

SECTION 02 4119  
SELECTIVE DEMOLITION

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

- A. This section describes each Prime Contractor's requirements for:
  - 1. Selective removal and subsequent disposal of portions of existing building indicated on drawings and as required to accommodate new construction.
  - 2. Salvage of existing fixtures, materials, and equipment indicated.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Applicable provisions of Bidding Requirements, Contract Requirements in Division 0 and all applicable Division 1 sections.

1.03 SUBMITTALS

- A. Schedule: Indicate proposed sequence of operations for selective demolition Work.
  - 1. Include coordination for shut-off, capping, and continuation of utility services.
  - 2. Indicate provisions for dust and noise control.
  - 3. Provide detailed sequence of demolition work to ensure uninterrupted progress of City's site operations.
  - 4. Coordinate with City's continuing occupation of portions of existing building and site with City's partial occupation of completed phases.
  - 5. Submit for review before commencing selective demolition.
- B. Photographs - Submit photographs of existing conditions that might be misconstrued as damage related to selective demolition operations.

1.04 JOB CONDITIONS

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- A. Condition of Structures: City assumes no responsibility for actual condition of items or structures to be demolished.
    - 1. City will maintain conditions existing at time of inspection for bidding purposes insofar as practical. Minor variation within structure may occur by City's removal and salvage operations prior to start of selective demolition.
  - B. Damages: Repair damages caused to adjacent facilities by selective demolition work.
  - C. Traffic: Conduct selective demolition operations and debris removal to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.
    - 1. Do not close, block, or obstruct streets, walks, or other occupied or used facilities without prior written permission from authorities having jurisdiction. Provide alternate routes if required.
  - D. Flame Cutting: Do not use open flame in occupied spaces. Verify area is clear of flammable materials before flame cutting. Maintain portable fire extinguishers while flame cutting.
  - E. Utility Services: Maintain existing utilities indicated to remain and protect them against damage during demo operations.

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1. Do not interrupt utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions.
2. Maintain fire protection services during selective demolition.

F. Environmental Controls: Limit dust and dirt migration.

## PART 2 PRODUCTS NOT USED

## PART 3 EXECUTION

### 3.01 PREPARATION

- A. Protections: Provide temporary barricades and other forms of protection to protect City personnel and general public from injury due to selective demolition.
1. Provide measure to allow free and safe passage of City personnel and general public to occupied portion of the building.
  2. Provide shoring, bracing, and temporary supports to prevent movement, settlement, or collapse of structure or element to be demolished and adjacent construction to remain.
  3. Protect existing construction that is to remain from damage.
  4. Erect temporary partitions to separate areas of noisy or dusty demolition.
  5. Provide temporary weather protection during interval between selective demolition operations which exposes interior of building to weather or water and subsequent construction
- B. Utilities: Locate, identify, stub off, and disconnect utility services that are not indicated to remain.

### 3.02 SELECTIVE DEMOLITION

- A. Remove portions of the existing as shown on drawings in manner for the new work to be installed and protecting the existing to remain.
- B. Recycle all materials removed in ascendance to City regulations.

### 3.03 DEMOLITION OF STRUCTURES where shown on drawings

- A. General: Perform selective demolition work in systematic manner and approximately in reverse order of construction. Comply with demolition plan and governing regulations.
1. Demolish foundation walls to minimum 12 inches below ground surface. Demolish and remove below-grade wood or metal construction. Break up below grade concrete slabs.
  2. Remove complete slab-on-grade in areas indicated for selective demolition.
  3. Saw cut slab-on-grade as required to remove indicated utilities and for new construction.

### 3.04 MATERIALS

- A. Salvage Items: Where indicated on drawings as "SALVAGE" carefully remove indicated items, clean, store, and turn over to City at location directed on-site.
- B. All materials resulting from selective demolition operations except where indicated as salvaged shall become the property of the Contractor. Remove from site and dispose of legally. Burning of materials is not allowed.

3.05 CLEANUP AND REPAIR

- A. General: Upon completion of demolition work, remove temporary facilities and all demolished materials. Leave interior spaces and site broom clean.
- B. Repairs: Repair demolition performed in excess of that required or indicated. Return elements of construction and surfaces to remain to condition existing prior to start of operations.

END OF SECTION 02 4119

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SECTION 03 0100  
MAINTENANCE OF CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Scope of Work: As indicated on drawings for the following:
- B. Cleaning of existing concrete surfaces.
- C. Repair of exposed structural, shrinkage, and settlement cracks.
- D. Resurfacing of concrete surfaces having spalled areas and other damage.
- E. Repair of deteriorated concrete.
- F. Repair of internal concrete reinforcement.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Finishing of concrete surface to tolerance; floating, troweling, and similar operations; curing.

1.03 REFERENCE STANDARDS

- A. ASTM A775/A775M - Standard Specification for Epoxy-Coated Steel Reinforcing Bars 2019.
- B. ASTM A996/A996M - Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement 2016.
- C. ASTM C33/C33M - Standard Specification for Concrete Aggregates 2018.
- D. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens 2021.
- E. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50 mm] Cube Specimens) 2021.
- F. ASTM C150/C150M - Standard Specification for Portland Cement 2022.
- G. ASTM C348 - Standard Test Method for Flexural Strength of Hydraulic-Cement Mortars 2021.
- H. ASTM C404 - Standard Specification for Aggregates for Masonry Grout 2018.
- I. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete 2020a.
- J. ASTM C928/C928M - Standard Specification for Packaged, Dry, Rapid-Hardening Cementitious Materials for Concrete Repairs 2020a.
- K. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete 2021.
- L. ASTM C1708/C1708M - Standard Test Methods for Self-leveling Mortars Containing Hydraulic Cements 2019.

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- M. AWS D1.4/D1.4M - Structural Welding Code - Steel Reinforcing Bars 2018, with Amendment (2020).
- N. ICRI 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair 2013.

#### 1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Indicate product standards, physical and chemical characteristics, technical specifications, limitations, maintenance instructions, and general recommendations regarding each material.

#### 1.05 QUALITY ASSURANCE

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

#### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Comply with manufacturers' instructions for storage, shelf life limitations, and handling of products.

### PART 2 PRODUCTS

#### 2.01 CLEANING MATERIALS

- A. Degreaser:
  - 1. Manufacturers:
    - a. Euclid Chemical Company; Euco Clean and Strip: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
    - b. L&M Construction Chemicals, Inc, a subsidiary of Laticrete International, Inc; CITREX: [www.lmcc.com/#sle](http://www.lmcc.com/#sle).
    - c. Nox-Crete, Inc; Bio-Clean Plus: [www.nox-crete.com/#sle](http://www.nox-crete.com/#sle).
    - d. SpecChem, LLC; Orange Peel-Citrus Cleaner: [www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).
    - e. United Gilsonite Laboratories; DRYLOK<sup>®</sup> Concrete Cleaner and Degreaser: [www.ugl.com/#sle](http://www.ugl.com/#sle).
    - f. W. R. Meadows, Inc: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
- B. Detergent: Non-ionic detergent.
- C. Alkaline Cleaning Agent: as recommended.
- D. Acidic Cleaning Agent:
  - 1. Manufacturers:
    - a. United Gilsonite Laboratories; DRYLOK<sup>®</sup> Concrete and Masonry Etch and Cleaner: [www.ugl.com/#sle](http://www.ugl.com/#sle).
- E. Strippers and Cleaners for Removal of Existing Coatings:
  - 1. Manufacturers:
    - a. Nox-Crete, Inc; Deco-Strip Series: [www.nox-crete.com/#sle](http://www.nox-crete.com/#sle).
    - b. Nox-Crete, Inc; Deco-Peel Series: [www.nox-crete.com/#sle](http://www.nox-crete.com/#sle).

- F. Blasting Medium: as required and allowed.

## 2.02 CEMENTITIOUS PATCHING AND REPAIR MATERIALS

- A. Manufacturers:
  - 1. Adhesives Technology Corporation: [www.atcepoxy.com/#sle](http://www.atcepoxy.com/#sle).
  - 2. ARDEX Engineered Cements: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
  - 3. Dayton Superior Corporation: [www.daytonsuperior.com/#sle](http://www.daytonsuperior.com/#sle).
  - 4. Euclid Chemical Company: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
  - 5. Kaufman Products Inc: [www.kaufmanproducts.net/#sle](http://www.kaufmanproducts.net/#sle).
  - 6. Master Builders Solutions by BASF: [www.master-builders-solutions.basf.us/en-us/#sle](http://www.master-builders-solutions.basf.us/en-us/#sle).
  - 7. The QUIKRETE Companies: [www.quikrete.com/#sle](http://www.quikrete.com/#sle).
  - 8. SpecChem, LLC: [www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).
  - 9. Stauf USA LLC: [www.staufusa.com/#sle](http://www.staufusa.com/#sle).
  - 10. W. R. Meadows, Inc: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
- B. Bonding Slurry: Water-based latex admixture complying with ASTM C1059/C1059M, combined with Portland cement and sand in accordance with admixture manufacturer's instructions.
  - 1. Admixture Manufacturers:
    - a. Dayton Superior Corporation: [www.daytonsuperior.com/#sle](http://www.daytonsuperior.com/#sle).
    - b. Euclid Chemical Company; AKKRO-7T: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
    - c. SpecChem, LLC; Strong Bond - Acrylic Bonder: [www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).
    - d. W. R. Meadows, Inc; Acry-lok: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
- C. Cementitious Resurfacing Mortar: One- or two-component, factory-mixed, polymer-modified cementitious mortar designed for continuous thin-coat application.
  - 1. In-place material resistant to freeze/thaw conditions.
  - 2. Mixed with water or latex type bonding agent in proportions as recommended by manufacturer.
  - 3. Integral corrosion inhibitor.
  - 4. Recommended Thickness: Feather edge to 1/8 inch.
  - 5. Color: Gray.
  - 6. Manufacturers:
    - a. SILPRO Corporation; Raeco Skimwall: [www.silpro.com/#sle](http://www.silpro.com/#sle).
    - b. Master Builders Solutions by BASF; MasterEmaco T 1061DR: [www.master-builders-solutions.basf.us/en-us/#sle](http://www.master-builders-solutions.basf.us/en-us/#sle).
    - c. SpecChem, LLC; Duo Patch: [www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).
- D. Cementitious Repair Mortar, Trowel Grade: One- or two-component, factory-mixed, polymer-modified cementitious mortar.
  - 1. In-place material resistant to freeze/thaw conditions.
  - 2. Mixed with water or latex type bonding agent in proportions as recommended by manufacturer.
  - 3. Dry Material: Complies with ASTM C928/C928M.
  - 4. Integral corrosion inhibitor.
  - 5. Manufacturers:
    - a. Koster American Corporation: [www.kosterusa.com/#sle](http://www.kosterusa.com/#sle).
    - b. Master Builders Solutions by BASF; MasterEmaco T 1060DR: [www.master-builders-solutions.basf.us/en-us/#sle](http://www.master-builders-solutions.basf.us/en-us/#sle).
- E. Cementitious Repair Mortar, Form and Pour/Pump Grade: Flowable, one- or two-component, factory-mixed, polymer-modified cementitious mortar; in-place material resistant to freeze/thaw conditions.

1. Mixed with water in proportions as recommended by manufacturer.
  2. Integral corrosion inhibitor.
  3. Manufacturers:
    - a. Dayton Superior Corporation: [www.daytonsuperior.com/#sle](http://www.daytonsuperior.com/#sle).
    - b. Euclid Chemical Company; EUCOCRETE: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
    - c. Euclid Chemical Company; EUCOCRETE SUPREME: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
    - d. Five Star Products, Inc; Five Star Structural Concrete: [www.fivestarproducts.com/#sle](http://www.fivestarproducts.com/#sle).
    - e. Kaufman Products Inc; Patchwell Deep: [www.kaufmanproducts.net/#sle](http://www.kaufmanproducts.net/#sle).
    - f. Master Builders Solutions by BASF; MasterEmaco S 440: [www.master-builders-solutions.basf.us/en-us/#sle](http://www.master-builders-solutions.basf.us/en-us/#sle).
    - g. SpecChem, LLC; Duo Patch; [www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).
    - h. SpecChem, LLC; RepCon H-350; [www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).
    - i. W. R. Meadows, Inc; Meadow-Crete FNP: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
- F. Cementitious Pavement Repair Mortar: Fast hardening, flowable; composed of cement, sand, and additives; capable of setting in cold weather conditions without the aid of chloride- or gypsum-based accelerators; in-place material resistant to freeze/thaw conditions.
1. Dry Material: Complies with ASTM C928/C928M.
  2. Integral corrosion inhibitor.
  3. Time To Open To Traffic: 6 hours, maximum.
  4. Time to Top-Coating: 4 hours, maximum.
  5. Manufacturers:
    - a. ARDEX Engineered Cements; ARDEX ERM: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
    - b. ARDEX Engineered Cements; ARDEX CD: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
    - c. ARDEX Engineered Cements; ARDEX Fine CD: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
    - d. Dayton Superior Corporation: [www.daytonsuperior.com/#sle](http://www.daytonsuperior.com/#sle).
    - e. Kaufman Products Inc; Duracrete II: [www.kaufmanproducts.net/#sle](http://www.kaufmanproducts.net/#sle).
    - f. Kaufman Products Inc; Duracrete II FT: [www.kaufmanproducts.net/#sle](http://www.kaufmanproducts.net/#sle).
    - g. SpecChem, LLC; RepCon 928: [www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).
    - h. SpecChem, LLC; RepCon 928 FS: [www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).
- G. Cementitious Hydraulic Waterstop: Very fast setting, low slump, hand formable, and capable of stopping active water leaks; in-place material resistant to freeze/thaw conditions.
1. Manufacturers:
    - a. Dayton Superior Corporation: [www.daytonsuperior.com/#sle](http://www.daytonsuperior.com/#sle).
    - b. Euclid Chemical Company; SPEED PLUG: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
    - c. Kaufman Products Inc; SurePlug - regular set: [www.kaufmanproducts.net/#sle](http://www.kaufmanproducts.net/#sle).
    - d. Kaufman Products Inc; HiCap: [www.kaufmanproducts.net/#sle](http://www.kaufmanproducts.net/#sle).
    - e. SpecChem, LLC; SpecPlug or Super SpecPlug; [www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).
    - f. United Gilsonite Laboratories; FAST PLUG □ Hydraulic Cement: [www.ugl.com/#sle](http://www.ugl.com/#sle).
    - g. W. R. Meadows, Inc; Meadow-Plug or Meadow-Patch 5: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
- H. Exterior Self-Leveling Concrete Topping: Portland cement-based; suitable as wear surface topping in exterior and wet locations as well as underlayment for applied materials.
1. Compressive Strength: 4300 pounds per square inch, minimum, at 28 days, when tested in accordance with ASTM C109/C109M, air cured.
  2. Flexural Strength: 1000 pounds per square inch, minimum, at 28 days, when tested in accordance with ASTM C348.
  3. Manufacturers:
    - a. ARDEX Engineered Cements; ARDEX K301: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).



- b. Kaufman Products Inc; SureFlow 042: [www.kaufmanproducts.net/#sle](http://www.kaufmanproducts.net/#sle).
- I. Exterior Self-Leveling Concrete Floor Topping:
  - 1. Minimum Compressive Strength at 28 Days, ASTM C1708/C1708M: 7,000 pounds per square inch.
  - 2. Manufacturers:
    - a. LATICRETE International, Inc; LATICRETE SUPERCAP SC650-MC: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
    - b. LATICRETE International, Inc; NXT Level SP: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
- J. Pre-Blended Concrete Mix for Small Projects: Construction-grade Portland cement uniformly blended with aggregates and other approved concrete ingredients, requiring only the addition of water.
  - 1. Compressive Strength: 4000 pounds per square inch, minimum, at 28 days, when tested in accordance with ASTM C39/C39M.

## 2.03 EPOXY PATCHING AND REPAIR MATERIALS

- A. Manufacturers:
  - 1. Adhesives Technology Corporation: [www.atcepoxy.com/#sle](http://www.atcepoxy.com/#sle).
  - 2. Chase Construction Products: [www.chasecorp.com/#sle](http://www.chasecorp.com/#sle).
  - 3. Dayton Superior Corporation: [www.daytonsuperior.com/#sle](http://www.daytonsuperior.com/#sle).
  - 4. Euclid Chemical Company: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
  - 5. Kaufman Products Inc.: [www.kaufmanproducts.net/#sle](http://www.kaufmanproducts.net/#sle).
  - 6. SpecChem, LLC: [www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).
  - 7. Sto Corp: [www.stocorp.com/#sle](http://www.stocorp.com/#sle).
  - 8. W. R. Meadows, Inc: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
- B. Epoxy Repair Mortar: Epoxy resin mixed with aggregate and other materials in accordance with manufacturer's instructions for purpose intended; comply with pot life and workability limits.
  - 1. Manufacturers:
    - a. ARDEX Engineered Cements; ARDEX BACA: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
    - b. Dayton Superior Corporation: [www.daytonsuperior.com/#sle](http://www.daytonsuperior.com/#sle).
    - c. Euclid Chemical Company; DURALFLEX FASTPATCH: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
    - d. Kaufman Products Inc; SurePox Mortar, SurePox HMLV, or SurePox HMLV Class B: [www.kaufmanproducts.net/#sle](http://www.kaufmanproducts.net/#sle).
    - e. LATICRETE International; SPARTACOTE™ Epoxy Fill Coat: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
    - f. Rust-Oleum Corporation; TurboKrete Concrete Patching Compound: [www.rustoleum.com/#sle](http://www.rustoleum.com/#sle).
    - g. SpecChem, LLC; SpecPox 1000, SpecPox 2000, SpecPox 3000 or SpecPox 3000 FS: [www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).
    - h. W. R. Meadows, Inc; Rezi-Weld Gel Paste, Rezi-Weld Gel Paste State, Rezi-Weld 1000, Rezi-Weld LV, or Rezi-Weld LV State: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
- C. Epoxy Injection Adhesive:
  - 1. Manufacturers:
    - a. Dayton Superior Corporation: [www.daytonsuperior.com/#sle](http://www.daytonsuperior.com/#sle).
    - b. Euclid Chemical Company; DURAL FAST SET LV: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
    - c. Kaufman Products Inc; SurePox HM, SurePox HMLV, SurePox HMLV Class B, or SurePox HMSLV: [www.kaufmanproducts.net/#sle](http://www.kaufmanproducts.net/#sle).
    - d. SpecChem, LLC; SpecPox 1000; [www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).

- e. W. R. Meadows, Inc; Rezi-Weld LV, Rezi-Weld LV State, Rezi-Weld (IP), or Rezi-Weld Gel Paste: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
- D. Epoxy Bonding Adhesive: Non-sag, two-component, 100 percent solids; recommended by manufacturer for purpose and conditions under which used.
- 1. Non-Load-Bearing Applications: ASTM C881/C881M Type I, II, III, IV, or V, whichever is appropriate to application.
  - 2. Load-Bearing Applications: ASTM C881/C881M Type IV or V, whichever is appropriate to application.
  - 3. Other Applications: ASTM C881/C881M Type as appropriate to application.
  - 4. Manufacturers:
    - a. ARDEX Engineered Cements; ARDEX BACA: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
    - b. Dayton Superior Corporation: [www.daytonsuperior.com/#sle](http://www.daytonsuperior.com/#sle).
    - c. Euclid Chemical Company; DURAL FAST SET LV: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
    - d. Euclid Chemical Company; DURALFLEX GEL: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
    - e. Euclid Chemical Company; DURALFLEX LV: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
    - f. Euclid Chemical Company; DURAL 452 GEL, DURAL 452 LV, or DURAL 452 MV: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
    - g. Kaufman Products Inc; SurePoxo HM Gel: [www.kaufmanproducts.net/#sle](http://www.kaufmanproducts.net/#sle).
    - h. Pecora; Dynapoxo Healer/Sealer: [www.pecora.com/#sle](http://www.pecora.com/#sle).
    - i. Pecora; Dynapoxo Low-Mod Epoxy: [www.pecora.com/#sle](http://www.pecora.com/#sle).
    - j. SpecChem, LLC; SpecPoxo 2000: [www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).
    - k. SpecChem, LLC; SpecPoxo 3000 FS: [www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).
    - l. W. R. Meadows, Inc; Rezi-Weld Gel Paste: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
    - m. W. R. Meadows, Inc; Rezi-Weld Gel Paste State: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
    - n. W. R. Meadows, Inc; Rezi-Weld 1000: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).

