. Install valves with stems upright or horizontal, not inverted.
- C. Provide ball valves adjacent to equipment when functioning to isolate equipment.
- D. Provide spring loaded check valves on discharge of water pumps.
- E. Where water pressure within a building exceeds eighty (80) psi static, an approved water pressure reducing valve conforming to ASSE 1003 with strainer shall be installed to reduce the pressure in the building water distribution piping to eighty (80) psi static or less.
  - 1. The pressure-reducing valve shall be designed to remain open to permit uninterrupted water flow in case of valve failure.
  - 2. All water-pressure reducing valves, regulators, and strainers shall be so constructed and installed as to permit repair or removal of parts without breaking a pipeline or removing the valve and strainer from the pipeline.
- F. Full open valves shall be installed in the following locations:
  - 1. A full open valve shall be located either outside the building within five (5) feet of the foundation wall in a readily accessible valve box, in the crawlspace within three (3) feet of the crawlspace access door or within the building in a location where it may be accessed without the use of a ladder or a tool.
  - 2. On the base of every water riser pipe.
  - 3. On the water supply pipe to a pressurized water tank.
  - 4. On the water supply pipe to every water heater.
- G. Shutoff valves shall be installed in the following locations:
  - 1. On the fixture supply to each plumbing fixture other than bathtubs and showers.
  - 2. On the water supply to each appliance or mechanical equipment.
  - 3. Each supply branch line serving more than one fixture shall have a shutoff valve installed so as to isolate all fixtures and all pieces of equipment supplied by the branch line. The shutoff valve shall be labeled and located as close to the connection to the supply main and riser as practical.
- H. Access shall be provided to all full open valves and shutoff valves.
- I. Service valves shall be identified. All other valves installed in locations that are not adjacent to the fixture or appliance shall be identified, indicating the fixture or appliance served. Refer to specification section 22 05 53.

### 3.3 STRAINER INSTALLATION

- A. Strainers shall be installed such that the blowdown is perpendicular to the floor, wall, or ceiling through which access to the strainer is obtained.
- B. Access shall be provided to all strainers.

### 3.4 WATER HAMMER ARRESTER INSTALLATION

- A. A water hammer arrester shall be installed where quick-closing valves and metallic piping is used.
- B. Install water hammer arresters on hot and cold-water supply piping as between the last two fixtures on the piping being served and as indicated in the drawings.

**3.5 PRESSURE GAUGE INSTALLATION**

- A. Install one pressure gauge for each pump, locate taps before strainers and on suction and discharge of pump.
- B. Install gauge taps in piping.
- C. Install pressure gauges with pulsation dampers. Provide needle valve to isolate each gauge.
- D. Provide instruments with scale ranges selected according to service with largest appropriate scale.
- E. Install gauges in locations where they are easily read from normal operating level. Install vertical to forty-five (45) degrees off vertical.
- F. Adjust gauges to final angle, clean windows, and lenses, and calibrate to zero.

**3.6 THERMOMETER INSTALLATION**

- A. Install thermometers in piping systems in sockets in short couplings. Enlarge pipes smaller than two-and-one-half (2-1/2) inches for installation of thermometer sockets. Allow clearance from insulation.
- B. Provide instruments with scale ranges selected according to service with largest appropriate scale.
- C. Install thermometers in locations where they are easily read from normal operating level. Install vertical to 45 degrees off vertical.
- D. Adjust thermometers to final angle, clean windows, and lenses, and calibrate to zero.

**3.7 HYDRANT INSTALLATION**

- A. Install at mounting heights indicated in plumbing fixture schedule on drawings.
- B. Coordinate installation of exterior wall hydrants with the general contractor so that each hydrant occupies space within a single course of masonry units.

**3.8 THERMAL EXPANSION TANK INSTALLATION**

- A. Install as indicated in thermal expansion tank schedule on drawings and in accordance with the water heater detail(s) on drawings.

**3.9 PUMP INSTALLATION**

- A. Provide pumps to operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, and operate within twenty-five (25) percent of midpoint of published maximum efficiency curve.
- B. Support piping adjacent to pump so no weight is carried on pump casings.
- C. Provide line sized shut-off valve and strainer on pump suction, and line sized soft seat check valve, balancing valve, and shutoff valve on pump discharge.
- D. Lubricate pumps before startup.

**3.10 PROTECTION OF THE POTABLE WATER SUPPLY**

- A. Chemicals and other substances that produce either toxic conditions, taste, odor, or discoloration in a potable water system shall not be introduced into, or utilized in, such systems.
- B. Piping that has been utilized for any purpose other than conveying potable water shall not be utilized for conveying potable water.