## 2.04 URETHANE PATCHING AND REPAIR MATERIALS

- A. Manufacturers:
- 1. Adhesives Technology Corporation: [www.atcepoxy.com/#sle](http://www.atcepoxy.com/#sle).
  - 2. ARDEX Engineered Cements: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
  - 3. Dayton Superior Corporation: [www.daytonsuperior.com/#sle](http://www.daytonsuperior.com/#sle).
  - 4. Euclid Chemical Company: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
- B. Polyurea-Modified Repair Gel: Rapid setting, two-component, 100 percent solids; use with or without aggregate to repair cracks and spalls in concrete surfaces.
- 1. Manufacturers:
    - a. Citadel Floor Finishing Systems, a division of Rust-Oleum Corporation; CFFS Fortification Formula: [www.citadelfloors.com/#sle](http://www.citadelfloors.com/#sle).
    - b. Rust-Oleum Corporation; Instapatch Ultra Rapid Curing Concrete Repair: [www.rustoleum.com/#sle](http://www.rustoleum.com/#sle).
- C. Polyurethane Repair Gel: Rapid setting, two-component; use with or without aggregate to repair cracks and spalls in concrete surfaces.
- 1. Manufacturers:
    - a. ARDEX Engineered Cements; ARDEX ArdiFix: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
    - b. Dayton Superior Corporation: [www.daytonsuperior.com/#sle](http://www.daytonsuperior.com/#sle).
    - c. Euclid Chemical Company; EUCO QWIKstitch: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
    - d. Rust-Oleum Corporation; Fast Cure High Strength Concrete Repair: [www.rustoleum.com/#sle](http://www.rustoleum.com/#sle).
- D. Hybrid Urethane Patching Material: Rapid setting, two-component, 100 percent solids; for rapid joint repair and crack filling where no future slab movement is anticipated.

## KINGSESSING LIBRARY BUILDING RENOVATIONS AND SITE IMPROVEMENTS

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### MAINTENANCE OF CONCRETE

1. Manufacturers:
  - a. Curecrete Distribution, Inc; CreteFill Spall Repair: [www.curecrete.com/#sle](http://www.curecrete.com/#sle).
  - b. Curecrete Distribution, Inc; CreteFill Crack Repair EZ Shave: [www.curecrete.com/#sle](http://www.curecrete.com/#sle).

## 2.05 ACCESSORIES

- A. Anchoring Adhesive: Self-leveling or non-sag as applicable.
  1. Self-Leveling Polyester-Based Products:
    - a. W. R. Meadows, Inc; Poly-Grip: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
  2. Self-Leveling Epoxy Products:
    - a. Euclid Chemical Company; DURAL FAST SET LV: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
    - b. SpecChem, LLC; SpecPoxy 2000; [www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).
    - c. W. R. Meadows, Inc; Rezi-Weld 1000, Rezi-Weld (IP), or Rezi-Weld 3/2: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
  3. Non-Sag Epoxy Products:
    - a. Dayton Superior Corporation: [www.daytonsuperior.com/#sle](http://www.daytonsuperior.com/#sle).
    - b. Euclid Chemical Company; DURAL FAST SET GEL: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
    - c. SpecChem, LLC; SpecPoxy 3000 or SpecPoxy 3000 FS: [www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).
    - d. W. R. Meadows, Inc; Rezi-Weld Gel Paste or Rezi-Weld Gel Paste State: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
- B. Portland Cement: ASTM C150/C150M, Type I, grey.
- C. Sand: ASTM C33/C33M or ASTM C404; uniformly graded, clean.
- D. Water: Clean and potable.
- E. Reinforcing Steel: Deformed bars, ASTM A996/A996M Grade 40 (280), Type A.
  1. Epoxy coated in accordance with ASTM A775/A775M.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that surfaces are ready to receive work.
- B. Beginning of installation means acceptance of substrate.

### 3.02 PREPARATION

- A. Prepare concrete surfaces to be repaired according to ICRI 310.2R.

### 3.03 CLEANING EXISTING CONCRETE

- A. Clean concrete surfaces of dirt or other contamination using the gentlest method that is effective.
  1. Try the gentlest method first, then, if not clean enough, use a less gentle method taking care to watch for impending damage.
  2. Clean out cracks and voids using same methods.

- B. The following are acceptable cleaning methods, in order from gentlest to less gentle:
  - 1. Water washing using low-pressure, maximum of 100 psi, and, if necessary, brushes with natural or synthetic bristles.
  - 2. Increasing the water washing pressure to maximum of 400 psi.
  - 3. Adding detergent to washing water; with final water rinse to remove residual detergent.
  - 4. Steam-generated low-pressure hot-water washing.

### 3.04 PAINT AND GRAFFITI REMOVAL

- A. Provide paint and graffiti removal from existing concrete as indicated on drawings.

### 3.05 CONCRETE STRUCTURAL MEMBER REPAIR

- A. See drawings for specific areas to be repaired.
- B. Remove broken and soft concrete at least 1/4 inch deep.
- C. Mechanically cut away damaged portions of reinforcement.
- D. Remove corrosion from steel and clean mechanically.
- E. Blast clean remaining exposed reinforcement surfaces.
- F. Repair by welding new bar reinforcement to existing reinforcement using sleeve splices.
  - 1. Perform welding work in accordance with AWS D1.4/D1.4M.
  - 2. Make welded sleeve splices to achieve strength to exceed strength of new reinforcement.
- G. Follow repair product manufacturer's written installation instructions.
- H. Cover exposed steel reinforcement with epoxy mortar.
- I. Work epoxy mortar into broken surface and build up patch to match original.
- J. Feather edges of repairs flush to sound surface and trowel surface to match surrounding area.

### 3.06 CRACK REPAIR USING EPOXY ADHESIVE INJECTION

- A. Repair exposed cracks as indicated on drawings.
- B. Provide temporary entry ports spaced to accomplish movement of fluids between ports; no deeper than the depth of the crack to be filled or port size diameter no greater than the thickness of the crack. Provide temporary seal at concrete surface to prevent leakage of adhesive.
- C. Inject adhesive into ports under pressure using equipment appropriate for particular application.
- D. Begin injection at lower entry port and continue until adhesive appears in adjacent entry port. Continue from port to port until entire crack is filled.
- E. Remove temporary seal and excess adhesive.
- F. Clean surfaces adjacent to repair and blend finish.

3.07 CONCRETE SURFACE REPAIR USING CEMENTITIOUS MATERIALS

- A. Clean concrete surfaces, cracks, and joints of dirt, laitance, corrosion, and other contamination using method(s) specified above and allow to dry.
- B. Apply coating of bonding agent to entire concrete surface to be repaired.
- C. Fill voids with cementitious mortar flush with surface.
- D. Apply repair mortar by steel trowel to a minimum thickness of 1/4 inch over entire surface, terminating at a vertical change in plane on all sides.
- E. Trowel finish to match adjacent concrete surfaces.

END OF SECTION 03 0100

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## SECTION 031000

### CONCRETE FORMING AND ACCESSORIES

#### 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. Form-facing material for cast-in-place concrete.
- 2. Form liners.
- 3. Shoring, bracing, and anchoring.

- B. Related Requirements:

- 1. Section 321313 "Concrete Paving" for formwork related to concrete pavement and walks.
- 2. Section 321316 "Decorative Concrete Paving" for formwork related to decorative concrete pavement and walks.

##### 1.3 DEFINITIONS

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

##### 1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
  - 1. Review the following:

- a. Special inspection and testing and inspecting agency procedures for field quality control.
- b. Construction, movement, contraction, and isolation joints
- c. Forms and form-removal limitations.
- d. Anchor rod and anchorage device installation tolerances.

## 1.5 ACTION SUBMITTALS

### A. Product Data: For each of the following:

1. Exposed surface form-facing material.
2. Concealed surface form-facing material.
3. Waterstops.
4. Form-release agent.

### B. Shop Drawings: Prepared by, and signed and sealed by, a qualified professional engineer responsible for their preparation, detailing fabrication, assembly, and support of forms.

1. For exposed vertical concrete walls, indicate dimensions and form tie locations.
2. Indicate dimension and locations of construction and movement joints required to construct the structure in accordance with ACI 301 (ACI 301M).
  - a. Location of construction joints is subject to approval of the Architect.
3. Indicate location of waterstops.
4. Indicate form liner layout and form line termination details.
5. Indicate proposed schedule and sequence of stripping of forms, shoring removal, and reshoring installation and removal.
6. Indicate layout of insulating concrete forms, dimensions, course heights, form types, and details.

### C. Samples:

1. For waterstops.
2. For Form Liners: 12-inch by 12-inch (305-mm by 305-mm) sample, indicating texture.

## 1.6 INFORMATIONAL SUBMITTALS

### A. Qualification Data: For testing and inspection agency.

### B. Research Reports: For insulating concrete forms indicating compliance with International Code Council Acceptance Criteria AC308.

### C. Field quality-control reports.



- D. Minutes of preinstallation conference.

## 1.7 QUALITY ASSURANCE

- A. Testing and Inspection Agency Qualifications: An independent agency, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.

## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Form Liners: Store form liners under cover to protect from sunlight.
- B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Concrete Formwork: Design, engineer, erect, shore, brace, and maintain formwork, shores, and reshores in accordance with ACI 301 (ACI 301M), to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads, so that resulting concrete conforms to the required shapes, lines, and dimensions.
  - 1. Design wood panel forms in accordance with APA's "Concrete Forming Design/Construction Guide."
  - 2. Design formwork to limit deflection of form-facing material to 1/240 of center-to-center spacing of supports.
    - a. For architectural concrete specified in Section 033300 "Architectural Concrete," limit deflection of form-facing material, studs, and walers to 0.0025 times their respective clear spans (L/400).

### 2.2 FORM-FACING MATERIALS

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

- b. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
  - 1) APA HDO (high-density overlay).
  - 2) APA MDO (medium-density overlay); mill-release agent treated and edge sealed.
  - 3) APA Structural 1 Plyform, B-B or better; mill oiled and edge sealed.
  - 4) APA Plyform Class I, B-B or better; mill oiled and edge sealed.
- B. Concealed Surface Form-Facing Material: Lumber, plywood, metal, plastic, or another approved material.
  - 1. Provide lumber dressed on at least two edges and one side for tight fit.

## 2.3 WATERSTOPS

- A. Flexible PVC Waterstops: U.S. Army Corps of Engineers CRD-C 572, for embedding in concrete to prevent passage of fluids through joints, with factory fabricate corners, intersections, and directional changes.
- B. Self-Expanding Butyl Strip Waterstops: Manufactured rectangular or trapezoidal strip, butyl rubber with sodium bentonite or other hydrophilic polymers, for adhesive bonding to concrete, 3/4 by 1 inch (19 by 25 mm).

## 2.4 RELATED MATERIALS

- A. Reglets: Fabricate reglets of not less than 0.022-inch- (0.55-mm-) thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.
- B. Dovetail Anchor Slots: Hot-dip galvanized-steel sheet, not less than 0.034 inch (0.85 mm) thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.
- C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch (19 by 19 mm), minimum.
- D. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.
- E. Form-Release Agent: Commercially formulated form-release agent that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.
  - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
  - 2. Form release agent for form liners shall be acceptable to form liner manufacturer.

- F. Form Ties: Factory-fabricated, removable or snap-off, glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
  - 1. Furnish units that leave no corrodible metal closer than 1 inch (25 mm) to the plane of exposed concrete surface.
  - 2. Furnish ties that, when removed, leave holes no larger than 1 inch (25 mm) in diameter in concrete surface.
  - 3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

## PART 3 - EXECUTION

### 3.1 INSTALLATION OF FORMWORK

- A. Comply with ACI 301 (ACI 301M).
- B. Construct formwork, so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117 (ACI 117M) and to comply with the Surface Finish designations specified in Section 033000 "Cast-In-Place Concrete" for as-cast finishes **and Section 033300 "Architectural Concrete"**.
- C. Limit concrete surface irregularities as follows:
  - 1. Surface Finish-1.0: ACI 117 Class D, 1 inch (25 mm).
  - 2. Surface Finish-2.0: ACI 117 Class B, 1/4 inch (6 mm).
  - 3. Surface Finish-3.0: ACI 117 Class A, 1/8 inch (3.0 mm).
- D. Construct forms tight enough to prevent loss of concrete mortar.
  - 1. Minimize joints.
  - 2. Exposed Concrete: Symmetrically align joints in forms.
- E. Construct removable forms for easy removal without hammering or prying against concrete surfaces.
  - 1. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces.
  - 2. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
  - 3. Install keyways, reglets, recesses, and other accessories, for easy removal.
- F. Do not use rust-stained, steel, form-facing material.
- G. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces.

1. Provide and secure units to support screed strips
  2. Use strike-off templates or compacting-type screeds.
- H. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible.
1. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar.
  2. Locate temporary openings in forms at inconspicuous locations.
- I. **Chamfer** exterior corners and edges of permanently exposed concrete.
- J. At construction joints, overlap forms onto previously placed concrete not less than 12 inches (305 mm).
- K. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work.
1. Determine sizes and locations from trades providing such items.
  2. Obtain written approval of Architect prior to forming openings not indicated on Drawings.
- L. Construction and Movement Joints:
1. Construct joints true to line with faces perpendicular to surface plane of concrete.
  2. Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
  3. Place joints perpendicular to main reinforcement.
  4. Locate joints for beams, slabs, joists, and girders in the middle third of spans.
    - a. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
  5. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
  6. Space vertical joints in walls as indicated on Drawings.
    - a. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
- M. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection.
1. Locate ports and openings in bottom of vertical forms, in inconspicuous location, to allow flushing water to drain.
  2. Close temporary ports and openings with tight-fitting panels, flush with inside face of form, and neatly fitted, so joints will not be apparent in exposed concrete surfaces.

- N. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- O. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- P. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

### 3.2 INSTALLATION OF EMBEDDED ITEMS

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

### 3.3 INSTALLATION OF WATERSTOPS

- A. Flexible Waterstops: Install in construction joints and at other joints indicated to form a continuous diaphragm.
  - 1. Install in longest lengths practicable.
  - 2. Locate waterstops in center of joint unless otherwise indicated on Drawings.
  - 3. Allow clearance between waterstop and reinforcing steel of not less than 2 times the largest concrete aggregate size specified in Section 033000 "Cast-In-Place Concrete."
  - 4. Secure waterstops in correct position at 12 inches (305 mm) on center.
  - 5. Field fabricate joints in accordance with manufacturer's instructions using heat welding.
    - a. Miter corners, intersections, and directional changes in waterstops.
    - b. Align center bulbs.
  - 6. Clean waterstops immediately prior to placement of concrete.
  - 7. Support and protect exposed waterstops during progress of the Work.

- B. Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated on Drawings, according to manufacturer's written instructions, by adhesive bonding, mechanically fastening, and firmly pressing into place.
  - 1. Install in longest lengths practicable.
  - 2. Locate waterstops in center of joint unless otherwise indicated on Drawings.
  - 3. Protect exposed waterstops during progress of the Work.

### 3.4 REMOVING AND REUSING FORMS

- A. Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations, and curing and protection operations need to be maintained.
  - 1. Leave formwork for beam soffits, joists, slabs, and other structural elements that support weight of concrete in place until concrete has achieved **at least 70 percent of** its 28-day design compressive strength.
  - 2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- B. Clean and repair surfaces of forms to be reused in the Work.
  - 1. Split, frayed, delaminated, or otherwise damaged form-facing material are unacceptable for exposed surfaces.
  - 2. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints.
  - 1. Align and secure joints to avoid offsets.
  - 2. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

### 3.5 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a **special inspector and qualified testing and inspecting agency** to perform field tests and inspections and prepare test reports.
- B. Testing Agency: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
- C. Inspections:

1. Inspect formwork for shape, location, and dimensions of the concrete member being formed.
2. Inspect insulating concrete forms for shape, location, and dimensions of the concrete member being formed.

END OF SECTION 031000

SECTION 032000  
CONCRETE REINFORCING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel reinforcement bars.
2. Welded-wire reinforcement.

B. Related Requirements:

1. Section 321313 "Concrete Paving" for reinforcing related to concrete pavement and walks.
2. Section 321316 "Decorative Concrete Paving" for reinforcing related to decorative concrete pavement and walks.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review the following:

- a. Special inspection and testing and inspecting agency procedures for field quality control.
- b. Construction contraction and isolation joints.
- c. Steel-reinforcement installation.

1.3 ACTION SUBMITTALS

A. Product Data: For the following:

1. Each type of steel reinforcement.
2. Zinc repair material.
3. Bar supports.

B. Shop Drawings: Comply with ACI SP-066:

1. Include placing drawings that detail fabrication, bending, and placement.
2. Include bar sizes, lengths, materials, grades, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, location of splices, lengths of lap splices, details



of mechanical splice couplers, details of welding splices, tie spacing, hoop spacing, and supports for concrete reinforcement.

3. For structural thermal break insulated connection system, indicate general configuration, insulation dimensions, tension bars, compression pads, shear bars, and dimensions.

C. Construction Joint Layout: Indicate proposed construction joints required to build the structure.

1. Location of construction joints is subject to approval of Architect.

#### 1.4 INFORMATIONAL SUBMITTALS

A. Delegated Design Engineer Qualifications: Include the following:

1. Experience providing delegated design engineering services of the type indicated.
2. Documentation that delegated design engineer is licensed in the **state** in which Project is located.

B. Welding certificates.

1. Reinforcement To Be Welded: Welding procedure specification in accordance with AWS D1.4/D1.4M.

C. Material Certificates: For each of the following, signed by manufacturers:

1. Epoxy-Coated Reinforcement: CRSI's "Epoxy Coating Plant Certification."
2. Dual-Coated Reinforcement: CRSI's "Epoxy Coating Plant Certification."

D. Material Test Reports: For the following, from a qualified testing agency:

1. Steel Reinforcement:
  - a. For reinforcement to be welded, mill test analysis for chemical composition and carbon equivalent of the steel in accordance with ASTM A706/A706M.
2. Mechanical splice couplers.

E. Field quality-control reports.

F. Minutes of preinstallation conference.

#### 1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.

- B. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.4/D 1.4M.
- C. Mockups: Reinforcing for cast-concrete formed surfaces, to demonstrate tolerances and standard of workmanship.
  - 1. Build panel approximately 100 sq. ft. (9.3 sq. m) for formed surface in the location indicated on Drawings or, if not indicated, as directed by Architect.
  - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage and to avoid damaging coatings on steel reinforcement.
  - 1. Store reinforcement to avoid contact with earth.
  - 2. Do not allow epoxy-coated reinforcement to be stored outdoors for more than 60 days without being stored under an opaque covering.
  - 3. Do not allow dual-coated reinforcement to be stored outdoors for more than 60 days without being stored under an opaque covering.
  - 4. Do not allow stainless steel reinforcement to come into contact with uncoated reinforcement.

## PART 2 - PRODUCTS

### 2.1 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A615/A615M, Grade 60 (Grade 420), deformed.
- B. Low-Alloy Steel Reinforcing Bars: ASTM A706/A706M, deformed.
- C. Headed-Steel Reinforcing Bars: ASTM A970/A970M.
- D. Steel Bar Mats: ASTM A184/A184M, fabricated from ASTM A615/A615M, Grade 60, deformed bars, assembled with clips.
- E. Plain-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, plain, fabricated from as-drawn steel wire into flat sheets.
- F. Deformed-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, flat sheet.
- G. Galvanized-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, plain, fabricated from galvanized-steel wire into flat sheets.