- C. The interior surface of a potable water tank shall not be lined, painted, or repaired with any material that changes the taste, odor, color, or potability of the water supply when the tank is placed in, or returned to, service.
- D. Water pumps, filters, softeners, tanks, and all other devices that handle or treat potable water shall be protected against contamination.

### **3.11 INSPECTION AND TESTING**

- A. Refer to specification section 22 01 00 for general inspection and testing requirements and performance requirements of test gauges.
- B. Upon completion of a section of or the entire water supply system, the system, or portion completed, shall be tested and proved tight under a water pressure of not less than the working pressure of the system; or an air test of not less than one hundred (100) psi. This pressure shall be held for at least fifteen (15) minutes. The water utilized for tests shall be obtained from a potable source of supply.

### **3.12 STERILIZATION OF THE DOMESTIC WATER SYSTEM**

- A. Permitted new or repaired potable water systems shall be purged of deleterious matter prior to neutralization.
- B. After the system has been tested and approved, the entire new system, including valves and accessories, shall be chlorinated. Disinfecting shall be in accordance with AWWA C651.
- C. Chlorine may be applied in any of the following forms:
  - 1. Liquid chlorine gas-water mixture.
    - a. Chlorine gas-water mixture shall be applied by a solution feed chlorinating device.
  - 2. Calcium hypochlorite and water mixture.
    - a. A solution consisting of five (5) percent powder to ninety-five (95) percent water by weight shall be prepared. The calcium hypochlorite and water mixture shall first be made into a paste, then thinned into slurry, and injected or pumped into the system.
- D. The system or any part thereof shall be filled with a water-chlorine solution containing a chlorine concentration and shall stand in the system for a duration from either of the following:
  - 1. Chlorine concentration of at least fifty (50) parts per million and a duration of twenty-four (24) hours.
  - 2. Chlorine concentration of at least two hundred (200) parts per million and a duration of three (3) hours.
- E. During the chlorination process all valves and accessories shall be independently and manually operated at least twice.
- F. After the chlorination process, the chlorine shall be flushed from the system until the system water is equal in chemical and bacteriological composition to those of the permanent source of water supply. Spent chlorinated water shall be disposed of in an environmentally responsible procedure.
- G. Water supply shall not be placed into service until bacteriological test results are found to be satisfactory and the water meets Environmental Protection Agency quality standards for drinking water.

- H. The contractor shall submit samples of the system water to a competent laboratory for analysis. Laboratory tests of the water shall be paid for by the contractor. The water test report shall be submitted to the professional for review and approval.
- I. After acceptance by the professional, the water test report shall be submitted by the contractor to the owner and authority having jurisdiction prior to sending a request for final acceptance and occupancy permit.

**END OF SECTION**



**SECTION 22 13 00****SANITARY WASTE AND VENT SYSTEMS****PART 1 GENERAL****1.1 SUMMARY**

- A. Section includes:
1. Underground sanitary waste and vent piping.
  2. Aboveground sanitary waste and vent piping.
  3. Valves.
  4. Floor drains.
  5. Floor sinks.
  6. Cleanouts.
  7. Interceptors.

**1.2 REFERENCES**

- A. ASTM International:
1. ASTM A74 – Standard Specification for Cast Iron Soil Pipe and Fittings.
  2. ASTM A888 – Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.
  3. ASTM B152 – Standard Specification for Copper Sheet, Strip, Plate, and Rolled Bar.
  4. ASTM C564 – Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
  5. ASTM C1540 – Standard Specification for Heavy Duty Shielded Couplings Joining Hubless Cast Iron Soil Pipe and Fittings.
  6. ASTM C1563 – Standard Test Method for Gaskets for Use in Connection with Hub and Spigot Cast Iron Soil Pipe and Fittings for Sanitary Drain, Waste, Vent, and Storm Piping Applications.
  7. ASTM D2321 – Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
  8. ASTM D2564 – Standard Specification for Solvent Cements for Polyvinyl Chloride (PVC) Plastic Piping Systems.
  9. ASTM D2665 – Standard Specification for Polyvinyl Chloride (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings.
  10. ASTM D2855 – Standard Practice for Making Solvent Cemented Joints with Polyvinyl Chloride (PVC) Pipe and Fittings.
  11. ASTM F656 – Standard Specification for Primers for Use in Solvent Cement Joints of Polyvinyl Chloride (PVC) Plastic Pipe and Fittings.
- B. Cast Iron Soil Pipe Institute (CISPI):
1. CISPI 301 – Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.

2. CISPI 310 – Specification for Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.

### **1.3 SUBMITTALS**

- A. Refer to specification section 22 01 05 for submittal requirements, definitions, and procedures.
- B. Submit manufacturer's data for the following:
  1. Underground sanitary waste and vent piping.
  2. Aboveground sanitary waste and vent piping.
  3. Valves.
  4. Floor drains.
  5. Floor sinks.
  6. Cleanouts.
  7. Interceptors.

### **1.4 OPERATION AND MAINTENANCE MANUALS**

- A. Refer to specification section 22 01 05 for submittal requirements, definitions, and procedures.
- B. Submit manufacturer's data, manufacturer's warranties, and operation and maintenance instructions for the following:
  1. Underground sanitary waste and vent piping.
  2. Aboveground sanitary waste and vent piping.
  3. Valves.
  4. Floor drains.
  5. Floor sinks.
  6. Cleanouts.
  7. Interceptors.

## **PART 2 PRODUCTS**

### **2.1 UNDERGROUND SANITARY WASTE AND VENT PIPING**

- A. Cast iron pipe:
  1. Pipe:
    - a. Hub and spigot: ASTM A74.
  2. Fittings:
    - a. Hub and spigot: ASTM A74.
  3. Joints:
    - a. Hub and spigot:
      - 1) Compression gasket: ASTM C564, ASTM C1563.
- B. Polyvinyl Chloride (PVC) Pipe:



1. Pipe:
    - a. ASTM D1785, Schedule 40, polyvinyl chloride (PVC) material, bell and spigot style solvent sealed joint ends.
  2. Fittings:
    - a. ASTM D2466, Schedule 40, PVC.
  3. Joints:
    - a. ASTM D2855, solvent weld with ASTM D2564 Solvent cement.
- C. Pipe fittings shall not have ledges, shoulders, or reductions capable of retarding or obstructing flow in the piping. Threaded drainage pipe fittings shall be of the recessed drainage type.
- D. The following types of joints and connections shall be prohibited.
1. Cement or concrete joints.
  2. Mastic or hot pour bituminous joints.
  3. Joints made with fittings not approved for the specific installation.
  4. Joints between different diameter pipes made with elastomeric O-rings.
  5. Solvent cement joints between different types of plastic pipe.
  6. Saddle type fittings.

## 2.2 ABOVEGROUND SANITARY WASTE AND VENT PIPING

- A. Cast iron pipe:
1. Pipe:
    - a. Hubless: ASTM A888, CISPI 301.
  2. Fittings:
    - a. Hubless: ASTM A888, CISPI 301.
  3. Joints:
    - a. Hubless shielded couplings: ASTM C564, CISPI 310.
      - 1) Heavy duty: ASTM C1540.
- B. Polyvinyl Chloride (PVC) Pipe:
1. Pipe:
    - a. ASTM D2665, Schedule 40, PVC.
  2. Fittings:
    - a. ASTM D2665, Schedule 40, PVC.
  3. Joints:
    - a. ASTM D2855, solvent weld with ASTM D2564 solvent cement.
- C. Pipe fittings shall not have ledges, shoulders, or reductions capable of retarding or obstructing flow in the piping. Threaded drainage pipe fittings shall be of the recessed drainage type.
- D. The following types of joints and connections shall be prohibited.
1. Cement or concrete joints.

2. Mastic or hot pour bituminous joints.
3. Joints made with fittings not approved for the specific installation.
4. Joints between different diameter pipes made with elastomeric O-rings.
5. Solvent cement joints between different types of plastic pipe.
6. Saddle type fittings.

### 2.3 FLOOR DRAINS

- A. As specified in plumbing fixture schedule on drawings.

### 2.4 FLOOR SINKS

- A. As specified in plumbing fixture schedule on drawings.

### 2.5 CLEANOUTS

- A. Cleanout plugs shall be brass or plastic, or other approved materials. Brass cleanout plugs shall be utilized with metallic drain, waste, and vent piping only, and shall conform to ASTM A74. Cleanouts with plate-style access covers shall be fitted with corrosion-resistant fasteners.
- B. As specified in plumbing fixture schedule on drawings.

## PART 3 EXECUTION

### 3.1 PIPING INSTALLATION

- A. Fittings shall be installed to guide sewage and waste in the direction of flow. Change in direction shall be made by fittings installed in accordance with the following table. Change in direction by combination fittings, side inlets, or increasers shall be installed in accordance with the following table based on the pattern of flow created by the fitting.