## 2.2 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A615/A615M, Grade 60 (Grade 420), plain-steel bars, cut true to length with ends square and free of burrs.
- B. Epoxy-Coated Joint Dowel Bars: ASTM A615/A615M, Grade 60 (Grade 420), plain-steel bars, ASTM A775/A775M epoxy coated.
- C. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place.
  - 1. Manufacture bar supports from steel wire, plastic, or precast concrete in accordance with CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
    - a. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire, all-plastic bar supports, or CRSI Class 2 stainless steel bar supports.
    - b. For epoxy-coated reinforcement, use CRSI Class 1A epoxy-coated or other dielectric-polymer-coated wire bar supports.
    - c. For dual-coated reinforcement, use CRSI Class 1A epoxy-coated or other dielectric-polymer-coated wire bar supports.
    - d. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.
    - e. For stainless steel reinforcement, use CRSI Class 1 plastic-protected steel wire, all-plastic bar supports, or CRSI Class 2 stainless steel bar supports.
- D. Steel Tie Wire: ASTM A1064/A1064M, annealed steel, not less than 0.0508 inch (1.2908 mm) in diameter.
  - 1. Finish: **Plain**.
- E. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating; compatible with epoxy coating on reinforcement and complying with ASTM A775/A775M.
- F. Zinc Repair Material: ASTM A780/A780M.

## 2.3 FABRICATING REINFORCEMENT

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

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Protection of In-Place Conditions:

1. Do not cut or puncture vapor retarder.
  2. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

### 3.2 INSTALLATION OF STEEL REINFORCEMENT

- A. Comply with CRSI's "Manual of Standard Practice" for placing and supporting reinforcement.
- B. Accurately position, support, and secure reinforcement against displacement.
1. Locate and support reinforcement with bar supports to maintain minimum concrete cover.
  2. Do not tack weld crossing reinforcing bars.
- C. Preserve clearance between bars of not less than 1 inch (25 mm), not less than one bar diameter, or not less than 1-1/3 times size of large aggregate, whichever is greater.
- D. Provide concrete coverage in accordance with ACI 318 (ACI 318M).
- E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- F. Splices: Lap splices as indicated on Drawings.
1. Bars indicated to be continuous, and all vertical bars to be lapped not less than 36 bar diameters at splices, or 24 inches (610 mm), whichever is greater.
  2. Stagger splices in accordance with ACI 318 (ACI 318M).
  3. Mechanical Splice Couplers: Install in accordance with manufacturer's instructions.
  4. Weld reinforcing bars in accordance with AWS D1.4/D 1.4M, where indicated on Drawings.
- G. Install welded-wire reinforcement in longest practicable lengths.
1. Support welded-wire reinforcement in accordance with CRSI "Manual of Standard Practice."
    - a. For reinforcement less than W4.0 or D4.0, continuous support spacing to not exceed 12 inches (305 mm).
  2. Lap edges and ends of adjoining sheets at least one wire spacing plus 2 inches (50 mm) for plain wire and 8 inches (200 mm) for deformed wire.
  3. Offset laps of adjoining sheet widths to prevent continuous laps in either direction.
  4. Lace overlaps with wire.

### 3.3 JOINTS

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

### 3.4 INSTALLATION TOLERANCES

- A. Comply with ACI 117 (ACI 117M).

### 3.5 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Testing Agency: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
- C. Inspections:
  - 1. Steel-reinforcement placement.
  - 2. Steel-reinforcement welding.
- D. Manufacturer's Inspections: Engage manufacturer of structural thermal break insulated connection system to inspect completed installations prior to placement of concrete, and to provide written report that installation complies with manufacturer's written instructions.

END OF SECTION 032000

SECTION 033000  
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cast-in-place concrete, including concrete materials, mixture design, placement procedures, and finishes.

B. Related Requirements:

1. Section 031000 "Concrete Forming and Accessories" for form-facing materials, form liners, insulating concrete forms, and waterstops.
2. Section 032000 "Concrete Reinforcing" for steel reinforcing bars and welded-wire reinforcement.
3. Section 033300 "Architectural Concrete" for general building applications of specially finished formed concrete.
4. Section 033543 "Polished Concrete Finishing" for concrete floors scheduled to receive a polished concrete finish.
5. Section 035300 "Concrete Topping" for emery- and iron-aggregate concrete floor toppings.
6. Section 312000 "Earth Moving" for drainage fill under slabs-on-ground.
7. Section 321313 "Concrete Paving" for concrete pavement and walks.
8. Section 321316 "Decorative Concrete Paving" for decorative concrete pavement and walks.

1.2 DEFINITIONS

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

- B. Water/Cement Ratio (w/cm): The ratio by weight of water to cementitious materials.

1.3 PREINSTALLATION MEETINGS

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

1. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:

- a. Contractor's superintendent.
  - b. Independent testing agency responsible for concrete design mixtures.
  - c. Ready-mix concrete manufacturer.
  - d. Concrete Subcontractor.
  - e. Special concrete finish Subcontractor.
2. Review the following:
- a. Special inspection and testing and inspecting agency procedures for field quality control.
  - b. Construction joints, control joints, isolation joints, and joint-filler strips.
  - c. Semirigid joint fillers.
  - d. Vapor-retarder installation.
  - e. Anchor rod and anchorage device installation tolerances.
  - f. Cold and hot weather concreting procedures.
  - g. Concrete finishes and finishing.
  - h. Curing procedures.
  - i. Forms and form-removal limitations.
  - j. Methods for achieving specified floor and slab flatness and levelness.
  - k. Floor and slab flatness and levelness measurements.
  - l. Concrete repair procedures.
  - m. Concrete protection.
  - n. Initial curing and field curing of field test cylinders (ASTM C31/C31M.)
  - o. Protection of field cured field test cylinders.

#### 1.4 ACTION SUBMITTALS

##### A. Product Data: For each of the following.

- 1. Portland cement.
- 2. Aggregates.
- 3. Admixtures:
  - a. Include limitations of use, including restrictions on cementitious materials, supplementary cementitious materials, air entrainment, aggregates, temperature at time of concrete placement, relative humidity at time of concrete placement, curing conditions, and use of other admixtures.
- 4. Vapor retarders.
- 5. Floor and slab treatments.
- 6. Liquid floor treatments.
- 7. Curing materials.
  - a. Include documentation from color pigment manufacturer, indicating that proposed methods of curing are recommended by color pigment manufacturer.
- 8. Joint fillers.
- 9. Repair materials.

- B. Design Mixtures: For each concrete mixture, include the following:
1. Mixture identification.
  2. Minimum 28-day compressive strength.
  3. Durability exposure class.
  4. Maximum w/cm.
  5. Calculated equilibrium unit weight, for lightweight concrete.
  6. Slump limit.
  7. Air content.
  8. Nominal maximum aggregate size.
  9. Synthetic micro-fiber content.
  10. Indicate amounts of mixing water to be withheld for later addition at Project site if permitted.
  11. Include manufacturer's certification that permeability-reducing admixture is compatible with mix design.
  12. Include certification that dosage rate for permeability-reducing admixture matches dosage rate used in performance compliance test.
  13. Intended placement method.
  14. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
- C. Shop Drawings:
1. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
    - a. Location of construction joints is subject to approval of the Architect.
- D. Concrete Schedule: For each location of each Class of concrete indicated in "Concrete Mixtures" Article, including the following:
1. Concrete Class designation.
  2. Location within Project.
  3. Exposure Class designation.
  4. Formed Surface Finish designation and final finish.
  5. Final finish for floors.
  6. Curing process.
  7. Floor treatment if any.

## 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For the following:
1. Installer: Include copies of applicable ACI certificates.
  2. Ready-mixed concrete manufacturer.
  3. Testing agency: Include copies of applicable ACI certificates.
- B. Material Certificates: For each of the following, signed by manufacturers:



1. Cementitious materials.
2. Admixtures.
3. Curing compounds.
4. Floor and slab treatments.
5. Bonding agents.
6. Adhesives.
7. Vapor retarders.
8. Semirigid joint filler.
9. Joint-filler strips.
10. Repair materials.

C. Material Test Reports: For the following, from a qualified testing agency:

1. Portland cement.
2. Aggregates.
3. Admixtures:
  - a. Permeability-Reducing Admixture: Include independent test reports, indicating compliance with specified requirements, including dosage rate used in test.

D. Floor surface flatness and levelness measurements report, indicating compliance with specified tolerances.

E. Research Reports:

1. For concrete admixtures in accordance with ICC's Acceptance Criteria AC198.
2. For sheet vapor retarder/termite barrier, showing compliance with ICC AC380.

F. Preconstruction Test Reports: For each mix design.

G. Field quality-control reports.

H. Minutes of preinstallation conference.

## 1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs Project personnel qualified as an ACI-certified Flatwork Technician and Finisher and a supervisor who is a certified ACI Flatwork Concrete Finisher/Technician or an ACI Concrete Flatwork Technician.

1. Post-Installed Concrete Anchors Installers: ACI-certified Adhesive Anchor Installer.

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

1. Manufacturer certified in accordance with NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- C. Laboratory Testing Agency Qualifications: A testing agency qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated and employing an ACI-certified Concrete Quality Control Technical Manager.
1. Personnel performing laboratory tests to be an ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Grade I. Testing agency laboratory supervisor to be an ACI-certified Concrete Laboratory Testing Technician, Grade II.
- D. Field Quality-Control Testing Agency Qualifications: An independent agency, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.
1. Personnel conducting field tests to be qualified as an ACI Concrete Field Testing Technician, Grade 1, in accordance with ACI CPP 610.1 or an equivalent certification program.

#### 1.7 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on each concrete mixture.
1. Include the following information in each test report:
    - a. Admixture dosage rates.
    - b. Slump.
    - c. Air content.
    - d. Seven-day compressive strength.
    - e. 28-day compressive strength.
    - f. Permeability.

#### 1.8 DELIVERY, STORAGE, AND HANDLING

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

#### 1.9 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with ACI 301 (ACI 301M) and ACI 306.1 and as follows.
1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
  2. When average high and low temperature is expected to fall below 40 deg F (4.4 deg C) for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301 (ACI 301M).

3. Do not use frozen materials or materials containing ice or snow.
4. Do not place concrete in contact with surfaces less than 35 deg F (1.7 deg C), other than reinforcing steel.
5. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

B. Hot-Weather Placement: Comply with ACI 301 (ACI 301M) and ACI 305.1 (ACI 305.1M), and as follows:

1. Maintain concrete temperature at time of discharge to not exceed 95 deg F (35 deg C).
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

#### 1.10 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to furnish replacement sheet vapor retarder/termite barrier material and accessories for sheet vapor retarder/ termite barrier and accessories that do not comply with requirements or that fail to resist penetration by termites within specified warranty period.

1. Warranty Period: 10 years from date of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 CONCRETE, GENERAL

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

#### 2.2 CONCRETE MATERIALS

A. Source Limitations:

1. Obtain all concrete mixtures from a single ready-mixed concrete manufacturer for entire Project.
2. Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant.
3. Obtain aggregate from single source.
4. Obtain each type of admixture from single source from single manufacturer.

B. Cementitious Materials:

1. Portland Cement: ASTM C150/C150M, **Type I/II, gray.**

- C. Normal-Weight Aggregates: ASTM C33/C33M, coarse aggregate or better, graded. Provide aggregates from a single source.
  - 1. Maximum Coarse-Aggregate Size: **1 inch (25 mm)** nominal.
  - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- D. Air-Entraining Admixture: ASTM C260/C260M.
- E. Water and Water Used to Make Ice: ASTM C94/C94M, potable.

### 2.3 VAPOR RETARDERS

- A. Sheet Vapor Retarder, Class A: ASTM E1745, Class A not less than 10 mils (0.25 mm) thick. Include manufacturer's recommended adhesive or pressure-sensitive tape.

### 2.4 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.
- C. Moisture-Retaining Cover: ASTM C171, polyethylene film burlap-polyethylene sheet.
  - 1. Color:
    - a. Ambient Temperature Below 50 deg F (10 deg C): Black.
    - b. Ambient Temperature between 50 deg F (10 deg C) and 85 deg F (29 deg C): Any color.
    - c. Ambient Temperature Above 85 deg F (29 deg C): White.
- D. Curing Paper: 8-feet- (2438-mm-) wide paper, consisting of two layers of fibered kraft paper laminated with double coating of asphalt.
- E. Water: Potable or complying with ASTM C1602/C1602M.

### 2.5 RELATED MATERIALS

- A. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, in accordance with ASTM D2240.
- B. Bonding Agent: ASTM C1059/C1059M, Type II, nonredispersible, acrylic emulsion or styrene butadiene.

## 2.6 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3 mm) and that can be feathered at edges to match adjacent floor elevations.
1. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
  2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
  3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3 to 6 mm) or coarse sand, as recommended by underlayment manufacturer.
  4. Compressive Strength: Not less than 4100 psi (29 MPa) at 28 days when tested in accordance with ASTM C109/C109M.
- B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch (6 mm) and that can be filled in over a scarified surface to match adjacent floor elevations.
1. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
  2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
  3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by topping manufacturer.
  4. Compressive Strength: Not less than 5000 psi (34.5 MPa) at 28 days when tested in accordance with ASTM C109/C109M.

## 2.7 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, in accordance with ACI 301 (ACI 301M).
1. Use a qualified testing agency for preparing and reporting proposed mixture designs, based on laboratory trial mixtures.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
1. Fly Ash or Other Pozzolans: 25 percent by mass.
  2. Slag Cement: 50 percent by mass.
  3. Silica Fume: 10 percent by mass.
  4. Total of Fly Ash or Other Pozzolans, Slag Cement, and Silica Fume: 50 percent by mass, with fly ash or pozzolans not exceeding 25 percent by mass and silica fume not exceeding 10 percent by mass.

5. Total of Fly Ash or Other Pozzolans and Silica Fume: 35 percent by mass with fly ash or pozzolans not exceeding 25 percent by mass and silica fume not exceeding 10 percent by mass.

C. Admixtures: Use admixtures in accordance with manufacturer's written instructions.

1. Use water-reducing, high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in pumped concrete, and concrete with a w/cm below 0.50.
4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

## 2.8 CONCRETE MIXTURES

A. Class **A**: Normal-weight concrete used for footings, grade beams, and tie beams.

1. Exposure Class: ACI 318 (ACI 318M) [**F0**].
2. Minimum Compressive Strength: As indicated on the drawings.
3. Maximum w/cm: As indicated on the drawings.
4. Slump Limit: As indicated on the drawings.
5. Air Content: As indicated on the drawings.

## 2.9 CONCRETE MIXING

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

B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete in accordance with ASTM C94/C94M. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For mixer capacity of 1 cu. yd. (0.76 cu. m) or smaller, continue mixing at least 1-1/2 minutes, but not more than five minutes after ingredients are in mixer, before any part of batch is released.
2. For mixer capacity larger than 1 cu. yd. (0.76 cu. m), increase mixing time by 15 seconds for each additional 1 cu. yd. (0.76 cu. m).
3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

#### A. Verification of Conditions:

1. Before placing concrete, verify that installation of concrete forms, accessories, and reinforcement, and embedded items is complete and that required inspections have been performed.
2. Do not proceed until unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

#### A. Provide reasonable auxiliary services to accommodate field testing and inspections, acceptable to testing agency, including the following:

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

### 3.3 INSTALLATION OF EMBEDDED ITEMS

#### A. Place and secure anchorage devices and other embedded items required for adjoining Work that is attached to or supported by cast-in-place concrete.

1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of ANSI/AISC 303.
3. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.

### 3.4 INSTALLATION OF VAPOR RETARDER

#### A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder in accordance with ASTM E1643 and manufacturer's written instructions.

1. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.
2. Seal penetrations in accordance with vapor retarder manufacturer's instructions.
3. Protect vapor retarder during placement of reinforcement and concrete.

### 3.5 JOINTS

- A. Construct joints true to line, with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Coordinate with floor slab pattern and concrete placement sequence.
  - 1. Install so strength and appearance of concrete are not impaired, at locations indicated on Drawings or as approved by Architect.
  - 2. Place joints perpendicular to main reinforcement.
    - a. Continue reinforcement across construction joints unless otherwise indicated.
    - b. Do not continue reinforcement through sides of strip placements of floors and slabs.
  - 3. Form keyed joints as indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.
  - 4. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
  - 5. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Control Joints in Slabs-on-Ground: Form weakened-plane control joints, sectioning concrete into areas as indicated. Construct control joints for a depth equal to at least one-fourth of concrete thickness as follows:
  - 1. Grooved Joints: Form control joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch (3.2 mm). Repeat grooving of control joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
  - 2. Sawed Joints: Form control joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3.2-mm-) wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random cracks.
- D. Isolation Joints in Slabs-on-Ground: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
  - 1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated on Drawings.
  - 2. Terminate full-width joint-filler strips not less than 1/2 inch (13 mm) or more than 1 inch (25 mm) below finished concrete surface, where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.
  - 3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
- E. Doweled Joints:



1. Install dowel bars and support assemblies at joints where indicated on Drawings.
2. Lubricate or asphalt coat one-half of dowel bar length to prevent concrete bonding to one side of joint.

### 3.6 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, embedded items, and vapor retarder is complete and that required inspections are completed.
  1. Immediately prior to concrete placement, inspect vapor retarder for damage and deficient installation, and repair defective areas.
  2. Provide continuous inspection of vapor retarder during concrete placement and make necessary repairs to damaged areas as Work progresses.
- B. Notify Architect and testing and inspection agencies 24 hours prior to commencement of concrete placement.
- C. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect in writing, but not to exceed the amount indicated on the concrete delivery ticket.
  1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- D. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301 (ACI 301M), but not to exceed the amount indicated on the concrete delivery ticket.
  1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- E. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness.
  1. If a section cannot be placed continuously, provide construction joints as indicated.
  2. Deposit concrete to avoid segregation.
  3. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
  4. Consolidate placed concrete with mechanical vibrating equipment in accordance with ACI 301 (ACI 301M).
    - a. Do not use vibrators to transport concrete inside forms.
    - b. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer.

- c. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.
  - d. At each insertion, limit duration of vibration to time necessary to consolidate concrete, and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- F. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
  - 1. Do not place concrete floors and slabs in a checkerboard sequence.
  - 2. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
  - 3. Maintain reinforcement in position on chairs during concrete placement.
  - 4. Screed slab surfaces with a straightedge and strike off to correct elevations.
  - 5. Level concrete, cut high areas, and fill low areas.
  - 6. Slope surfaces uniformly to drains where required.
  - 7. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface.
  - 8. Do not further disturb slab surfaces before starting finishing operations.

### 3.7 FINISHING FORMED SURFACES

#### A. As-Cast Surface Finishes:

- 1. ACI 301 (ACI 301M) Surface Finish SF-1.0: As-cast concrete texture imparted by form-facing material.
  - a. Patch voids larger than 1-1/2 inches (38 mm) wide or 1/2 inch (13 mm) deep.
  - b. Remove projections larger than 1 inch (25 mm).
  - c. Tie holes do not require patching.
  - d. Surface Tolerance: ACI 117 (ACI 117M) Class D.
  - e. Apply to concrete surfaces not exposed to public view.

### 3.8 FINISHING FLOORS AND SLABS

- A. Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Trowel Finish:
  - 1. After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel.
  - 2. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance.
  - 3. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

4. Do not add water to concrete surface.
  5. Do not apply hard-troweled finish to concrete, which has a total air content greater than 3 percent.
  6. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
- C. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and locations indicated on Drawings.
1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.
  2. Coordinate required final finish with Architect before application.

### 3.9 INSTALLATION OF MISCELLANEOUS CONCRETE ITEMS

A. Filling In:

1. Fill in holes and openings left in concrete structures after Work of other trades is in place unless otherwise indicated.
2. Mix, place, and cure concrete, as specified, to blend with in-place construction.
3. Provide other miscellaneous concrete filling indicated or required to complete the Work.

- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

### 3.10 CONCRETE CURING

- A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

1. Comply with ACI 301 (ACI 301M) and ACI 306.1 for cold weather protection during curing.
2. Comply with ACI 301 (ACI 301M) and ACI 305.1 (ACI 305.1M) for hot-weather protection during curing.
3. Maintain moisture loss no more than 0.2 lb/sq. ft. x h (1 kg/sq. m x h), calculated in accordance with ACI 305.1, before and during finishing operations.