TYPE OF FITTING PATTERN	CHANGE IN DIRECTION		
	HORIZONTAL TO VERTICAL	VERTICAL TO HORIZONTAL	HORIZONTAL TO HORIZONTAL
Sixteenth bend	X	X	X
Eighth bend	X	X	X
Sixth bend	X	X	X
Quarter bend	X	X <sup>[3,5]</sup>	X <sup>[4]</sup>
Short sweep	X	X <sup>[2]</sup>	X <sup>[1]</sup>
Long sweep	X	X	X
Sanitary tee	X		
Wye	X	X	X
Combination wye and eighth bend	X	X	X

1. The fittings shall only be permitted for a two (2) inch or smaller sink or lavatory fixture drain.
  2. Two (2) inches and larger.
  3. May be used only within twelve (12) inches below water closet flange measured to centerline of the quarter bend.
  4. This fitting shall only be permitted to be used as the first fitting directly behind the fixture for drains two (2) inches and smaller, except clothes washers.
  5. The heel inlet connection of a quarter bend may be used as a wet or dry vent if the heel inlet connection of the quarter bend is located in the vertical position. The heel or side inlet connection may be used as a wet vent if the quarter bend is located directly below a water closet or other fixture with one integral trap.
- B. Heel inlet quarter bends shall be an acceptable means of connection, except where the quarter bend serves a water closet. A low heel inlet shall not be used as a wet vented connection. Side inlet quarter bends shall be an acceptable means of connection for drainage, wet venting, and stack venting arrangements.
- C. Direct connection of a steam exhaust, blowoff, or drip pipe shall not be made with the building drainage system. Wastewater when discharged into the building drainage system shall be at a temperature not higher than 140 °F. When higher temperatures exist, approved cooling methods shall be provided.
- D. Exposed soil or waste piping shall not be installed above any working, storage, or eating surfaces in food service establishments.
- E. Water service pipe and the building sewer shall be separated by five (5) feet of undisturbed or compacted earth.
1. Exceptions:
    - a. The required separation distance shall not apply where the bottom of the water service pipe within five (5) feet of the sewer is a minimum of twelve (12) inches above the top of the highest point of the sewer and the pipe materials conform to Table 702.3 of the North Carolina Plumbing Code.
    - b. Water service pipe is permitted to be located in the same trench with a building sewer, provided such sewer is constructed of materials listed in Table 702.2 of the North Carolina Plumbing Code.
    - c. The required separation distance shall not apply where a water service pipe crosses a sewer pipe, provided the water service pipe is sleeved at least five (5) feet horizontally from the sewer pipe centerline on both sides of such crossing with pipe materials listed in Table 605.3, 702.2, or 702.3 of the North Carolina Plumbing Code.
- F. Horizontal drainage piping shall be installed in uniform alignment at uniform slopes. The minimum slope of a horizontal drainage pipe shall be in accordance with the following:
1. Pipes sized two-and-one-half (2-1/2) inches or less: one-quarter (1/4) inch per foot.
  2. Pipes sized (3) three to six (6) inches: one-eighth (1/8) inch per foot.
  3. Slope all grease waste piping at one-quarter (1/4) inch per foot.
- G. The size of drainage piping shall not be reduced in size in the direction of flow.

- H. Horizontal branches shall connect to the bases of stacks at a point located not less than ten (10) times the diameter of the drainage stack downstream from the stack. Horizontal branches shall connect to horizontal stack offsets at a point located not less than ten (10) times the diameter of the drainage stack downstream of the upper stack.
- I. In the installation or removal of any part of a drainage system, dead ends shall be prohibited. Cleanout extensions and approved future fixture drainage piping shall not be considered as dead ends.
- J. Joints between cast iron pipe or fittings shall comply with the following:
1. Compression gasket joints: Compression gaskets for hub and spigot pipe and fittings shall conform to ASTM C564 and shall be tested to ASTM C1563. Gaskets shall be compressed when the pipe is fully inserted.
  2. Mechanical joint couplings: Mechanical joint couplings for hubless pipe and fittings shall comply with CISPI 310, ASTM C1277, or ASTM C1540. The elastomeric sealing sleeve shall conform to ASTM C564 and shall be provided with a center stop. Mechanical joint couplings shall be installed in accordance with the manufacturer's instructions.
- K. Joints between polyvinyl chloride (PVC) plastic pipe or fittings shall comply with the following:
1. Solvent cementing: Joint surfaces shall be clean and free of moisture. A purple primer or an ultraviolet purple primer that conforms to ASTM F656 shall be applied. When an ultraviolet primer is used, the installer shall provide an ultraviolet light to the inspector to be used during the inspection. Solvent cement not purple in color and conforming to ASTM D2564 shall be applied to all joint surfaces. The joint shall be made while the cement is wet and shall be in accordance with ASTM D2855. Solvent cement joints shall be permitted above or below ground.
- L. Outdoor vent extensions shall comply with the following:
1. Every building in which plumbing is installed shall have at least one (1) stack the size of which is not less than one-half (1/2) of the required diameter of the building drain, and not less than two (2) inches in diameter. Such stack shall run undiminished in size and as directly as possible from the building drain through to the open air or to a vent header that extends to the open air.
  2. Vent stacks or stack vents shall extend outdoors and terminate to open air.
- M. Vent terminals shall comply with the following:
1. All open vent pipes that extend through a roof shall be terminated at least six (6) inches above the roof, except that where a roof is used by the public or tenants for any purpose, the vent extensions shall be run at least seven (7) feet above the roof.
  2. The juncture of each vent pipe with the roof line shall be made water-tight by an approved flashing.
    - a. Sheet copper for vent pipe flashing shall conform to ASTM B152 and shall weigh not less than eight (8) ounces per square foot.
    - b. Sheet lead for vent pipe flashings shall weight not less than three (3) pounds per square foot for field-constructed flashings and not less than two-and-one-half (2.5) pounds per square foot for prefabricated flashings.

3. Vent terminals shall not be used a flag pole or to support flag poles, television aerials, or similar items, except when the piping has been anchored in an approved manner.
  4. An open vent terminal from a drainage system shall not be located directly beneath any door, operable window, or other air intake opening of the building or of an adjacent building or property line, and any such vent terminal shall not be within ten (10) feet horizontally of such an opening unless it is at least two (2) feet above the top of such opening.
- N. Vent connections shall comply with the following:
1. All individual, branch, and circuit vents shall connect to a vent stack, stack vent, air admittance valve, or extend to the open air.
  2. All vent and branch vent pipes shall be so graded and connected as to drain back to the drainage pipe by gravity.
  3. Every dry vent connecting to a horizontal drain shall connect above the centerline of the horizontal drain pipe.
  4. Every dry vent shall rise vertically to a minimum of six (6) inches above the flood level rim of the highest trap or trapped fixture being vented.
    - a. Exception: When vents for interceptors and isolated floor drains are not located near an adjacent wall, the vent must rise six (6) inches vertically before turning horizontally and continuing to the nearest wall. A cleanout the same size as the vent shall be provided.
  5. A connection between a vent pipe and a vent stack or stack vent shall be made at least six (6) inches above the flood level rim of the highest fixture served by the vent. Horizontal vent pipes forming branch vents, relief vents, or loop vents shall be at least six (6) inches above the flood level rim of the highest fixture served.
- O. Fixture vents shall comply with the following:
1. Each fixture trap shall have a protecting vent located so that the slope and the developed length in the fixture drain from the trap weir to the vent fitting are as indicated in Table 906.1 of the North Carolina Plumbing Code.
  2. The total fall in a fixture drain due to pipe slope shall not exceed the diameter of the fixture drain, nor shall the vent connection to a fixture drain, except for water closets, be below the weir of the trap.
  3. A vent shall not be installed within two (2) pipe diameters of the trap weir.
- P. Each trap and trapped fixture is permitted to be provided with an individual vent. The individual vent shall connect to the fixture drain of the trap or trapped fixture being vented.

### 3.2 FLOOR DRAIN INSTALLATION

- A. Coordinate the final location of all floor drains dedicated to serving equipment with the equipment provider prior to installation.
- B. Floor drains shall be installed with tops and strainers level with the floor slab.

### 3.3 FLOOR SINK INSTALLATION

- A. Coordinate the final location of all floor sinks dedicated to serving equipment with the equipment provider prior to installation.

- B. Floor sinks shall be installed with tops and strainers level with the floor slab.