- B. Curing Formed Surfaces: Comply with ACI 308.1 (ACI 308.1M) as follows:

1. Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces.
2. Cure concrete containing color pigments in accordance with color pigment manufacturer's instructions.
3. If forms remain during curing period, moist cure after loosening forms.

4. If removing forms before end of curing period, continue curing for remainder of curing period, as follows:
  - a. Continuous Fogging: Maintain standing water on concrete surface until final setting of concrete.
  - b. Continuous Sprinkling: Maintain concrete surface continuously wet.
  - c. Absorptive Cover: Pre-dampen absorptive material before application; apply additional water to absorptive material to maintain concrete surface continuously wet.
  - d. Water-Retention Sheeting Materials: Cover exposed concrete surfaces with sheeting material, taping, or lapping seams.
  - e. Membrane-Forming Curing Compound: Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
    - 1) Recoat areas subject to heavy rainfall within three hours after initial application.
    - 2) Maintain continuity of coating and repair damage during curing period.

### 3.11 TOLERANCES

- A. Conform to ACI 117 (ACI 117M).

### 3.12 JOINT FILLING

- A. Prepare, clean, and install joint filler in accordance with manufacturer's written instructions.
  1. Defer joint filling until concrete has aged at least one month.
  2. Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.
- C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches (50 mm) deep in formed joints.
- D. Overfill joint, and trim joint filler flush with top of joint after hardening.

### 3.13 CONCRETE SURFACE REPAIRS

- A. Defective Concrete:
  1. Repair and patch defective areas when approved by Architect.
  2. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

- B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 (1.18-mm) sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
  - 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch (13 mm) in any dimension to solid concrete.
    - a. Limit cut depth to 3/4 inch (19 mm).
    - b. Make edges of cuts perpendicular to concrete surface.
    - c. Clean, dampen with water, and brush-coat holes and voids with bonding agent.
    - d. Fill and compact with patching mortar before bonding agent has dried.
    - e. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
  - 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement, so that, when dry, patching mortar matches surrounding color.
    - a. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching.
    - b. Compact mortar in place and strike off slightly higher than surrounding surface.
  - 3. Repair defects on concealed formed surfaces that will affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces:
  - 1. Test unformed surfaces, such as floors and slabs, for finish, and verify surface tolerances specified for each surface.
    - a. Correct low and high areas.
    - b. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
  - 2. Repair finished surfaces containing surface defects, including spalls, popouts, honeycombs, rock pockets, crazing, and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
  - 3. After concrete has cured at least 14 days, correct high areas by grinding.
  - 4. Correct localized low areas during, or immediately after, completing surface-finishing operations by cutting out low areas and replacing with patching mortar.
    - a. Finish repaired areas to blend into adjacent concrete.

5. Correct other low areas scheduled to receive floor coverings with a repair underlayment.
  - a. Prepare, mix, and apply repair underlayment and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
  - b. Feather edges to match adjacent floor elevations.
6. Correct other low areas scheduled to remain exposed with repair topping.
  - a. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch (6 mm) to match adjacent floor elevations.
  - b. Prepare, mix, and apply repair topping and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
7. Repair defective areas, except random cracks and single holes 1 inch (25 mm) or less in diameter, by cutting out and replacing with fresh concrete.
  - a. Remove defective areas with clean, square cuts, and expose steel reinforcement with at least a 3/4-inch (19-mm) clearance all around.
  - b. Dampen concrete surfaces in contact with patching concrete and apply bonding agent.
  - c. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate.
  - d. Place, compact, and finish to blend with adjacent finished concrete.
  - e. Cure in same manner as adjacent concrete.
8. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar.
  - a. Groove top of cracks and cut out holes to sound concrete, and clean off dust, dirt, and loose particles.
  - b. Dampen cleaned concrete surfaces and apply bonding agent.
  - c. Place patching mortar before bonding agent has dried.
  - d. Compact patching mortar and finish to match adjacent concrete.
  - e. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

### 3.14 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a special inspector to perform field tests and inspections and prepare testing and inspection reports.

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



- E. Concrete Tests: Testing of composite samples of fresh concrete obtained in accordance with ASTM C 172/C 172M to be performed in accordance with the following requirements:
1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.
    - a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing to be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
  2. Slump: ASTM C143/C143M:
    - a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
    - b. Perform additional tests when concrete consistency appears to change.
  3. Slump Flow: ASTM C1611/C1611M:
    - a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
    - b. Perform additional tests when concrete consistency appears to change.
  4. Air Content: ASTM C231/C231M pressure method, for normal-weight concrete;
    - a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
  5. Concrete Temperature: ASTM C1064/C1064M:
    - a. One test hourly when air temperature is 40 deg F (4.4 deg C) and below or 80 deg F (27 deg C) and above, and one test for each composite sample.
  6. Unit Weight: ASTM C567/C567M fresh unit weight of structural lightweight concrete.
    - a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
  7. Compression Test Specimens: ASTM C31/C31M:
    - a. Cast and laboratory cure two sets of **two** 6-inch (150 mm) by 12-inch (300 mm) or 4-inch (100 mm) by 8-inch (200 mm) cylinder specimens for each composite sample.
    - b. Cast, initial cure, and field cure **two** sets of **two** standard cylinder specimens for each composite sample.
  8. Compressive-Strength Tests: ASTM C39/C39M.



- a. Test one set of **two** laboratory-cured specimens at seven days and one set of two specimens at 28 days.
  - b. Test one set of **two** field-cured specimens at seven days and one set of two specimens at 28 days.
  - c. A compressive-strength test to be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
- 9. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor to evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
  - 10. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength, and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa) if specified compressive strength is 5000 psi (34.5 MPa), or no compressive strength test value is less than 10 percent of specified compressive strength if specified compressive strength is greater than 5000 psi (34.5 MPa).
  - 11. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
  - 12. Additional Tests:
    - a. Testing and inspecting agency to make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.
    - b. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42/C42M or by other methods as directed by Architect.
      - 1) Acceptance criteria for concrete strength to be in accordance with ACI 301 (ACI 301M), Section 1.6.6.3.
  - 13. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
  - 14. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

### 3.15 PROTECTION

#### A. Protect concrete surfaces as follows:

- 1. Protect from petroleum stains.
- 2. Diaper hydraulic equipment used over concrete surfaces.
- 3. Prohibit vehicles from interior concrete slabs.
- 4. Prohibit use of pipe-cutting machinery over concrete surfaces.
- 5. Prohibit placement of steel items on concrete surfaces.
- 6. Prohibit use of acids or acidic detergents over concrete surfaces.

7. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.
8. Protect concrete surfaces scheduled to receive surface hardener or polished concrete finish using Floor Slab Protective Covering.

END OF SECTION 033000

SECTION 04 0101  
REPAIR AND CLEANING OF EXISTING MASONRY

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Applicable provisions of Bidding Requirements, Contract Requirements in Division 0 and all applicable Division 01 sections.
- B. Work of this section shall be governed by the Contract Documents. Provide materials, labor, equipment, and services necessary to furnish, deliver, and install all work of this section as shown on the drawings, as specified herein, and/or as required by job conditions.

1.02 SUMMARY

A. Section Includes:

- 1. Cleaning, repointing and repair of existing masonry.
  - a. Stain and dirt removal by chemicals from historic surfaces including limestone, sandstone, marble, unpolished granite, terra cotta, concrete, brownstone and brick. Mock-ups will determine the most appropriate method.
  - b. Visual Requirements to maintain aesthetic or historic qualities of Project by protecting Work designated to remain.
  - c. Including paint removal on exterior brick and limestone masonry as indicated on drawings.
  - d. Cleaning, repointing and repair of exterior limestone masonry, granite steps and base and other stone masonry including Terra Cotta, as indicated on the Drawings.
  - e. Cleaning, repointing and repair of the exterior brick masonry walls, as indicated on the Drawings.
  - f. Terra Cotta repair, restoration and skyward waterproofing for top of cornice as indicated on drawings.
  - g. Replacement of Terra Cotta, stone masonry and brick units as indicated on drawings.
  - h. Repointing for mortar joints in brick, Terra Cotta and stone masonry as indicated on drawings..
  - i. Water cleaning of existing interior and exterior masonry surfaces as indicated on drawings.

B. Related Sections:

- 1. Section 040511 Mortar and Masonry Grout - for items not defined in this section.
- 2. Section 042000 Unit Masonry - for items not defined in this section.
- 3. Section 079200 Joints Sealants - for items not defined in this section.
- 4. Section 099000 Paints and Coatings - for items not defined in this section.

C. Scope of Cleaning Work: The scope of cleaning work of this Section shall include, but is not limited to, the following items:

- 1. General cleaning for 100 percent cleaning of existing interior masonry and concrete floor as indicated on drawings.
- 2. Paint removal as generally indicated on drawings with an allowance for 5% more than drawings show.
- 3. Patching of masonry walls wherever small holes are encountered and as result of cleaning.

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4. Cleaning of exterior limestone masonry walls, as designated on the Drawings, using the “water-misting” method.
  5. Cleaning of the exterior brick masonry walls, as designated on the Drawings, using a restoration cleaner.
  6. Cleaning of efflorescence on the exterior brick masonry walls, as designated on the Drawings, using a restoration cleaner.
  7. Cleaning of exterior limestone masonry walls, as designated on the Drawings, using a low pressure water wash.
  8. Cleaning of selected areas of limestone as designated on the Drawings, using a restoration cleaner or poultice.
  9. Cleaning of the granite building base and steps as designated on the Drawings, using a restoration cleaner.
  10. Cleaning of adhesive residue from the granite building base as designated on the Drawings, using a restoration cleaner.
  11. Cleaning of ferrous stains on the granite building base and steps as designated on the Drawings, using a restoration cleaner.
  12. Cleaning of copper stained masonry at selected locations as designated on the Drawings, using a restoration poultice.
  13. Terra Cotta Cleaning and select repairs as indicated on drawings.
- D. Scope of Removal includes removing the following from existing masonry as indicated on drawings:
1. Dirt and soil.
  2. Tar, asphalt, and bitumens.
  3. Paint and coatings.
  4. Graffiti and graffiti resistant coatings.
  5. Rust and metallic stains.
  6. Efflorescence and lime.
  7. Carbon encrustation and soot.
  8. Body oils, finger prints, hand prints, foot prints.
  9. All other non-masonry substances, stains, and contamination.
- E. Scope of masonry joint repointing and sealant replacement as follows:
1. Replacement of Terra Cotta, stone masonry and brick units as indicated on drawings.
  2. Repointing for mortar joints in brick, Terra Cotta and stone masonry.
  3. Repointing as scoped on drawings; the following is applicable if less than 100% repointing is required.
    - a. Repointing required for the worse existing mortar joints for amount indicated on drawing and provide an additional allowance of repointing equal to 10% of all brick to remain.
  4. Repair of damaged masonry for amount indicated on drawings and provide an additional allowance of repair of damaged masonry of 30 SF at 10 separate locations for Rec and 10SF at 5 for LIB.
- F. Scope of stone repair as follows:
1. 100% re-pointing of granite and limestone joints, as designated on the Drawings.
  2. Selective re-pointing of brick joints, as designated on the Drawings.
  3. Repairing vertical cracks in brick by sawcutting and sealing vertical control joints as designated on the Drawings.
  4. Repairing cracks in masonry with cementitious injection grout as designated on the Drawings.
  5. Shoring and repointing at dropped flat arches as designated on the Drawings.
  6. Exposing, cleaning, and painting of embedded steel, and replacement of masonry as designated on the Drawings.

7. Dutchman repairs to granite spalls as designated on the Drawings.
  8. Mortar patching and pinning at masonry spalls as designated on the Drawings.
  9. Replacement of damaged brick as designated on the Drawings.
  10. Patching of masonry at removal of abandoned metal elements as designated on the Drawings.
  11. Patching, pinning, and re-tooling of sugared limestone as designated on the Drawings.
  12. Routing and sealing of spalled cold joint at concrete as designated on the Drawings.
  13. Removal and resetting of selected granite step as designated on the Drawings.
  14. Rubbing and tooling of delaminated and scaled granite as designated on the Drawings.
- G. Additional Repointing Requirements
1. Comply with ASTM E 2260, Standard Guide for Repointing. (Tuckpointing) Historic Masonry.
  2. Comply with the following for brick repointing:
    - a. <https://masonryadvisorycouncil.org/wp-content/uploads/2019/05/Repointing-Masonry>
    - b. <https://www.gobrick.com/docs/default-source/read-research-documents/brick-briefs/repointing-brick-masonry>

### 1.03 REFERENCE STANDARDS

- A. Masonry Restoration shall conform to the Guidelines of the Secretary of the Interior for Historic Preservation. Techniques employed for masonry cleaning, pointing, and repair shall be as outlined in "Preservation Brief No, 1" (November 2000) as published by the National Park Service.
- B. ACI 530.1/ASCE 6/TMS 602 – Specification for Masonry Structures; American Concrete Institute International; 2008. Contractor shall maintain at least one copy of ACI / ASCE 530.1-88 on site.
- C. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures 2016.

### 1.04 SUBMITTALS:

- A. Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturer's specifications and installation instructions for products used including finishing materials and methods.
- C. Submit manufacturer's technical data sheet for product indicated including recommendations for their application and use.
- D. Submit a work plan describing capture, storage, and disposal as required and/or governed by any and all local, state, and/or federal laws, codes, and regulations.
- E. Samples: Provide sample installation of product. Locations per the owner or owner's representative's directions.
- F. Product Data: Manufacturer's data including instructions, recommendations, and restrictions.
- G. Shop Drawings: Indicate setting details of stone. Detail shoring.
- H. Product Data: Provide data on each type of product indicated.

- I. Pre-Submittal Conference: Conduct coordination conference with attendance by representatives of Suppliers and Contractors to review proper methods and the procedures for cleaning masonry. No cleaning work shall begin until the Pre-Submittal Conference takes place.
- J. Sequence of Operations: The Contractor shall submit his proposed schedule and sequence of cleaning operations for review by the Professional and the Using Agent prior to beginning work. No cleaning work shall begin until the sequence of operations is approved.
- K. Product literature: The Contractor shall submit manufacturer's product literature for all cleaning products. Product literature shall include specification data, instructions for use and Material Safety Data Sheets.

#### 1.05 SUBMITTALS FOR MASONRY REPAIR

- A. Product Data: The Contractor shall submit product literature for all manufactured mortar and stone patching materials. Literature shall indicate compliance with the referenced material standards and these specifications shall include, where applicable, manufacturer's instructions for application and use. Include test data substantiating that products comply with requirements.
- B. Qualification Data: For sub-contractor firms to demonstrate their capabilities and experience. Include list of completed projects with project names and addresses, names and addresses of architects and owners and other information specified.
- C. Description of Methods of Protection: Prior to commencement of cleaning operations, the Contractor shall submit to the Professional in writing a description of methods of protection of the public and of components of the building which are not to be cleaned. Contractor is required to mask windows from water or material infiltration during cleaning and clean-up any water or material which might enter the building. Contractor is required to protect any plaques or signs attached to the building with 2 layers of plastic for the duration of the masonry cleaning and restoration. Contractor is required to protect all light fixtures. Contractor is required to protect all equipment, louvers, etc. during the cleaning process. The method for securing the plastic shall be reviewed with the Professional before installation. Any tape residue that is left on the building or on a sign /plaque after the plastic has been removed shall also be cleaned/removed by the contractor with a method reviewed and approved by the Professional before proceeding with the work.
- D. Samples for verification:
  - 1. Each type of masonry unit to be used for replacing existing units. Include sets of samples as necessary to show the full range of shape, color, and texture to be expected. For brick, provide a range of up to 4 colors for review.
  - 2. Each type, color and texture of pointing mortar in the form of sample mortar strips, 6 inches (150 mm) long by  $\frac{1}{4}$  inch (6mm) wide, set in aluminum or plastic channels. Include with each sample a list of ingredients with proportions of each. Identify sources, both supplier and quarry, of each type of sand and brand names of cementitious materials and pigments if any. Have each set contain a close color range of at least three samples of different mixes of colored sands and cements that produce a mortar that matches the cleaned stone when cured and dry.
    - a. Limestone pointing mortar materials
    - b. Granite base pointing materials
    - c. Granite steps pointing materials
    - d. Brick pointing materials
  - 3. Patching Compound: Submit sets of patching compound Samples in the form of plugs (patches in drilled holes) in sample units of stone representative of the range of stone colors on the building. Have each set contain a close color range of at least three samples of different mixes of patching compound that matches the variations in existing

- stone when cured and dry.
- a. Limestone patching mortar materials
- b. Brick patching mortar materials
- 4. Each type of adhesive.
- 5. Accessories: Each type of anchor, accessory, and miscellaneous support.
- 6. Limestone Dutchman materials.
- 7. Granite Dutchman materials.

#### 1.06 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week prior to commencing of each major part of the work of this section.
  - 1. Require attendance of parties directly affecting work of this section.
  - 2. Major part of the work of this section: Cleaning
    - a. Cleaning
    - b. Masonry repair and select replacement
    - c. Repointing
- B. Review conditions of installation, installation procedures, and coordination with related work.
- C. Review methods and procedures related to stone restoration and cleaning including, but not limited to, the following:
  - 1. Construction Schedule: Verify availability of materials, Restoration Specialist's personnel, equipment, and facilities needed to make progress and avoid delays.
  - 2. Materials, material application, sequencing, tolerances, and required clearances.

#### 1.07 QUALITY ASSURANCE - IN PLACE SAMPLES:

- A. Comply with Section 014516.13 Contractor's Quality Control.

#### 1.08 QUALITY CONTROL

- A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.
- B. Restorer: Company specializing in masonry restoration with minimum three years of documented experience.
- C. The Contractor performing the work of this Section shall have a minimum of five years' experience in the cleaning of masonry materials similar to those required for this project and shall have successfully completed at least three projects of similar scope and size within the previous two years.
- D. Chemical-Cleaner Manufacturer Qualifications: A firm regularly engaged in producing masonry cleaners that have been used for similar applications with successful results, and with factory-trained representatives who are available for consultation and Project-site inspection and assistance at no additional cost.
- E. Cleaning and Repair Appearance Standard: Cleaned and repaired surfaces are to have a uniform appearance as viewed from 20 feet (6 m) away by The Professional. Perform additional paint and stain removal, general cleaning, and spot cleaning of small areas that are noticeably different, so that surface blends smoothly into surrounding areas.
- F. Consolidant Manufacturer Qualifications: A firm regularly engaged in producing stone consolidants that have been used for similar applications with successful results, and with

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factory-trained representatives who are available for consultation and Project-site inspection and assistance at no additional cost.

- G. Source Limitations: Obtain each type of material for stone repair (stone, cement, sand, etc.) from one source with resources to provide materials of consistent quality in appearance and physical properties.
- H. Retain first subparagraph below if high-lime-content mortar is used.
- I. Retain first paragraph below to control overall appearance from a distance.
- J. Cleaning and Repair Appearance Standard: Cleaned and repaired surfaces are to have a uniform appearance as viewed from 20 feet (6 m) away by The Professional. Perform additional paint and stain removal, general cleaning, and spot cleaning of small areas that are noticeably different, so that surface blends smoothly into surrounding areas.

#### 1.09 QUALITY ASSURANCE - TEST PROCEDURES:

- A. Testing: Before production cleaning, test cleaners, cleaner concentrations, and cleaning techniques on small test samples at inconspicuous locations pre-approved by Owner and Architect.
  - 1. Before production cleaning: test cleaners, cleaner concentrations, and cleaning techniques on small test samples at inconspicuous locations pre-approved by Owner and Architect.
    - a. Repeat testing until successful cleaning is achieved, as judged by the Owner and Architect.
  - 2. Before production patching: test patching materials on small test samples at inconspicuous locations pre-approved by owner and Architect.
    - a. Repeat testing until successful repair patch is achieved, as judged by the Owner and Architect.
    - b. Test patch to include painted surface, applied to match surrounding color and sheen.
- B. Written Records: Provide detailed written records for each cleaning test, each cleaning condition, each substrate, and each contamination type.
  - 1. Record cleaner used, cleaner concentration, cleaning techniques, cleaner dwell time on surface, tools used, water temperature, water pressure, water volume, and other relevant information.
  - 2. Record patching material used, including paint color and sheen, and other relevant information.
  - 3. Use the Written Record to reproduce successful cleaning.
- C. Observation: Perform Quality Assurance Testing under direct observation of the Owner and Architect.