### 3.4 CLEANOUT INSTALLATION

- A. Plugs shall have raised square or countersunk square heads. Countersunk heads shall be installed where raised heads are a trip hazard.
- B. Cleanouts shall be located in accordance with the following:
1. All horizontal drains shall be provided with cleanouts located not more than one-hundred (100) feet apart.
  2. One cleanout shall be required for every four (4) horizontal forty-five (45) degree changes located in series. A long sweep bend is equivalent to two (2) forty-five (45) degree bends.
  3. A cleanout shall be provided at the base of each waste or soil stack.
  4. There shall be a cleanout at the junction of the building drain and the building sewer. The cleanout shall be outside the building wall and shall be brought up to the finished ground level. An approved two-way cleanout is allowed to be used at this location to serve as a required cleanout for both the building drain and building sewer.
    - a. The cleanout at the junction of the building drain and building sewer shall not be required if the cleanout on a three (3) inch or larger diameter waste stack is located within a developed length of not more than fifteen (15) feet from the building drain and building sewer connections and is extended to the outside of the building.
- C. Cleanout plugs shall not be covered with cement, plaster, or any other permanent finish material. Where it is necessary to conceal a cleanout or to terminate a cleanout in an area subject to vehicular traffic, the covering plate, access door, or cleanout shall be of an approved type designed and installed for this purpose.
- D. Every cleanout shall be installed to open to allow cleaning in the direction of flow of the drainage piping or at right angles thereto.
- E. Cleanouts shall be the same nominal size of the pipe they serve up to four (4) inches. For pipes larger than four (4) inches nominal size, the minimum size of the cleanout shall be four (4) inches.
- F. Cleanouts on six (6) inch and smaller pipes shall be provided with a clearance of not less than eighteen (18) inches for rodding.
- G. Access shall be provided to all cleanouts.
- H. Each horizontal drainage pipe shall be provided with a clean out at the upstream end of the pipe.
1. The following plumbing arrangements are acceptable in lieu of the upstream cleanout:
    - a. P-traps connected to the drainage piping with slip joints or ground joint connections.
    - b. P-traps into which floor drains, shower drains, or tub drains with removable strainers discharge.
    - c. P-traps into which straight through type waste and overflow discharge with the overflow connecting to the top of the tee.
    - d. P-traps into which residential washing machines discharge.

- e. Test tees or cleanouts in a vertical pipe.
- f. Cleanout near the junction of the building drain and the building sewer which may be rodded in both directions.
- g. Water closets for the water closet fixture drain only.
- h. Cast iron cleanout sizing shall be in accordance with ASTM A74 for hub and spigot fittings or CISPI 301 for hubless fittings.

### 3.5 INSPECTION AND TESTING

- A. Refer to specification section 22 01 00 for general inspection and testing requirements and performance requirements of test gauges.
- B. Drainage and vent water test:
  - 1. A water test shall be applied to the drainage system within the building either in its entirety or in sections.
  - 2. If applied to the entire system, all openings in the piping shall be tightly closed, except the highest opening, and the system shall be filled with water to the point of overflow.
  - 3. If the system is tested in sections, each opening shall be tightly plugged except the highest openings of the section under test, and each section shall be filled with water, but no section shall be tested with less than a ten (10) foot head of water.
  - 4. In testing successive sections, at least the upper ten (10) feet of the next preceding section shall be tested so that no joint or pipe in the building, except the uppermost ten (10) feet of the system shall have been submitted to a test of less than a ten (10) foot head of water.
  - 5. This pressure shall be held for at least fifteen (15) minutes. Then system shall then be tight at all points.
- C. Drainage and vent final test:
  - 1. The final test of the completed drainage and vent systems shall be visual and in sufficient detail to determine compliance with the provisions of the contract documents.

**END OF SECTION**





**SECTION 22 33 00****ELECTRIC DOMESTIC WATER HEATERS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes:
  - 1. Storage type water heaters.

**1.2 REFERENCES**

- A. American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE):
  - 1. ASHRAE 90.1 – Energy Standard for Buildings Except Low-Rise Residential Buildings.
- B. ASME International:
  - 1. ASME PTC 25 – Pressure Relief Devices.
  - 2. ASME Section VIII – Boiler and Pressure Vessel Code - Pressure Vessels.
- C. National Fire Protection Association (NFPA):
  - 1. NFPA 70 – National Electrical Code.

**1.3 SUBMITTALS**

- A. Refer to specification section 22 01 05 for submittal requirements, definitions, and procedures.
- B. Submit manufacturer's data for the following:
  - 1. Storage type water heaters.

**1.4 OPERATION AND MAINTENANCE MANUALS**

- A. Refer to specification section 22 01 05 for submittal requirements, definitions, and procedures.
- B. Submit manufacturer's data, manufacturer's warranties, and operation and maintenance instructions for the following:
  - 1. Storage type water heaters.

**PART 2 - PRODUCTS****2.1 STORAGE TYPE WATER HEATERS**

- A. Type: Factory-assembled and wired, electric, vertical storage.
- B. Capacity: As indicated in water heater schedule on drawings.
- C. Tank: Glass-lined welded steel; four (4) inches diameter inspection port, thermally insulated with minimum two (2) inches polyurethane encased in corrosion-resistant steel jacket; baked-on enamel finish.