#### 1.10 MOCK-UP

- A. Restore and repoint an existing masonry wall area sized 8 feet long by 6 feet high; include in mock-up area instances of mortar, accessories, wall openings, and flashings.
- B. Clean a 10 ft by 10 ft panel of wall to determine extent of cleaning.
- C. Locate where directed.
- D. Mock-up may remain as part of the Work.



1.11 TEST PANELS

- A. The Contractor, at locations designated by the Professional, shall prepare the following test panels for each of the cleaning methods specified for approval prior to commencing cleaning operations.
  - 1. Water Misting – 10 feet by 10 feet panel of limestone wall panel.
  - 2. Low Pressure Washing – 10 feet by 10 feet panel of limestone wall panel.
  - 3. Chemical Cleaning (Brick) – 10 feet by 10 feet panel of brick wall panel.
  - 4. Execution of this test panel shall determine the required dwell time for the remainder of this type of cleaning.
  - 5. Chemical Cleaning (Limestone) – 4'-0" x 4'-0" section
  - 6. Chemical Cleaning (Granite) – 4'-0" x 4'-0" section
  - 7. Rust Removal/Cleaning – 4'-0" x 4'-0" section

1.12 DELIVERY, STORAGE, HANDLING:

- A. Comply with Division 1 General Requirements and manufacturer's instructions and recommendations.
- B. Deliver cleaning chemicals to the site in the manufacturer's original containers with brand name and product identification information readily visible. Handle, store and protect all materials in such a manner as to prevent contamination and spillage thereof.
- C. Deliver masonry neatly stacked and tied on pallets. Store clear of ground with adequate waterproof covering.
- D. Store blast medium materials in manufacturer's packaging.

1.13 SITE/PROJECT CONDITIONS

- A. Cold and Hot Weather Requirements: Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.
- B. Do not blast clean or use process creating dust, dirt, when wind is over 10 mph.
- C. Weather Limitations: Proceed with the work only when existing and forecasted weather conditions permit masonry repair and masonry cleaning work to be performed according to manufacturer's written instructions and specified requirements except where the requirements of this section are more restrictive.
- D. The work of this Section shall be executed only when the air and surface temperatures are greater than 50 degrees F and rising or less than 90 degrees F and falling or within the ranges directed by the cleaning product manufacturer, where applicable. Minimum temperature for masonry cleaning shall be expected to remain above 50 degrees F for at least 2 hours after completion of the washing. In no case shall masonry cleaning be performed when freezing weather is expected within the 24 hours after completion.
- E. Comply with the requirements of all relevant Federal, State, and City Legislation related to the transportation, handling, use, and disposal of all cleaning materials as required by the authorities having jurisdiction.
- F. Contractor shall be responsible for controlling water flow from the cleaning and misting operations at the sidewalk level at all areas where there is public access. Daily cleanup of cleaning media and/or chemicals at building entrances and on portions of the sidewalk and

surrounding areas shall be provided.

- G. The Contractor is responsible for protecting existing adjacent materials during the execution of the work. Provide all necessary protection and work procedures to avoid damage to existing material assemblies not a part of the work of this Section. At a minimum, the Contractor shall:
  - 1. The Contractor shall be responsible for the removal of effluent from cleaning operations, waste materials, packaging and other debris associated with the work of this Section in a manner conforming with federal, state and local environmental regulations.
  - 2. Protect passing pedestrians and vehicles from overspray and wind drift during cleaning operations. Erect barricades and install yellow caution tape and signage as required to restrict access to work area.
  - 3. Protect all metal, glass and painted surfaces adjacent to areas to receive chemical cleaning or water repellent using plastic, plywood, sealants or other materials as required to prevent penetration of cleaning chemicals. The Contractor shall be responsible for surface etching and other damage caused to adjacent materials.
  - 4. Protect the bottom course of limestone cladding during the cleaning of the granite base. The Contractor shall be responsible for rectifying any staining or bleaching of the limestone due to over splash from the granite cleaning chemicals.
  - 5. Protect the adjacent limestone cladding during the cleaning of the brick cleaning. The Contractor shall be responsible for rectifying any staining or bleaching of the limestone due to over splash from the brick cleaning chemicals.
- H. The Contractor shall repair all damage to adjacent materials caused by the execution of the Work of this section at no expense to the Department. Damaged materials shall be repaired or replaced by mechanics experienced in the respective type of work, to the satisfaction of the Professional and Department.
- I. Prevent grout or mortar used in repointing and repair work from staining face of surrounding masonry and other surfaces. Remove immediately grout and mortar in contact with exposed masonry and other surfaces. Protect sills, ledges and projections from mortar droppings.

#### 1.14 COORDINATION

- A. Coordinate stone restoration and cleaning with public circulation patterns at Project Site. Some work is near public circulation patterns. Public circulation patterns cannot be closed off entirely, and in places can only be temporarily redirected around small areas of work. Plan and execute the Work accordingly.

#### 1.15 SEQUENCING AND SCHEDULING

- A.
- B. Perform stone repair work in the following sequence:
  - 1. Remove plant growth.
  - 2. Inspect for open mortar joints and repair before cleaning to prevent the intrusion of water and other cleaning materials into the wall.
  - 3. Remove paint and clean rust stains.
  - 4. Clean stone surfaces. Direct run-off away from building surface.
  - 5. Retain first subparagraph below if water repellents are part of Project.
  - 6. Repair stonework, including replacing existing stone with new stone material (Dutchman).
  - 7. Install composite patch material at areas indicated on the documents.
  - 8. Rake out mortar from joints to be repointed.
  - 9. Point mortar and sealant joints.
  - 10. After repairs and repointing have been completed and cured, perform a final cleaning to remove residues from this work.

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11. Coordinate the work of this section so repair work proceeds in a normal sequence and work does not interfere with work of other trades.
- C. As scaffolding is removed, patch anchor holes used to attach scaffolding. Patch holes in stone to comply with "Stone Patching" Article. Patch holes in mortar joints to comply with "Repointing Stonework" Article.

## PART 2 - PRODUCTS

### 2.01 MASONRY MATERIALS

- A. Granite stone: Provide natural building stone of variety, color, texture, grain, veining, finish, size, and shape to match existing stone and with physical properties
1. For existing stone that exhibits a range of colors, texture, grain, veining, finishes, sizes, or shapes, provide stone that proportionally matches that range rather than stone that matches an individual color, texture, grain, veining, finish, size, or shape within that range. Stone is to be standard grade free of cracks, seams, or starts which may impair integrity, appearance, or function and complying with the following ASTM performance standards:
    2. Density – 160 pounds per cubic foot, minimum
    3. Compressive Strength – 19,000 psi, minimum
- B. Limestone: Indiana (oolitic) limestone complying with the requirements of ASTM C568, Category II (medium density). Obtain limestone consistent with the color and texture range of the existing material. Stones shall be sound and free from cracks, chips, and other defects which may affect strength or appearance.
- C. Retain subparagraph below only if original quarry is known to have stone that meets appearance and other requirements. Often, original quarries cannot match historic stonework due to natural variations in the geologic deposit. See discussion in the Evaluations in Division 4 Section "Masonry Restoration and Cleaning."
- D. Retain first two paragraphs below for stone having bedding planes, usually sedimentary stone such as limestone and sandstone. Retain option in second paragraph if there are arches. Revise second paragraph if bedding planes are used ornamentally or with fleuri cut.
- E. Quarrying New Stone: Have quarry clearly label the direction of bedding planes when rough stone is quarried, to facilitate cutting stones so that natural bedding planes will be as required in "Cutting New Stone" Paragraph.
- F. Cutting New Stone: Regardless of how existing stone was cut and set, cut each new stone so that, when it is set in final position, natural bedding planes are essentially horizontal.
- G. Brick: Face brick shall be type FBS, Grade SW, in conformance with ASTM C216. New facing brick shall match existing brick in size, color, range, and texture of existing bricks.

### 2.02 MORTAR MATERIALS

- A. Portland Cement: ASTM C 150, Type I, non-staining and without air entrapment. Gray and white Portland cement may be combined where required for color matching of exposed mortar.
1. Provide cement containing not more than 0.60 percent total alkali when tested according to ASTM C 114.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Mortar Sand: ASTM C 144 unless otherwise indicated.

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1. Color: Provide natural sand of color necessary to produce required mortar color.
  2. Retain first subparagraph below if required.
  3. For pointing mortar, provide sand with rounded edges.
  4. Match size, texture, and gradation of existing mortar sand as closely as possible. Blend several sands if necessary to achieve suitable match.
  5. Sand shall be free of silt, loam, soluble salts and organic matter. Sand shall be cleaned (properly washed) to not cause staining or streaking on the building face.
- D. Mortar Pigments: Natural and synthetic iron oxides, compounded for mortar mixes. Use only pigments with a record of satisfactory performance in masonry mortars. Mortar pigments, if required to match the existing mortar, shall be a standard product manufactured by Solomon Grind-Chem Service, Riverton Lime Co., Medusa, or other approved manufacturer.
- E. Water: Potable, free from injurious amounts of oil, soluble salts, alkali, acids, organic impurities and other deleterious materials.
- F. Admixtures: do not use admixtures of any kind in mortar, unless otherwise indicated and with Professional's approval.
- G. Aggregate for Mortar: ASTM C144 unless otherwise indicated.
1. Color Mortar Aggregate: natural or manufactured sand to produce mortar color indicated to match size, texture and gradation of existing mortar as closely as possible.
- H. Mortar mixes:
1. Mortar mix proportions for repointing granite:
    - a. 1 part by volume white Portland cement.
    - b. 1 part by volume hydrated lime.
    - c. 3 parts sand.
  2. Mortar mix proportions for repointing limestone:
    - a. 1 part by volume white Portland cement.
    - b. 1 part by volume hydrated lime.
    - c. 6 parts sand.
  3. Mortar mix proportions for repointing brick:
    - a. 1 part by volume white Portland cement.
    - b. 1 part by volume hydrated lime.
    - c. 6 parts sand.
  4. Mortars for setting Dutchman:
    - a. Thin-set applications (joints less than 3/8" thick): Pointing mortar specified above, add Laticrete 4237 in accordance with manufacturer's instructions.

## 2.03 CEMENTITIOUS PATCHING MATERIALS AND MIXES

- A. Stone Patching Compound: Factory-mixed cementitious product that is custom manufactured for patching stone. Provide custom colored composite repair patching materials.
1. Products: Subject to compliance with requirements, provide one of the following or equal as approved by the Professional:
    - a. Cathedral Stone Products, Inc.; Jahn Restoration Mortars.
    - b. Conproco Corporation; Mimic and/or Matrix.
    - c. Edison Coatings, Inc.; Custom System 45.
  2. Use formulation that is vapor and water permeable (equal to or more than the stone), exhibits low shrinkage, frost and salt resistant, has lower modulus of elasticity than the stone units being repaired, and develops high bond strength to all types of stone.
  3. Use formulation having working qualities and retardation control to permit forming and sculpturing where necessary.

4. Formulate patching compound in colors, textures, and grain to match stone being patched. Provide five custom colors to enable matching each piece and type of stone.
  5. Follow manufacturer recommended mixing ratios.
- B. Cementitious Crack Filler: An ultrafine super plasticized grout that can be injected into cracks, is suitable for application to wet or dry cracks, exhibits low shrinkage, and develops high bond strength to all types of stone.
1. Products: Subject to compliance with requirements, provide the following or equal as approved by the Professional:
    - a. Cathedral Stone Products, Inc.; Jahn Injection Grout.
    - b. Conproco Corporation; Terra Cotta Finish.
    - c. Edison Coatings, Inc.; Pump-X 53-Series.
- C. Stone-to-Stone Adhesive: Epoxy-resin stone adhesive with a 15-to 45-minute cure at 70 deg F or 1-part cementitious stone adhesive, recommended by adhesive manufacturer for type of stone repair indicated, and matching stone color.
1. Products: Subject to compliance with requirements, provide the following or equal as approved by the Professional:
    - a. Two-Part Polyester or Epoxy-Resin Stone Adhesive:
      - 1) Akemi North America; Akepox
      - 2) Bonstone Materials Corporation; Fast Set 41
      - 3) Edison Coatings, Inc.; Flexi-Weld 520T
    - b. One-Part Cementitious Stone Adhesive:
      - 1) Cathedral Stone Products, Inc.; Jahn Restoration Adhesive.
- D. Stone Consolidation Treatment: Ready-to-use product designed for consolidation of stone that has deteriorated due to weathering and exposure to pollutants. Treatment shall be composed of silicic-ethyl esters, a neutral catalyst, and solvents.
1. Products: Subject to compliance with requirements, provide the following or equal as approved by the Professional:
    - a. Akemi North America; Stone Strengthener K.
    - b. Cohalan Company, Inc.; Keim Silex OH.
    - c. Diedrich Technologies Inc.; D50C.
    - d. HCT pretreatment in first subparagraph below is recommended by manufacturer for extremely deteriorated carbonate stones (marble and limestone). It forms a conversion layer, not film, on carbonate mineral grains, thereby increasing resistance to acid attack.
    - e. PROSOCO; Conservare OH100 Stone Strengthener with HCT pretreatment.

#### 2.04 PAINT REMOVERS

- A. Alkaline Paste Paint Remover: Manufacturer's standard alkaline paste formulation for removing paint coatings from masonry.
1. Products: Subject to compliance with requirements, provide one of the following or equal as approved by the Professional:
    - a. ABR Products, Inc.; 800 Brush Grade.
    - b. Diedrich Technologies Inc.; 606 Multi-Layer Paint Remover or 606X Extra Thick Multi-Layer Paint Remover.
    - c. Hydroclean, Hydrochemical Techniques, Inc.; Hydroclean HT-716 Heavy Duty Paint Remover.
    - d. PROSOCO; Sure Klean Heavy-Duty Paint Stripper.
- B. Solvent-Type Paint Remover: Manufacturer's standard water-rinsable, solvent-type gel formulation for removing paint coatings from masonry.

1. Products: Subject to compliance with requirements, provide one of the following or equal as approved by the Professional:
  - a. ABR Products, Inc.; Super Bio Strip Gel.
  - b. Diedrich Technologies Inc.; 505 Special Coatings Stripper.
  - c. Dumond Chemicals, Inc.; Peel Away 2.
  - d. Hydroclean, Hydrochemical Techniques, Inc.; Hydroclean HT-300 Solvent Paint Remover.
  - e. Price Research, Ltd.; Price Strip-All.
  - f. PROSOCO; Sure Klean Fast Acting Stripper.

## 2.05 MIXING PROCEDURES

- A. Pointing Mortar:
  1. Mix mortar in accordance with ASTM C-270
  2. Measure materials by volume or equivalent weight as indicated. Do not measure by shovel.
  3. Mix ingredients in a clean mechanical batch mixer for 3 to 5 minutes.
  4. Mortar shall stand for 20 minutes prior to use to allow for initial shrinkage. Place mortar in final position within two (2) hours of mixing. Do not retemper or use partially hardened mortar.
- B. Patching Mortar
  1. Mix patching mortar in accordance with the manufacturer's instructions. Add liquid to mortar material in a clean bucket and mix with trowel until all the dry material has been moistened. Do not mix more mortar than can be used in a 30 minute period.
  2. Mortar is to be mixed to the proper consistency when a handful of material squeezed into a ball leaves little or no mortar residue on the hand.
  3. All personnel to be involved in limestone patching work must complete certification coursework as required by the manufacturer.

## 2.06 ACCESSORY MATERIALS

- A. Sealant Materials:
  1. Provide manufacturer's standard chemically curing, elastomeric sealant(s) of base polymer and characteristics indicated below that comply with applicable requirements in Division 7 Section "Joint Sealants."
  2. Colors: Provide colors of exposed sealants to match colors of stonework adjoining installed sealant unless otherwise indicated.
- B. Joint-Sealant Backing:
  1. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin) and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
  2. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.
- C. Setting Buttons: Resilient plastic buttons, nonstaining to stone, sized to suit joint thicknesses and bed depths of stone units without intruding into required depths of pointing materials.
- D. Masking Tape: Nonstaining, nonabsorbent material, compatible with pointing mortar, joint primers, sealants, and surfaces adjacent to joints; that will easily come off entirely, including adhesive.



- E. Retain first paragraph below if retaining requirement in Part 3 for coating existing anchors within wall.
- F. Antirust Coating: Fast-curing, lead- and chromate-free, self-curing, universal modified-alkyd primer complying with SSPC-Paint 20 or SSPC-Paint 29 zinc-rich coating.
  - 1. Use coating requiring no better than SSPC-SP 3, "Power Tool Cleaning" surface preparation according to manufacturer's literature or certified statement.
  - 2. Use coating with a VOC content of 420 g/L (3.5 lb/gal) or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- G. Miscellaneous Products: Select materials and methods of use based on the following, subject to approval of a mockup:
  - 1. Previous effectiveness in performing the work involved.
  - 2. Little possibility of damaging exposed surfaces.
  - 3. Consistency of each application.
  - 4. Uniformity of the resulting overall appearance.
  - 5. Do not use products or tools that could do the following:
    - a. Remove, alter, or in any way harm the present condition or future preservation of existing surfaces, including surrounding surfaces not in contract.
    - b. Leave a residue on surfaces

#### 2.07 MANUFACTURERS:

- A. Restoration and Cleaning Chemicals:
  - 1. Prosoco, Inc. [www.prosoco.com/#sle](http://www.prosoco.com/#sle).
  - 2. Aqua Mix
  - 3. Chemique, Inc.
  - 4. Diedrich Technologies, Inc: [www.diedrichtechnologies.com/#sle](http://www.diedrichtechnologies.com/#sle).
  - 5. HMK Stone Care System: [www.hmkstonecare.com/#sle](http://www.hmkstonecare.com/#sle).
  - 6. Paint removal basis of design:
    - a. Prosoco, Inc. product Sure Klean Heavy Duty Paint Stripper Paint, Coating & Graffiti Removers
- B. Patching:
  - 1. Basis of Design: 3M BONDO All Purpose Putty 3M Bondo
  - 2. Evercoat Polyester Glazing Putty, a division of Illinois Tool Works, Inc., Evercoat.
  - 3. Isopon Body Filler, manufactured by U-POL Ltd. U-POL

#### 2.08 MASONRY CLEANING AND PATCHING MATERIALS GENERAL:

- A. Cleaners: Provide cleaners specifically manufactured for each substrate and soiling condition.
  - 1. Cleaning basis of design for quarry tile: "Aqua Mix 1 & 2 Deep Clean", Aqua Mix
  - 2. General cleaning basis of design for glazed block: "Sure Klean Vana Trol" by Prosoco.
  - 3. Rust Remover Basis of Design: Prosoco "Sure Klean Ferrous Stain Remover".
- B. Water: Clean, drinkable, and free of deleterious materials.
  - 1. 180 Degrees F Hot Water: Required for removal of paint, tar, and asphalt.
- C. Brushes: Soft bristle with fiber type recommended by cleaner manufacturer for each cleaner used.
- D. Pressure Cleaning Equipment:
  - 1. Pressure: 1,000 psi.
  - 2. Spray Tip: 15 degree spread.

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3. Water Flow Rate: 4 gallons per minute. [https://www.3m.com/3M/en\\_US/bondo-us/](https://www.3m.com/3M/en_US/bondo-us/)

## 2.09 CLEANING MATERIALS

### A. CSP Cleaners

1. CSP Bio-Cleaner should be used in their undiluted form. No acids, bases, caustics, solvents or other agents should be added. Products should be applied to limestone, sandstone, unpolished granite, terra cotta, concrete, brownstone, brick and other masonry surfaces. Acceptable products are available through Cathedral Stone Products. Tel: 410-782-9150; fax: 410-782-9155.
2. Miscellaneous Equipment
  - a. Natural bristle brush
  - b. Paint roller
  - c. Airless sprayer
  - d. Clean rags
  - e. Latex gloves
  - f. Eye and skin protection
  - g. Garden hose with running water supply
  - h. Pressure washer using 600 to 1200 psi
  - i. Soft bristle scrub brush

- B. Limestone – Water Cleaning: Water shall be potable, non-staining and free of soluble salts, oils, organic matter and other substances deleterious to the surfaces to be cleaned. No detergents or other agents shall be added to cleaning water unless specifically directed by the Professional.

### C. Brick Cleaning – Light Duty Restoration Cleaner:

1. ProSoCo, Inc.: EnviroKlean Saf Restorer
2. Chemique: Artisan – No Pane Restoration Cleaner
3. Cathedral Stone: masonRE G
4. The product shall be used as packaged. Do not dilute or mix with other products.

### D. Cleaning of Efflorescence from Brick – Light Duty Restoration Cleaner:

1. ProSoCo, Inc.: Sure Klean Hard Water Desposit Remover
2. Chemique: Artisan – Efflorescence Remover
3. Other Approved Equal
4. The product shall be used as packaged. Do not dilute or mix with other products.

### E. Limestone, Granite and Concrete Cleaning – Light Duty Restoration Cleaner:

1. ProSoCo, Inc.: EnviroKlean Saf Restorer
2. Chemique: Artisan – Safer L/S Cleaner
3. Cathedral Stone: masonRE B
4. The product shall be used as packaged. Do not dilute or mix with other products.

### F. Iron Stains on Limestone – Ferrous Stain Remover

1. ProSoCo, Inc.: SureKlean Ferrous Stain Remover
2. Chemique: Artisan – Heavy Duty Rust Remover
3. Cathedral Stone: masonRE Rust Remover
4. The product shall be used as packaged, do not mix with other products. Dilute based on manufacturers requirements listed on product data sheet.

### G. Iron Stains on Granite – Ferrous Stain Remover: Cleaner as manufactured by:

1. ProSoCo, Inc.
2. Chemique: Artisan



3. Cathedral Stone: masonRE
4. The product shall be used as packaged, do not mix with other products. Dilute based on manufacturers requirements listed on product data sheet.

- H. Copper Stain Cleaning:
1. ProSoCo, Inc.: T515 Copper Stain Remover
  2. Other Approved Equal
  3. The product shall be used as packaged, do not mix with other products. Dilute based on manufacturers requirements listed on product data sheet.

## 2.10 TERRA COTTA RESTORATION AND SKYWARD COATING

- A. Terra Cotta restoration of terra cotta cornice and other masonry terra cotta
- B. Basis of design products for Terra Cotta restoration Manufacturer
1. CONPROCO 17 Production Drive, Dover, NH 03820
  2. 800.258.3500 FAX 603.743.5744 www.conproco.com
  3. <https://conproco.com/product-category/masonry-repair-restoration/terracotta/>
- C. Provide waterproof and breathable coating for 100% of skyward side of terracotta cornice using Elastideck by Conproco or equal approved products by Jahn or Cathedral Stone.
- D. Conproco Products for the following Terra Cotta Repairs and Restoration:
- E. Decorative protective coating for Parapet and as otherwise indicated on drawings:
1. ELASTIDECK
- F. Repair and reconstruct natural and cast stone, terracotta and brick:
1. MATRIX
- G. Repair and reconstruct natural and cast stone, terracotta and brick with smooth finish to match:
1. MATRIX Superfine
- H. Thin, protective repairs to terracotta, limestone and other soft stones and concrete
1. MATRIX TR
- I. Repair for Colored Glaze finishes for Terra Cotta and other glazed finishes
1. Terra-Color
- J. Apply over Terra-Color to match surrounding undamaged terracotta
1. TERRACOTTA Finish

## PART 3 - EXECUTION

### 3.01 GENERAL

- A. EXAMINATION and PREPARATION
1. Verify that surfaces to be cleaned are ready for work of this section.
  2. Protect surrounding elements from damage due to restoration procedures.
  3. Carefully remove and store removable items located in areas to be restored, including fixtures, fittings, finish hardware, and accessories; reinstall upon completion.
  4. Separate areas to be protected from restoration areas using means adequate to prevent damage.
  5. Mask immediately adjacent surfaces with material that will withstand cleaning and restoration procedures.

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- B. The Contractor shall inspect the areas to be cleaned prior to commencing operations. All open joint, anchor penetrations and other openings shall be temporarily sealed using removable caulk to prevent penetration of water behind the stone cladding.
- C. Based on testing, cleaning is to be done in the following order:
  1. Water-Misting Cleaning
  2. Low Pressure Washing
  3. Light Duty Chemical Cleaning as Documented, up to three (3) applications as required, with cold water, low-pressure rinse after each application
  4. Application of Ferrous Stain Removal as Documented

### 3.02 REPOINT EXISTING MASONRY

- A. General: Repoint joints in granite, limestone, and brick as shown on the Drawings.
  1. Perform repointing prior to cleaning masonry surfaces.
  2. Cut out loose or disintegrated mortar in joints to minimum 1/2 inch depth or until sound mortar is reached.
  3. Use power tools only after test cuts determine no damage to masonry units will result.
  4. Do not damage masonry units.
  5. When cutting is complete, remove dust and loose material by brushing.
  6. Premoisten joint and apply mortar. Pack tightly in maximum 1/4 inch layers. Form a smooth, compact concave joint to match existing.
  7. Moist cure for 72 hours.
  8. Immediately remove stains, efflorescence, or other excess resulting from the work of this section.
  9. Remove excess mortar, smears, and droppings as work proceeds and upon completion.
  10. Clean surrounding surfaces.
- B. Mortar: Mixing and Installation Procedures:
  1. In cold weather for exterior masonry, maintain the temperature of the mortar at time of use to above 50°F, but less than 85°F. Do not heat water.
  2. Measure cementitious and aggregate material in a dry condition by volume or equivalent weight. Do not measure by shovel, use known measure.
  3. Mix ingredients in clean mechanical batch mixer 3 to 5 minutes.
  4. Let setting mortar sit 20 minutes prior to use to allow for initial shrinkage.
  5. Repointing mortar shall be pre-hydrated to reduce shrinkage. Lime and sand shall be mixed with only enough water to produce an unworkable mix that will retain its shape.

### 3.03 MORTAR PATCHING – LIMESTONE CRACKS

- A. All cracks must be filled as noted on the Drawings. Cracks with existing patches which show visible signs of failure shall be removed and replaced. Prepare crack by removing all previous patching material or foreign debris. If crack is less than 1/8 inch wide, open up crack with a dremel tool with rotar top to a minimum width of 1/8 inch wide.
- B. Remove deteriorated material and remove adjacent material that has begun to deteriorate. Carefully remove additional material so patch will not have feathered edges but will have square or slightly undercut edges on areas to be patched and will be at least 1/2 inch thick, but not less than recommended by patching compound manufacturer.
- C. Thoroughly wet area to be patched to prevent suction of moisture from the patching material. Apply a slurry coat of mortar to the substrate.

- D. Install injection mortar material in layers to fill the required depth of crack in accordance with the manufacturer's published instructions. Roughen surface of each layer to provide a key for next layer.
  - 1. Trowel, scrape, or carve surface of patch to match texture and surrounding surface plane or contour of the stone. Shape and finish surface before or after curing, as determined by testing, to best match existing stone.
  - 2. Build up  $\frac{1}{8}$  inch above surrounding stone and carve surface to match adjoining stone after patching compound has hardened.
- E. Keep the mortar patches damp for 72 hours using damp burlap, plastic sheeting, or other membrane as required.
- F. Remove and replace patches with hairline cracks or that show separation from stone at edges, and those that do not match adjoining stone in color or texture.

### 3.04 DUTCHMAN PATCHING – LIMESTONE AND GRANITE

- A. Remove damaged stone down to sound material and square up the edges of the area to be patched to form a neat rectangular opening. When patching granite, a core drill may be used to remove damaged material where the spalled area is small.
- B. Where there is an existing corroded anchor, wire brush or otherwise remove corrosion down to sound metal. Coat anchors with zinc based primer and allow to cure prior to installing Dutchman patch.
- C. Cut a piece of stone of a color and texture matching the original surface to fit the dimensions of the prepared area. A stone plug may be used for small granite patches only in lieu of a traditional Dutchman. Check the fit of the Dutchman prior to applying adhesive, making certain the contact surfaces of the repair stone fit tightly to minimize the appearance of the glue line. Where an entire stone is to be replaced, the Dutchman shall be sized to maintain the existing joint width and placement.
- D. Where the required Dutchman exceeds 100 square inches in area, stainless steel anchor pins will be required. The Contractor shall consult the Professional regarding the number and placement of stainless steel anchors.
- E. Apply adhesive carefully to the prepared opening, keeping adhesive away from exposed edges to minimize squeezing of the adhesive out of the joint and onto the stone surface. Insert the Dutchman into the prepared opening.
- F. After adhesive has set, grind or sand any excess Dutchman material down to the level of the adjoining surface. Using a fine abrasive, complete the sanding until the Dutchman is flush with the surrounding stone.
- G. Remove mortar from joints that abut area of stone removal to same depth as stone was removed. Remove loose mortar particles and other debris from surfaces to be bonded and surfaces of adjacent stone units that will receive mortar by cleaning with stiff-fiber brush.
- H. Retain last option in first paragraph below for stone having bedding planes, usually sedimentary stone such as limestone and sandstone, unless this degree of control is considered unnecessary for dutchmen.
- I. Cut and trim partial replacement to accurately fit area where material was removed from backing stone. Fabricate to size required to produce joints between partial replacement and backing stone of no more than 1/16 inch (1.6 mm) in width, and joints between partial replacement and other stones that match existing joints between stones.

- J. Retain one of first two paragraphs below if large partial replacements that can accommodate pinning are required. Second paragraph might be required for noticeably patterned stones close to view, but is more difficult. Revise pin diameter, length, or spacing if required. Consider deleting third option in either paragraph and detailing pin layout on Drawings. If retaining either paragraph, verify that method is appropriate to type of stone used.
- K. Pinning: Before applying adhesive, prepare for mechanical anchorage consisting of 1/4-inch- (6-mm-) diameter, threaded stainless-steel pins set into 1/4-inch- (6-mm-) diameter holes drilled at a 45-degree downward angle through face of partial replacement and into backing stone. Center and space pins between 3 and 5 inches (75 and 125 mm) apart and at least 2 inches (50 mm) from any edge. Insert pins at least 2 inches (50 mm) into backing stone and 2 inches (50 mm) into partial replacement with end countersunk at least 3/4 inch (19 mm) from exposed face of partial replacement.
- L. Concealed Pinning: Before applying adhesive, prepare for concealed mechanical anchorage consisting of 1/4-inch- (6-mm-) diameter, threaded stainless-steel pins set into 1/4-inch- (6-mm-) diameter holes drilled into backing stone and into, but not through, the partial replacement. Center and space pins between 3 and 5 inches (75 and 125 mm) apart and at least 2 inches (50 mm) from any edge. Insert pins at least 2 inches (50 mm) into backing stone and 2 inches (50 mm) into partial replacement, but no closer than 3/4 inch (19 mm) from exposed face of partial replacement.
- M. Apply stone-to-stone adhesive to comply with adhesive manufacturer's written instructions. Coat bonding surfaces of backing stone and partial replacement, completely filling all crevices and voids.
- N. Apply partial replacement while adhesive is still tacky and hold securely in place until adhesive has cured. Use shims, clamps, wedges, or other devices as necessary to align face of partial replacement with face of backing stone.
- O. Retain option in paragraph below if retaining "Pinning" Paragraph.
- P. Clean adhesive residue from exposed surfaces and patch chipped areas and exposed drill holes.

### 3.05 GRANITE AND LIMESTONE REPOINTING

- A. Areas of granite and limestone masonry to be pointed are designated M1 on the Drawings. The extent of the work shall be reviewed with the Professional at the site before beginning operations.
- B. Rake designated mortar material out of the joints:
  1. For limestone, use a chisel less than  $\square$  inch in width. Do not use power-operated grinders without the Professional's written approval based upon approved quality-assurance program. Prying against the arrises of the building stones shall be avoided. Do not chip, spall, or cut into the edges of the stone with the chisel or the grinder. Clean all mortar from surfaces within the joint so that the new pointing bonds to the building stone rather than the old mortar.
  2. For granite, use a chisel less than  $\square$  inch in width or by mechanical grinding using a carborundum blade. For mechanical grinders, cut out center of mortar bed joints with carborundum blade and remove remaining mortar by hand with chisel and resilient mallet. Prying against the arrises of the building stones shall be avoided. Do not chip, spall, or cut into the edges of the stone with the chisel or the grinder. Clean all mortar from surfaces within the joint so that the new pointing bonds to the building stone rather than the old mortar.
  3. Do not spall edges or widen joints.

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- C. Notify the Professional of unforeseen detrimental conditions including voids in mortar joints, cracks, loose stone, rotted wood, rusted metal, and other deteriorated items.
- D. If work is found to be unacceptable, all raking will cease without additional cost to the Department until deficiencies in tools, workmanship, or methodology have been corrected to the Professional's satisfaction.
- E. Rake back a minimum of  $\frac{1}{4}$  inch to sound mortar. Brush, vacuum, or blow joints clean with compressed air to remove sediment and debris. Do not use water to remove sediment and debris from the mortar joint.
- F. Apply new mortar in  $\frac{1}{4}$  inch thick layers, allowing each layer to reach initial set/thumb-print hardness before applying succeeding layers. Work mortar into the full depth of the joint using a flexible tool.
- G. When final layer of mortar is thumb-print hard, tool joint as required to match the existing profile. Avoid feather-edging of joints. Remove and dispose of excess mortar promptly before it can set or stain masonry.
- H. Keep joints damp for 72 hours after repointing using damp burlap, plastic, or other waterproof membrane. Adjust curing methods to ensure that pointing mortar is damp throughout its depth without eroding surface mortar.
- I. Hairline cracking within the mortar or mortar separation at edge of a joint is unacceptable. Completely remove such mortar and repoint.
- J. The Contractor shall leave the granite and limestone surface clean of mortar, grease, or other spots. Any compounds proposed for cleaning stains shall be approved by the Professional prior to use.
- K. Pointing with Sealant – for use at the meeting of dissimilar materials and at wash joints:
  1. After raking out, keep joints dry and free of mortar and debris.
  2. Clean and prepare joint surfaces according to Division 7 Section "Joint Sealants." Prime joint surfaces unless sealant manufacturer recommends against priming. Do not allow primer to spill or migrate onto adjoining surfaces.
  3. Fill sealant joints with specified joint sealant according to Division 7 Section "Joint Sealants" and the following:
    - a. Install cylindrical sealant backing beneath the sealant except where space is insufficient. There, install bond-breaker tape.
    - b. Install sealant using only proven installation techniques that will ensure that sealant will be deposited in a uniform, continuous ribbon, without gaps or air pockets, and with complete wetting of the joint bond surfaces equally on both sides. Fill joint flush with surrounding stonework and matching the contour of adjoining mortar joints.
    - c. Install sealant as recommended by sealant manufacturer but within the following general limitations, measured at the center (thin) section of the bead:
    - d. Fill joints to a depth equal to joint width, but not more than 1/2 inch (13 mm) deep or less than 1/4 inch (6 mm) deep.
    - e. Immediately after first tooling, apply ground-mortar aggregate to sealant, gently pushing aggregate into the surface of sealant. Retool sealant to form smooth, uniform beads, slightly concave. Remove excess sealant and aggregate from surfaces adjacent to joint.
    - f. Do not allow sealant to overflow or spill onto adjoining surfaces, or to migrate into the voids of adjoining surfaces, particularly rough textures. Remove excess and spillage of sealant promptly as the work progresses. Clean adjoining surfaces by the means necessary to eliminate evidence of spillage, without damage to

adjoining surfaces or finishes, as demonstrated in an approved mockup.  
4. Cure sealant according to Division 7 Section "Joint Sealants."

L. Where repointing work precedes cleaning of existing stone, allow mortar to harden at least 30 days before beginning cleaning work.

### 3.06 GRANITE TOOLING

A. Areas of deteriorated granite to be tooled are designated as M14 on the Drawings. The extent of the work shall be reviewed with the Professional at the site before beginning operations.

B. Rub all deteriorated granite with granite gneiss block with round edges (or stone material that is softer and more friable than granite). Remove all loose and friable material on the surface of the granite. Rub all rough edges to sound and smooth surface.

### 3.07 BRICK REPOINTING

A. Areas of brick masonry to be repointed are designates as M1, M5 on the Drawings. The extent of the work shall be reviewed with the Architect at the site before beginning operations.

B. Rake designated mortar material out of the joints using a chisel less than  $\frac{1}{4}$  inch in width or by mechanical grinding using a carborundum blade. For mechanical grinders, cut out center of mortar bed joints with carborundum blade and remove remaining mortar by hand with chisel and resilient mallet. Prying against the arrises of the brick shall be avoided. Do not chip, spall, or cut into the edges of the brick. Clean all mortar from surfaces within the joint so that the new pointing bonds to the building stone rather than the old mortar.

C. If work is found to be unacceptable, all raking will cease without additional cost to the Department until deficiencies in tools, workmanship, or methodology have been corrected to the Professional's satisfaction.

D. Rake back a minimum of  $\frac{1}{4}$  inch to sound mortar. Brush, vacuum, or blow joints clean with compressed air to remove sediment and debris. Do not use water to remove sediment and debris from the mortar joint.

E. Apply new mortar in  $\frac{1}{4}$  inch thick layers, allowing each layer to reach initial set/thumb-print hardness before applying succeeding layers. Work mortar into the full depth of the joint using a flexible tool.

F. When final layer of mortar is thumb-print hard, tool joint as required to match the existing profile. Avoid feather-edging of joints. Remove and dispose of excess mortar promptly before it can set or stain masonry.

G. Keep joints damp for 72 hours after repointing using damp burlap, plastic, or other waterproof membrane.

H. The Contractor shall leave the brick surface clean of mortar, grease, or other spots. Any compounds proposed for cleaning stains shall be approved by the Professional prior to use.

I. Pointing with Sealant – for use at the meeting of dissimilar materials and at wash joints:

1. After raking out, keep joints dry and free of mortar and debris.
2. Clean and prepare joint surfaces according to Division 7 Section "Joint Sealants." Prime joint surfaces unless sealant manufacturer recommends against priming. Do not allow primer to spill or migrate onto adjoining surfaces.
3. Fill sealant joints with specified joint sealant according to Division 7 Section "Joint Sealants" and the following:

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- a. Install cylindrical sealant backing beneath the sealant except where space is insufficient. There, install bond-breaker tape.
  - b. Install sealant using only proven installation techniques that will ensure that sealant will be deposited in a uniform, continuous ribbon, without gaps or air pockets, and with complete wetting of the joint bond surfaces equally on both sides. Fill joint flush with surrounding stonework and matching the contour of adjoining mortar joints.
  - c. Install sealant as recommended by sealant manufacturer but within the following general limitations, measured at the center (thin) section of the bead:
    - 1) Fill joints to a depth equal to joint width, but not more than 1/2 inch (13 mm) deep or less than 1/4 inch (6 mm) deep.
  - d. Immediately after first tooling, apply ground-mortar aggregate to sealant, gently pushing aggregate into the surface of sealant. Retool sealant to form smooth, uniform beads, slightly concave. Remove excess sealant and aggregate from surfaces adjacent to joint.
  - e. Do not allow sealant to overflow or spill onto adjoining surfaces, or to migrate into the voids of adjoining surfaces, particularly rough textures. Remove excess and spillage of sealant promptly as the work progresses. Clean adjoining surfaces by the means necessary to eliminate evidence of spillage, without damage to adjoining surfaces or finishes, as demonstrated in an approved mockup.
4. Cure sealant according to Division 7 Section "Joint Sealants."
- J. Where repointing work precedes cleaning of existing brick, allow mortar to harden at least 30 days before beginning cleaning work.