- D. Controls: Automatic immersion water thermostat; externally adjustable temperature range, flanged or screw-in nichrome elements, high temperature limit thermostat.
- E. Accessories: Brass water connections and dip tube, drain valve, magnesium anode, and ASME rated temperature and pressure relief valve.
- F. Heating elements: Flange-mounted immersion elements; individual elements sheathed with corrosion-resistant metal alloy.
- G. Electrical characteristics: As indicated in water heater schedule on drawings.

### **PART 3 - EXECUTION**

#### **3.1 STORAGE TYPE WATER HEATER INSTALLATION**

- A. Maintain manufacturer's recommended clearances.
- B. Install discharge piping from relief valves and drain valves as indicated in detail on drawings.
- C. Install water heater trim and accessories furnished loose for field mounting.
- D. Install electrical devices furnished loose for field mounting.

**END OF SECTION**

**SECTION 22 40 00****PLUMBING FIXTURES****PART 1 GENERAL****1.1 SUMMARY**

- A. Section includes:
  - 1. Flush valve water closets.
  - 2. Urinals.
  - 3. Lavatories.
  - 4. Electric water coolers.
  - 5. Sinks.
  - 6. Showers.
  - 7. Custodial sinks.
  - 8. Recessed valve boxes for automatic clothes washers.
  - 9. ADA compliant insulation kit.

**1.2 REFERENCES**

- A. American National Standards Institute:
  - 1. ANSI A117.1 – Accessible and Usable Buildings and Facilities.
- B. United States Department of Justice:
  - 1. ADA Standards for Accessible Design.

**1.3 SUBMITTALS**

- A. Refer to specification section 22 01 05 for submittal requirements, definitions, and procedures.
- B. Submit manufacturer's data for the following:
  - 1. Flush valve water closets.
  - 2. Urinals.
  - 3. Lavatories.
  - 4. Electric water coolers.
  - 5. Sinks.
  - 6. Showers.
  - 7. Custodial sinks.
  - 8. Recessed valve boxes for automatic clothes washers.
  - 9. ADA compliant insulation kit.

**1.4 OPERATION AND MAINTENANCE MANUALS**

- A. Refer to specification section 22 01 05 for submittal requirements, definitions, and procedures.

- B. Submit manufacturer's data, manufacturer's warranties, and operation and maintenance instructions for the following:
  - 1. Flush valve water closets.
  - 2. Urinals.
  - 3. Lavatories.
  - 4. Electric water coolers.
  - 5. Sinks.
  - 6. Showers.
  - 7. Custodial sinks.
  - 8. Recessed valve boxes for automatic clothes washers.
  - 9. ADA compliant insulation kit.

## **PART 2 PRODUCTS**

### **2.1 FLUSH VALVE WATER CLOSETS**

- A. As specified in plumbing fixture schedule on drawings.

### **2.2 URINALS**

- A. As specified in plumbing fixture schedule on drawings.

### **2.3 LAVATORIES**

- A. As specified in plumbing fixture schedule on drawings.

### **2.4 ELECTRIC WATER COOLERS**

- A. As specified in plumbing fixture schedule on drawings.

### **2.5 SINKS**

- A. As specified in plumbing fixture schedule on drawings.

### **2.6 SHOWERS**

- A. As specified in plumbing fixture schedule on drawings.

### **2.7 CUSTODIAL SINKS**

- A. As specified in plumbing fixture schedule on drawings.

### **2.8 AUTOMATIC CLOTHES WASHERS**

- A. Fixtures shall be provided by others. The contractor shall provide final connections to the fixture.
- B. As specified in plumbing fixture schedule on drawings.

### **2.9 ADA COMPLIANT INSULATION KIT**

- A. Safety covers conforming to ANSI A117.1 and consisting of insulation kit of molded closed cell antimicrobial vinyl construction, minimum 1/8-inch thick, white color, for

insulating tailpiece, P-trap, valves, and supply piping. Furnish with cleanout angle valve access covers.

### **PART 3 EXECUTION**

#### **3.1 PREINSTALLATION**

- A. Verify walls and floor finishes are prepared and ready for installation of fixtures.
- B. Confirm millwork is constructed with adequate provision for installation of countertop lavatories and sinks.
- C. Review millwork shop drawings. Confirm location and size of fixtures and openings before rough in and installation.
- D. Rough-in fixture piping connections in accordance with minimum sizes indicated in plumbing fixture schedule for each particular fixture.