### 3.08 BRICK REPAIR

- A. Carefully dismantle selected areas of masonry where designated M7 on the Drawings. Dismantle adjacent assemblies as required for access to the designated masonry, salvaging components for reuse to the greatest extent possible.
- B. Rake or grind mortar from joints to the greatest extent possible before attempted removal of brick. Avoid excessive prying against the arrises of the selected masonry units to avoid spalling and chipping.
- C. Clean old mortar and sealants from masonry units to be reassembled.
- D. Reset bricks to proper position, straight and plumb and true to line and level, with full mortar bed. Ensure that vertical joints are completely filled with mortar. Rake and point as described above except at coping head joints, which shall be pointed with flexible sealant.
- E. Reinstall adjacent materials or patch in kind as required to complete this installation.

### 3.09 SELECTIVE MASONRY REMOVALS

- A. Cut masonry units with motor-driven saws to provide clean, sharp, unchipped edges. Cut at joints wherever possible and as required to accept new masonry openings as indicated.
- B. Salvage masonry units being removed to the greatest extent possible for re-use as Dutchmen at other areas of the building.

### 3.10 PROTECTION

- A. Protect persons, motor vehicles, surrounding surfaces of building being restored, building site, plants, and surrounding buildings from harm resulting from stone restoration work.

1. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during course of restoration and cleaning work.
- B. Prevent mortar from staining face of surrounding stone and other surfaces.
  1. Cover sills, ledges, and projections to protect from mortar droppings.
  2. Keep wall area wet below rebuilding and pointing work to discourage mortar from adhering.
  3. Immediately remove mortar in contact with exposed stone and other surfaces.
  4. Clean mortar splatters from scaffolding at end of each day.

### 3.11 UNUSED ANCHOR REMOVAL

- A. Remove stone anchors, brackets, wood nailers, and other extraneous items no longer in use unless identified as historically significant or indicated to remain.
  1. Remove items carefully to avoid spalling or cracking stone.
  2. Where directed, if an item cannot be removed without damaging surrounding stone, do the following:
    - a. Cut or grind off item approximately 3/4 inch (20 mm) beneath surface and core drill a recess of same depth in surrounding stone as close around item as practical.
    - b. Immediately paint exposed end of item with two coats of antirust coating, following coating manufacturer's written instructions and without exceeding manufacturer's recommended dry film thickness per coat. Keep paint off sides of recess.
  3. Patch the hole where each item was removed unless directed to remove and replace the stone unit.

### 3.12 STONE REMOVAL AND REPLACEMENT

- A. At locations indicated, remove stone that has deteriorated or is damaged beyond repair. Carefully demolish or remove entire units from joint to joint, without damaging surrounding stone, in a manner that permits replacement with full-size units.
- B. Support and protect remaining stonework that surrounds removal area. Maintain flashing, reinforcement, lintels, and adjoining construction in an undamaged condition.
- C. Notify Professional of unforeseen detrimental conditions including voids, cracks, bulges, and loose units in existing stone or unit masonry backup, rotted wood, rusted metal, and other deteriorated items.
- D. Remove in an undamaged condition as many whole stone units as possible.
  1. Remove mortar, loose particles, and soil from stone by cleaning with hand chisels, brushes, and water.
  2. Remove sealants by cutting close to stone with utility knife and cleaning with solvents.
  3. Store stone for reuse. Store off ground, on skids, and protected from weather.
  4. Deliver cleaned stone not required for reuse to the Department unless otherwise indicated.
- E. Clean stone surrounding removal areas by removing mortar, dust, and loose particles in preparation for replacement.
- F. Replace removed damaged stone with other removed stone in good quality, where possible, or with new stone matching existing stone, including size. Do not use broken units unless they can be cut to usable size.



- G. Do not allow face bedding of stone. Before setting, inspect to verify that each stone has been cut so that, when it is set in final position, natural bedding planes are essentially horizontal. Reject and replace stone with vertical bedding planes except as required for arches, lintels, and copings.
- H. Install replacement stone into bonding and coursing pattern of existing stone. If cutting is required, use a motor-driven saw designed to cut stone with clean, sharp, un-chipped edges. Finish edges to blend with appearance of edges of existing stone.
  - 1. Maintain joint width for replacement stone to match existing joints.
  - 2. Use setting buttons or shims to set stone accurately spaced with uniform joints.
- I. Set replacement stone with completely filled bed, head, and collar joints. Butter vertical joints for full width before setting and set units in full bed of mortar unless otherwise indicated. Replace existing anchors with new anchors of size and type indicated.
  - 1. Tool exposed mortar joints in repaired areas to match joints of surrounding existing stonework.
  - 2. Retain subparagraph above or first subparagraph below. Coordinate with mortar mixes in Part 2.
  - 3. Rake out mortar used for laying stone before mortar sets and point new mortar joints in repaired area to comply with requirements for repointing existing stone, and at same time as repointing of surrounding area.
  - 4. When mortar is sufficiently hard to support units, remove shims and other devices interfering with pointing of joints.

### 3.13 PAINTING STEEL UNCOVERED DURING THE WORK

- A. Inspect steel exposed during stone removal. Where The Professional determines that it is structural, or for other reasons cannot be totally removed, prepare and paint it as follows:
  - 1. Remove paint, rust, and other contaminants as applicable to meet paint manufacturer's recommended preparation.
  - 2. Immediately paint exposed steel with two coats of antirust coating, following coating manufacturer's written instructions and without exceeding manufacturer's recommended rate of application (dry film thickness per coat).
- B. If on inspection and rust removal, the cross section of a steel member is found to be reduced from rust by more than 1/16 inch (1.6 mm) notify The Professional before proceeding.

### 3.14 STONE PLUG REPAIR

- A. Remove cylindrical piece of damaged stone by core-drilling perpendicular to stone surface.
- B. Prepare a replacement plug by core-drilling replacement stone. Use a drill sized to produce a core that will fit into hole drilled in damaged stone with only minimum gap necessary for adhesive. Cut and install plug so that, when it is set in final position, natural bedding planes will match the orientation of bedding planes of the backing stone unless otherwise indicated.
- C. Apply stone-to-stone adhesive to comply with adhesive manufacturer's written instructions. Coat bonding surfaces of existing stone and plug, completely filling all crevices and voids.
- D. Apply plug while adhesive is still tacky and hold securely in place until adhesive has cured.
- E. Clean adhesive residue from exposed surfaces.

### 3.15 STONE-FRAGMENT REPAIR

- A. Carefully remove cracked or fallen stone fragment indicated to be repaired. Reuse only stone fragment that is in sound condition.
- B. Remove soil, loose particles, mortar, and other debris or foreign material, from fragment surfaces to be bonded and from parent stone where fragment had broken off, by cleaning with stiff-fiber brush.
- C. Pinning: Before applying adhesive, prepare for mechanical anchorage consisting of 1/4-inch- (6-mm-) diameter, threaded stainless-steel pins set into 1/4-inch- (6-mm-) diameter holes drilled at a 45-degree downward angle through face of fragment and into parent stone. Center and space pins between 3 and 5 inches (75 and 125 mm) apart and at least 2 inches (50 mm) from any edge. Insert pins at least 2 inches (50 mm) into parent stone and 2 inches (50 mm) into fragment with end countersunk at least 3/4 inch (19 mm) from exposed face of fragment.
- D. Concealed Pinning: Before applying adhesive, prepare for concealed mechanical anchorage consisting of 1/4-inch- (6-mm-) diameter, threaded stainless-steel pins set into 1/4-inch- (6-mm-) diameter holes drilled into parent stone and into, but not through, the fragment. Center and space pins between 3 and 5 inches (75 and 125 mm) apart and at least 2 inches (50 mm) from any edge. Insert pins at least 2 inches (50 mm) into parent stone and 2 inches (50 mm) into fragment, but no closer than 3/4 inch (19 mm) from exposed face of fragment.
- E. Apply stone-to-stone adhesive to comply with adhesive manufacturer's written instructions. Coat bonding surfaces of fragment and parent stone, completely filling all crevices and voids.
- F. Fit stone fragment onto parent stone while adhesive is still tacky and hold fragment securely in place until adhesive has cured. Use shims, clamps, wedges, or other devices as necessary to align face of fragment with face of parent stone.
- G. Clean adhesive residue from exposed surfaces and patch chipped areas and exposed drill holes.

### 3.16 CRACK INJECTION

- A. General: Comply with cementitious crack-filler manufacturer's written instructions.
- B. Drill 1/4-inch- (6-mm-) diameter injection holes as follows:
  - 1. Transverse Cracks Less Than 3/8 inch (9 mm) Wide: Drill holes through center of crack at 12 to 18 inches (300 to 500 mm) o.c.
  - 2. Transverse Cracks More Than 3/8 inch (9 mm) Wide: Drill holes through center of crack at 18 to 36 inches (500 to 900 mm) o.c.
  - 3. Delaminations: Drill holes at approximately 18 inches (500 mm) o.c. both vertically and horizontally.
  - 4. Drill holes 2 inches (50 mm) deep. Where possible drill holes in mortar joints.
- C. Clean out drill holes and cracks with compressed air and water. Remove dirt and organic matter, loose material, sealants, and failed crack repair materials.
- D. Place plastic injection ports in drilled holes and seal face of cracks between injection ports with clay or other non-staining, removable plugging material. Leave openings at upper ends of cracks for air release.

- E. Inject cementitious crack filler through ports sequentially, beginning at one end of area and working to opposite end; where possible, begin at lower end of injection area and work upward. Inject filler until it extrudes from adjacent ports. After port has been injected, plug with clay or other suitable material and begin injecting filler at adjacent port, repeating process until all ports have been injected.
- F. Clean cementitious crack filler from face of stone before it sets by scrubbing with water.
- G. After cementitious crack filler has set, remove injection ports, plugging material, and excess filler. Patch injection holes and surface of cracks as specified in "Stone Patching" Article.

### 3.17 STONE CONSOLIDATION TREATMENT

- A. Apply treatment to clean, dry surfaces according to manufacturer's written instructions. Remove areas of blind exfoliation, delamination, and flaking before applying.
- B. Apply in cycles to small sections of stonework, not more than 100 sq. ft. (9 sq. m) in area. Each cycle shall consist of 3 successive saturating applications, applied at 5- to 15-minute intervals depending on drying conditions.
- C. Apply by low-pressure spray to point of rejection in each application. Apply from bottom of section to top.
- D. Apply 3 cycles, allowing treated surface to dry for 60 to 90 minutes between cycles.
- E. Protect treated surfaces from rain for 48 hours after treatment.
- F. Allow treated surfaces to dry for at least 21 days before repointing, patching, or applying water repellents or sealants.

### 3.18 CLEANING AFTER STONE REPAIR

- A. After mortar has fully hardened, thoroughly clean exposed stone surfaces of excess mortar and foreign matter; use wood scrapers, stiff-nylon or -fiber brushes, and clean water spray applied at low (100 psi) pressure.
  - 1. Do not use metal scrapers or brushes.
  - 2. Do not use acidic or alkaline cleaners.
- B. Coordinate final rinse with completion of masonry repair work.
- C. Remove all protection erected as part of cleaning operations.
- D. Clean all surfaces at grade level and below, including all areaways that may have been affected by the cleaning operation.
- E. Paragraphs below are examples only; revise to suit Project.
- F. Wash adjacent woodwork and other non-stone surfaces. Use detergent and soft brushes or cloths.
- G. Clean mortar and debris from roof; remove debris from gutters and downspouts. Rinse off roof and flush gutters and downspouts.
- H. Sweep and rake adjacent pavement and grounds to remove mortar and debris. Where necessary, pressure wash pavement surfaces to remove mortar, dust, dirt, and stains.

- I. As the blocking and other related components associated with the scaffolding system are removed from the masonry surface, the exposed surfaces behind the component are to be cleaned with the low-pressure mild abrasive system.

### 3.19 MASONRY CLEANING:

- A. Comply with cleaner manufacturer's instructions and recommendations.
- B. Effectively protect glass and adjacent substrates from cleaning chemicals and cleaning processes.
- C. Wet surfaces to be cleaned before application of cleaning solutions.
- D. Mix cleaner with water as recommended by cleaner manufacturer.
- E. Apply cleaning solution then work cleaner solution into surface by hand with soft brush.
- F. Work cleaner into all cracks, crevices, and details.
- G. Gently agitate the surface and lift contamination.
- H. Allow cleaner to dwell on the surface for time period used for Quality Assurance Testing - Successful Cleaning. Follow the Written Record.
- I. Do not allow cleaner to dry on the surface.
- J. Rinse thoroughly and completely with water volumes, temperatures, and pressures used for Quality Assurance Testing. Follow the Written Record.
- K. Gently agitate the surface with hand brushes while rinsing.
- L. Keep pressure washer spray nozzle, if used, = 8 inches from the surface.
- M. Repeat cleaning until acceptable cleaning is achieved.
- N. Do not damage substrates.
- O. Do not "bleach", streak, or change actual substrate colors.
- P. Protect all work areas and adjacent areas from bleaching, streaking, soiling and staining.
- Q. Do not damage masonry, mortar, or any surface with high pressure water.
- R. Match approved In Place Samples.

### 3.20 GENERAL APPLICATION of CSP BIO-CLEANER

- A. Follow instructions provided by the manufacturer (See Data Sheet).
- B. Clearly mark or identify the time of application and dwell time.
- C. Apply cleaner using a brush, roller, or airless sprayer to the desired thickness. Thicknesses of cleaner on test patches will determine appropriate thickness.
- D. Leave cleaner on substrate only as long as determined acceptable in the mock-ups and approved by the owner or their representatives.

- E. If the approved dwell time has elapsed and a stain or blemish persists use a soft bristle scrub brush to agitate the area.
- F. Apply a small amount of CSP Bio-Cleaner to the brush then scrub the area again to facilitate in the removal of the stain if necessary.
- G. Follow instructions provided by the manufacturer (See Data Sheet).
- H. Begin at the top of each section and pressure wash the cleaner and residue off the substrate. Use appropriate pressure as determined in the mock-up.
- I. Pressure wash should be performed at a pressure which will not damage the substrate yet provide adequate removal of cleaner and residue.
- J. Be sure all of the cleaner and residue are washed off the substrate.
- K. Exercise caution during cleaning operations to avoid wind drift of materials to adjacent properties, persons, or cars below. Schedule cleaning operations for times or days when risk to pedestrians or vehicles is at a minimum.
- L. Use only methods and materials determined during testing phase and approved by owner's representative. Clean surface to degree accepted by owner's representative. Do not permit cleaning to continue if methods and materials employed results in any permanent damage to surfaces.
- M. Contractor shall reclaim, characterize and dispose of all waste and residue used in conjunction with this project in accordance with applicable laws. Disposal sites shall be approved by the owner's representative.
- N. During the work, remove from the site discarded cleaning and coating materials, rubbish, cans and rags at the end of each workday.
- O. Upon completion of work, remove all protective coverings and coatings, and clean window glass and other spattered surfaces. Remove spattered coatings by proper methods as recommended by manufacturer, using care not to damage adjacent surfaces.

### 3.21 GLAZE PATCHING

- A. Comply with manufacturer's instructions and recommendations.
- B. Always test patching and painted finish in an inconspicuous location prior to proceeding to ensure durability, compatibility and desired appearance.
- C. Locally clean repair area with warm, soapy water or a surface cleaner to remove dirt, oil, dust or contaminants; let dry completely.
- D. Thoroughly mix the two part system of putty and cream hardener in small amounts that can be used in 3-4 minutes.
- E. Spread initial thin layer of mixed putty over repair area using firm pressure to ensure maximum adhesion. Apply additional layers until desired thickness is reached.
- F. For repairs 1/2 inch or deeper, it is recommend to fill repairs making more than one application.
- G. Allow the putty to dry 15 minutes at 77 degress F.

- H. Sand and shape using 80 grit sandpaper; feather the edge using 180 grit until the surface is smooth.
- I. Prime and paint the area per the manufacturer's recommendation.
- J. Clean tools with acetone or lacquer thinner, per manufacturer's instructions.

### 3.22 WATER-MISTING CLEANING

- A. The Contractor shall protect all building components against damage from weight of suspended cleaning apparatus and against scratching or abrasion damage from protruding parts.
- B. Windows and window frames shall be protected using polyethylene and temporary sealants as required during water misting. The Contractor shall maintain at least one employee on the interior of the building to monitor window and wall conditions during cleaning. Water spray shall cease immediately if leakage is discovered inside the building and shall not resume until the cause is identified and corrected.
- C. Water shall be supplied through nebulizing nozzles to produce a fine mist. The quantity of water delivered to each spray head shall not exceed 15 gallons per hour. The spacing of the spray heads shall be 12" on centers minimum.
- D. Washing shall occur at intervals of one hour on and two hours off during daylight hours. No washing shall be permitted at night.

### 3.23 LOW PRESSURE WASHING

- A. Pressure washing of designated areas shall proceed from the bottom of the area to the top.
- B. Using a nozzle pressure of 800 psi or less (based on the results of the test panel) and a fan tipped spray nozzle, the water spray shall be directed at the stone surface from a distance of not less than 12 inches.

### 3.24 CHEMICAL CLEANING (BRICK, LIMESTONE, and GRANITE)

- A. Chemical cleaning of designated areas shall proceed from the bottom of the area to the top. Wet surfaces to be cleaned thoroughly prior to application of cleaning chemicals to prevent excessive absorption into the stone.
- B. Apply specified cleaning product in accordance with the manufacturer's printed instructions. Do not exceed recommended solution concentrations or dwell times. Cleaning solutions shall be applied by hand using a fiber brush or sponge. Cleaning solutions may not be applied using pressure washing equipment.
- C. Allow cleaner to dwell on the stone in accordance with the manufacturer's printed instructions. Reapply and scrub stubborn stains.
- D. Rinse all cleaned areas thoroughly to remove all traces of cleaner from cracks and corners. Rinse down adjacent materials to prevent discoloration or streaking from cleaning chemicals.

### 3.25 FERROUS STAIN REMOVAL

- A. In a plastic bucket or container, combine poultice ingredients in accordance with manufacturer's printed instructions. Stir continuously until the mixture forms a smooth, wet paste.

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- B. Apply a layer of poultice paste, 1/8" to 1/4" in thickness, immediately to the stained surface. Surfaces to be cleaned should be dry and free of surface dirt and dust.
- C. Cover with plastic. Leave poultice paste on the masonry for 24 hours or until completely dry.
- D. Once the poultice is completed dried, scrape mixture from the surface using wood, plastic or rubber spatulas. Rinse the treated area thoroughly with water and a soft brush to remove remaining residue.

### 3.26 COPPER STAIN REMOVAL

- A. In a plastic bucket or container, combine poultice ingredients in accordance with manufacturer's printed instructions. Stir continuously until the mixture forms a smooth, wet paste.
- B. Apply a layer of poultice paste, 1/8" to 1/4" in thickness, immediately to the stained surface. Surfaces to be cleaned should be dry and free of surface dirt and dust.
- C. Cover with plastic. Leave poultice paste on the masonry for 24 hours or until completely dry.
- D. Once the poultice is completed dried, scrape mixture from the surface using wood, plastic or rubber spatulas. Rinse the treated area thoroughly with water and a soft brush to remove remaining residue.

### 3.27 CLEAN-UP AND SITE RESTORATION

- A. Excess materials shall be removed from the site. Do not dump excavation around building or on site.
- B. Remove Temporary sealants around window and door openings.
- C. Remove splatters from building immediately.

### 3.28 TERRA COTTA REPAIR AND PATCHING

- A. Strictly follow manufacturer guidelines for the following but not limited to.
- B. Surface Preparation, Mixing, Application, Curing, and Clean up.

END OF SECTION 04 0101

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SECTION 04 0511  
MASONRY MORTARING AND GROUTING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Mortar for masonry.

1.02 RELATED REQUIREMENTS

- A. Section 04 0101 - Repair and Cleaning of Existing Masonry: in general.
- B. Section 04 2000 - Unit Masonry: Installation of mortar and grout.