#### **3.2 GENERAL INSTALLATION REQUIREMENTS**

- A. For ADA compliant fixtures, installation shall comply with the requirements of the latest edition of the Department of Justice's document *ADA Standards for Accessible Design*. These guidelines shall apply unless superseded by more stringent state or local requirements.
- B. The supply lines and fittings for every plumbing fixture shall be installed so as to prevent backflow.
- C. Plumbing fixtures shall be installed so as to afford easy access for cleaning both the fixture and the area around the fixture.
- D. Fixtures shall be set level and in proper alignment with reference to adjacent walls.
- E. Joints formed where fixtures come in contact with walls or floors shall be sealed as indicated.
- F. Slip-joint connections are prohibited.

#### **3.3 WATER CLOSET INSTALLATION**

- A. Connections between the drain and wall-hung water closets shall be made with an approved extension nipple or horn adaptor. The water closet shall be bolted to the hanger with corrosion-resistant bolts or screws. Joints shall be sealed with an approved elastomeric gasket, flange-to-fixture connection complying with ASME A112.4.3, or an approved setting compound. Wall-hung water closets shall be supported by a concealed metal carrier that is attached to the building structural members so that strain is not transmitted to the closet connector or any other part of the plumbing system.
- B. Seal fixture connection to wall with white acrylic caulk.
- C. A water closet shall not be set closer than fifteen (15) inches from its center to any side wall, partition, vanity, or other obstruction, or closer than thirty (30) inches center-to-center between adjacent fixtures. There shall be at least twenty-one (21) inches clearance in front of the water closet to any wall, fixture, or door.

#### **3.4 URINAL INSTALLATION**

- A. Connect fixture securely so that the carrier bears the entire weight of the fixture. None of the load shall be transferred to the piping system. Seal fixture connection to wall with white acrylic caulk.

- B. A urinal shall not be set closer than fifteen (15) inches from its center to any side wall, partition, vanity, or other obstruction, or closer than thirty (30) inches center-to-center between adjacent fixtures. There shall be at least twenty-one (21) inches clearance in front of the urinal to any wall, fixture, or door.

### **3.5 LAVATORY INSTALLATION**

- A. Connect fixture securely so that the carrier bears the entire weight of the fixture. None of the load shall be transferred to the piping system. Seal fixture connection to wall with white acrylic caulk.
- B. Install each fixture with trap easily removable for servicing and cleaning.
- C. A lavatory shall not be set closer than fifteen (15) inches from its center to any side wall, partition, vanity, or other obstruction, or closer than thirty (30) inches center-to-center between adjacent fixtures. There shall be at least twenty-one (21) inches clearance in front of the lavatory to any wall, fixture, or door.

### **3.6 ELECTRIC WATER COOLER INSTALLATION**

- A. Connect fixture securely so that the mounting bracket bears the entire weight of the fixture. None of the load shall be transferred to the piping system. Seal fixture connection to wall with white acrylic caulk.
- B. Install each fixture with filter easily removable for replacement.
- C. Adjust stops or valves for intended to control water flow rate to fixtures without splashing, noise, or overflow.

### **3.7 SINK INSTALLATION**

- A. Connect fixture securely so that the countertop bears the entire weight of the fixture. None of the load shall be transferred to the piping system. Seal fixture connection to countertop with seal of white putty, white acrylic caulk, or concealed vinyl gasket.
- B. Install each fixture with trap easily removable for servicing and cleaning.

### **3.8 SHOWER INSTALLATION**

- A. Install shower trim in accordance with the architectural plans.

### **3.9 CUSTODIAL SINK INSTALLATION**

- A. Basin shall be set in a bed of mortar and allowed to set before pipe connection is made. Waste outlet connection to piping shall be made with threaded fittings. When installed on an above grade floor, install fixture with trap easily removable for servicing and cleaning.

### **3.10 AUTOMATIC CLOTHES WASHER INSTALLATION**

- A. Confirm that the water supply connection is protected against backflow by an integral air gap prior to installation. Where the fixture does not have an integral air gap, provide a backflow preventer in accordance with the North Carolina Plumbing Code.
- B. Securely support valve box from structural members on both sides.

### **3.11 ADA COMPLIANT INSULATION KIT INSTALLATION**

- A. Install on each lavatory or sink with exposed piping, including those that are not specified as ADA compliant fixtures.

- B. Installation shall allow for access to cleanout plugs and valves without removal of the entire insulation kit.

**END OF SECTION**