1.03 REFERENCE STANDARDS

- A. ASTM C91/C91M - Standard Specification for Masonry Cement 2018.
- B. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete 2022.
- C. ASTM C270 - Standard Specification for Mortar for Unit Masonry 2019a, with Editorial Revision.
- D. ASTM C387/C387M - Standard Specification for Packaged, Dry, Combined Materials for Concrete and High Strength Mortar 2017.
- E. ASTM C476 - Standard Specification for Grout for Masonry 2020.
- F. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry 2020.
- G. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete 2016.
- H. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures 2016.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Include design mix and indicate whether the Proportion or Property specification of ASTM C270 is to be used. Also include required environmental conditions and admixture limitations.
- C. Samples: Submit two samples of mortar, illustrating mortar color and color range.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Manufacturer's Installation Instructions: Submit packaged dry mortar manufacturer's installation instructions.

1.05 QUALITY ASSURANCE

1.06 PRECONSTRUCTION TESTING

- A. Testing will be conducted by an independent test agency, in accordance with provisions of Section 01 4000 - Quality Requirements.
- B. Mortar Mixes: Test mortars prebatched by weight in accordance with ASTM C780 recommendations for preconstruction testing.
  - 1. Test results will be used to establish optimum mortar proportions and establish quality control values for construction testing.

1.07 DELIVERY, STORAGE, AND HANDLING

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

1.08 FIELD CONDITIONS

- A. Cold and Hot Weather Requirements: Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.

PART 2 PRODUCTS

2.01 MORTAR AND GROUT APPLICATIONS

- A. Use only factory premixed packaged dry materials for mortar and grout, with addition of water only at project site.
  - 1. Exception: If a specified mix design is not available in a premixed dry package, provide equivalent mix design using standard non-premixed materials.
- B. Mortar Color: As noted.
- C. Mortar Mix Designs: ASTM C270, Property Specification.
  - 1. Historic Exterior Masonry Pointing Mortar: Type O; color to match existing.
  - 2. Exterior, Non-loadbearing Masonry: Type N.
  - 3. Exterior Repointing Mortar: Type N.
- D. Grout Mix Designs:
  - 1. Engineered Masonry: 3,000 psi strength at 28 days; 8-10 inches slump; provide premixed type in accordance with ASTM C 94/C 94M.
    - a. Fine grout for spaces with smallest horizontal dimension of 2 inches or less.
    - b. Coarse grout for spaces with smallest horizontal dimension greater than 2 inches.

2.02 MATERIALS

- A. Packaged Dry Material for Mortar for Unit Masonry: Premixed Portland cement, hydrated lime, and sand; complying with ASTM C387/C387M and capable of producing mortar of the specified strength in accordance with ASTM C270 with the addition of water only.
  - 1. Type: Type N.
  - 2. Color: Mineral pigments added as required to produce approved color sample:

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3. Basis of Design Manufacturer:
  - a. Cathedral Stone Products, Inc., <https://www.cathedralstone.com/>
- B. Packaged Dry Material for Mortar for Repointing: Premixed Portland cement, graded sand, and chemical admixtures complying with ASTM C91/C91M with the addition of water only.
  1. Color: To match adjacent mortar color.
  2. Basis of Design Manufacturer:
    - a. Cathedral Stone Products, Inc. <https://www.cathedralstone.com/>.
- C. Packaged Dry Material for Mortar for Repointing: Premixed Portland cement, hydrated lime, and graded sand; capable of producing Type O mortar in accordance with ASTM C270 with the addition of water only.
  1. Color: Mineral pigments added as required to produce approved color sample.
  2. Manufacturers:
    - a. Cathedral Stone Products, Inc.; <https://www.cathedralstone.com/>
    - b. Limeworks; <https://www.limeworks.us/>
- D. Packaged Dry Material for Grout for Masonry: Premixed cementitious materials and dried aggregates; capable of producing grout of the specified strength in accordance with ASTM C476 with the addition of water only.
  1. Type: Fine.
- E. Pigments for Colored Mortar: Pure, concentrated mineral pigments specifically intended for mixing into mortar and complying with ASTM C979/C979M.
  1. Color(s): as indicated on drawings or as selected.
    - a. Brownstone: match purple stone.
    - b. Sandstone: match tan stone.
    - c. Serpentine: match existing red mortar.
    - d. Green precast stone: match existing red mortar.
    - e. Wissahicken Schist: match existing gray.
  2. Manufacturers:
    - a. Davis Colors: [www.daviscolors.com/#sle](http://www.daviscolors.com/#sle).
    - b. Lambert Corporation: [www.lambertusa.com/#sle](http://www.lambertusa.com/#sle).
    - c. Solomon Colors; Solomon Colors Concentrated A, H, and X Series: [www.solomoncolors.com/#sle](http://www.solomoncolors.com/#sle).
- F. Water: Clean and potable.

## 2.03 MORTAR MIXING

- A. Thoroughly mix mortar ingredients using mechanical batch mixer, in accordance with ASTM C270 and in quantities needed for immediate use.
- B. Maintain sand uniformly damp immediately before the mixing process.
- C. Do not use anti-freeze compounds to lower the freezing point of mortar.
- D. If water is lost by evaporation, re-temper only within two hours of mixing.

## 2.04 GROUT MIXING

- A. Mix grout in accordance with ASTM C94/C94M.
- B. Thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C476 for fine and coarse grout.

## PART 3 EXECUTION

### 3.01 INSTALLATION

- A. Install mortar to requirements of section(s) in which masonry is specified.
- B. Work grout into masonry cores and cavities to eliminate voids.
- C. Do not displace reinforcement while placing grout.
- D. Remove excess mortar from grout spaces.

### 3.02 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field tests, in accordance with provisions of Section 01 4000 - Quality Requirements.
- B. Test and evaluate mortar in accordance with ASTM C780 procedures.

END OF SECTION 04 0511

## SECTION 04 2000 UNIT MASONRY

### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

- A. New 2 hour fire rated elevator shaft enclosure with a clear hoistway of the dimensions shown on drawings and plumb to within 1".
  - 1. Provide solid filled and steel reinforced CMU unit in location required for elevator rail attachments.
- B. Existing masonry replacement units and where indicated on drawings select existing masonry wall extensions for the following:
- C. Concrete block.
- D. Clay facing brick.
  - 1. For select repairs to existing as shown on drawings.
- E. Common brick.
  - 1. For select repairs to existing as shown on drawings.
- F. Mortar and grout.
- G. Reinforcement and anchorage.
- H. Flashings.
  - 1. flexible stainless steel flashing with bituminous layer toward lintel to prevent galvanic reaction between galvanize steel lintel and stainless steel flashing.
- I. Lintels.
  - 1. galvanized steel.
- J. Accessories.
  - 1. other items indicated on drawings, listed in this section and as required to have complete system.

#### 1.02 RELATED REQUIREMENTS

- A. Section 04 0101 -Repair and Cleaning of Existing Masonry.
- B. Section 04 0511 - Masonry Mortaring and Grouting.
- C. Section 05 5000 - Metal Fabrications: Loose steel lintels.
- D. Section 07 6200 - Sheet Metal Flashing and Trim: Through-wall masonry flashings.
- E. Section 07 8400 - Firestopping: Firestopping at penetrations of fire-rated masonry and at top of fire-rated walls.
- F. Section 07 9200 - Joint Sealants: Sealing control and expansion joints.

### 1.03 REFERENCE STANDARDS

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- B. ASTM A480/A480M - Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip 2022.
- C. ASTM A580/A580M - Standard Specification for Stainless Steel Wire 2018.
- D. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement 2022.
- E. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire 2019.
- F. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- G. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- H. ASTM A951/A951M - Standard Specification for Steel Wire for Masonry Joint Reinforcement 2016, with Editorial Revision (2018).
- I. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete 2018a.
- J. ASTM C67/C67M - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile 2021.
- K. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units 2022.
- L. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units 2017.
- M. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar 2018.
- N. ASTM C150/C150M - Standard Specification for Portland Cement 2022.
- O. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes 2018.
- P. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale) 2022.
- Q. ASTM C270 - Standard Specification for Mortar for Unit Masonry 2019a, with Editorial Revision.
- R. ASTM C404 - Standard Specification for Aggregates for Masonry Grout 2018.
- S. ASTM C476 - Standard Specification for Grout for Masonry 2020.
- T. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry 2020.
- U. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete 2016.
- V. ASTM C1072 - Standard Test Methods for Measurement of Masonry Flexural Bond Strength 2019.

- W. ASTM C1148 - Standard Test Method for Measuring the Drying Shrinkage of Masonry Mortar 1992a (Reapproved 2014).
- X. ASTM E154/E154M - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover 2008a (Reapproved 2019).
- Y. ASTM E514/E514M - Standard Test Method for Water Penetration and Leakage Through Masonry 2020.
- Z. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures 2016.
- AA. UL (FRD) - Fire Resistance Directory Current Edition.

#### 1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all relevant installers.

#### 1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.
  1. Confirmation masonry ties meet BIA standards for wide cavity exceeding 4", 5 3/8" and 6 3/8".
- C. Shop drawings of 2 hour fire rated elevator CMU shaft enclosure with a clear hoistway of the dimensions as approved by elevator manufacturer/installer and showing location of solid filled and steel reinforced CMU unit in location required for elevator rail attachments for approval of approved by elevator manufacturer/installer.
- D. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.
- E. Test Reports: Concrete masonry manufacturer's test reports for units with integral water repellent admixture.

#### 1.06 QUALITY ASSURANCE

- A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.
- B. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section with minimum three years of documented experience.

#### 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.
- B. Handle and store pre-faced concrete block units in protective cartons or trays. Do not remove from protective packaging until ready for installation.

## PART 2 PRODUCTS

### 2.01 CONCRETE MASONRY UNITS

- A. Concrete Block: Comply with referenced standards and as follows:
  - 1. Size: Standard units with nominal face dimensions of 16 by 8 inches and nominal depth of 8 inches.
  - 2. Special Shapes: Provide non-standard blocks configured for corners.
    - a. Provide bullnose units for outside corners.
  - 3. Load-Bearing Units: ASTM C90, normal weight.
    - a. Hollow block, as indicated.
    - b. Exposed Faces: Manufacturer's standard color and texture where indicated.
  - 4. Manufacturers:
    - a. The Concrete Products Group; Spec-Brik: [www.concreteproductsgroup.com/#sle](http://www.concreteproductsgroup.com/#sle).
  - 5. Non-Loadbearing Units: ASTM C129.
    - a. Hollow block, as indicated.
    - b. Normal weight.

### 2.02 BRICK UNITS

- A. Manufacturers:
  - 1. Basis of Design products to match existing from: Diener Brick Company 856-858-2000
  - 2. Belden Brick; Belcrest: [www.beldenbrick.com/#sle](http://www.beldenbrick.com/#sle).
  - 3. Endicott Clay Products Co: [www.endicott.com/#sle](http://www.endicott.com/#sle).
  - 4. General Shale Brick: [www.generalshale.com/#sle](http://www.generalshale.com/#sle).
  - 5. Meridian Brick LLC; Athens Architectural Series: [www.meridianbrick.com/#sle](http://www.meridianbrick.com/#sle).
- B. Facing Brick: ASTM C216, Type FBS Smooth, Grade SW.
  - 1. Color and texture to match existing to be patched or as otherwise indicated for the following:
  - 2. Color and texture to match Architect's sample.
  - 3. Nominal size: As indicated on drawings.
  - 4. Special shapes: Molded units as required by conditions indicated, unless standard units can be sawn to produce equivalent effect.
  - 5. Compressive strength: As indicated on drawings, measured in accordance with ASTM C67/C67M.

### 2.03 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C150/C150M, Type I; color as required to produce approved color sample.
  - 1. Not more than 0.60 percent alkali.
- B. Hydrated Lime: ASTM C207, Type S.
- C. Mortar Aggregate: ASTM C144.
- D. Grout Aggregate: ASTM C404.
- E. Pigments for Colored Mortar: Pure, concentrated mineral pigments specifically intended for mixing into mortar and complying with ASTM C979/C979M.
  - 1. Color(s): As selected by Architect to match existing from manufacturer's full range.



- F. Water: Clean and potable.
- G. Accelerating Admixture: Nonchloride type for use in cold weather.
- H. Moisture-Resistant Admixture: Water repellent compound designed to reduce capillarity.
- I. Packaged Dry Material for Grout for Masonry: Premixed cementitious materials and dried aggregates; capable of producing grout of the specified strength in accordance with ASTM C476 with the addition of water only.

## 2.04 REINFORCEMENT AND ANCHORAGE

- A. Manufacturers:
  - 1. Hohmann & Barnard, Inc; X-Seal Anchor: [www.h-b.com/#sle](http://www.h-b.com/#sle).
- B. Reinforcing Steel: ASTM A615/A615M, Grade 40 (40,000 psi), deformed billet bars; galvanized.
- C. Single Wythe Joint Reinforcement: ASTM A951/A951M.
  - 1. Type: Truss or ladder.
  - 2. Material: ASTM A1064/A1064M steel wire, mill galvanized to ASTM A641/A641M Class 3.
  - 3. Size: 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not less than 5/8 inch of mortar coverage on each exposure.
- D. Flexible Anchors: 2-piece anchors that permit differential movement between masonry and building frame, sized to provide not less than 5/8 inch of mortar coverage from masonry face.
- E. Masonry Veneer Anchors: 2-piece anchors that permit differential movement between masonry veneer and structural backup, hot dip galvanized to ASTM A 153/A 153M, Class B.
  - 1. Anchor plates: Not less than 0.075 inch thick, designed for fastening to structural backup through sheathing by two fasteners; provide design with legs that penetrate sheathing and insulation to provide positive anchorage.
  - 2. Wire ties: Manufacturer's standard shape, 0.1875 inch thick. min or as required by the following:
    - a. See requirements for cavity width per BIA and ASTM A951/ A951M.
  - 3. Vertical adjustment: Not less than 3-1/2 inches at anchor plates, 1" at pintels.

## 2.05 FLASHINGS

- A. Metal Flashing Materials:
  - 1. Stainless Steel Flashing: ASTM A666, Type 304, soft temper; 26 gage, 0.0187 inch thick; finish 2B to 2D. Provide as basis of design H&B SS drip edge.
- B. Combination Non-Asphaltic Flashing Materials - Stainless Steel:
  - 1. Stainless Steel/Polymer Fabric Flashing: ASTM A240/A240M; 2 mil type 304 stainless steel sheet bonded on one side to one sheet of polymer fabric.
    - a. Manufacturers:
      - 1) Hohmann & Barnard, Inc; Mighty-Flash Stainless Flashing: [www.h-b.com/#sle](http://www.h-b.com/#sle).
      - 2) WIRE-BOND: [www.wirebond.com/#sle](http://www.wirebond.com/#sle).
      - 3) York Manufacturing, Inc; Multi-Flash SS: [www.yorkmfg.com/#sle](http://www.yorkmfg.com/#sle).
  - 2. Stainless Steel/Polymer Fabric Flashing - Self-adhering: ASTM A240/A240M; 2 mil type 304 stainless steel sheet bonded on inward facing side to a sheet of polymer fabric that

has a clear adhesive with a removable release liner.

- a. Manufacturers:
  - 1) Hohmann & Barnard, Inc: [www.h-b.com/#sle](http://www.h-b.com/#sle).

## 2.06 ACCESSORIES

- A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.
  - 1. Manufacturers:
    - a. Hohmann & Barnard, Inc: [www.h-b.com/#sle](http://www.h-b.com/#sle).
- B. Joint Filler: Closed cell polyvinyl chloride; oversized 50 percent to joint width; self expanding; in maximum lengths available.
  - 1. Manufacturers:
    - a. Hohmann & Barnard, Inc: [www.h-b.com/#sle](http://www.h-b.com/#sle).
- C. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

## 2.07 LINTELS

- A. Galvanized Steel Lintels: as indicated and where applicable see structural drawings and provide installation details as required by BIA.

## 2.08 MORTAR AND GROUT MIXING

- A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.
  - 1. Masonry below grade and in contact with earth: Type S.
  - 2. Exterior, loadbearing masonry: Type N.
  - 3. Exterior, non-loadbearing masonry: Type N.
  - 4. Interior, loadbearing masonry: Type N.
  - 5. Interior, non-loadbearing masonry: Type O.
- B. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio.
- C. New Mortar for Old Brick: Proportion by volume only; no more than 20 percent of the total volume of Portland cement and lime combined to be Portland cement.
- D. Grout: ASTM C476; consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches.
- E. Mixing: Use mechanical batch mixer and comply with referenced standards.

## PART 3 EXECUTION

### 3.01 EXAMINATION

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

### 3.02 PREPARATION

- A. Direct and coordinate placement of metal anchors supplied for installation under other sections.
- B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

### 3.03 COLD AND HOT WEATHER REQUIREMENTS

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

### 3.04 COURSING

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Concrete Masonry Units:
  - 1. Bond: Running.
  - 2. Coursing: One unit and one mortar joint to equal 8 inches.
  - 3. Mortar Joints: Concave.

### 3.05 PLACING AND BONDING

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

### 3.06 LINTELS

- A. Install loose steel lintels over openings.

### 3.07 GROUTED COMPONENTS

- A. Reinforce bond beams with 2, bars, 1 inch from bottom web.
- B. Reinforce columns with , bars, placed .
- C. Lap splices minimum 24 bar diameters.
- D. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
- E. Place and consolidate grout fill without displacing reinforcing.
- F. At bearing locations, fill masonry cores with grout for a minimum 12 inches either side of opening.

### 3.08 CONTROL AND EXPANSION JOINTS

- A. Do not continue horizontal joint reinforcement through control or expansion joints.

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

### 3.09 BUILT-IN WORK

- A. As work progresses, install built-in metal door frames and glazed frames and other items to be built into the work and furnished under other sections.
- B. Install built-in items plumb, level, and true to line.
- C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.
  - 1. Fill adjacent masonry cores with grout minimum 12 inches from framed and unframed openings; see details.
- D. Do not build into masonry construction organic materials that are subject to deterioration.

### 3.10 TOLERANCES

- A. Install masonry within the site tolerances found in TMS 402/602.

### 3.11 CUTTING AND FITTING

- A. Cut and fit for chases. Coordinate with other sections of work to provide correct size, shape, and location.
- B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.
- C. Cutting and fitting of units are required under window sills, at sloping cap units for gym access ramp and other locations as indicated.

### 3.12 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.

### 3.13 CLEANING

- A. Remove excess mortar and mortar droppings.
- B. Replace defective mortar. Match adjacent work.
- C. Clean soiled surfaces with cleaning solution.
- D. Use non-metallic tools in cleaning operations.

### 3.14 PROTECTION

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

3.15 SCHEDULES

- A. Interior Partitions: Single wythe concrete block units.

END OF SECTION 04 2000

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## SECTION 05 5000 METAL FABRICATIONS

### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

- A. Shop fabricated steel and aluminum items.
- B. Dark Bronze (black galvanized steel per ASTM A53) metal picket security fence with vandal proof curved top for Library at exterior roof locations as indicated on drawings
- C. Dark Bronze Anodized Aluminum guardrail for Library at exterior stair well (wall and deck mounted) and as indicated on drawings for main entry step mounted hand and guardrail.
- D. All exterior guardrails and support posts to be black galvanized steel per ASTM A53 unless noted otherwise.

#### 1.02 RELATED REQUIREMENTS

- A. Section 04 2000 - Unit Masonry: Placement of metal fabrications in masonry.
- B. Section 05 5133 - Metal Ladders.
- C. Section 05 5213 - Pipe and Tube Railings.
- D. Section 09 9000 - Paints and Coatings: Exterior Paint finish.

#### 1.03 REFERENCE STANDARDS

- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum 2020.
- B. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2021.
- C. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2021, with Errata (2022).
- D. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2020, with Errata (2022).
- E. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes 2017.
- F. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- G. ASTM A48/A48M - Standard Specification for Gray Iron Castings 2022.
- H. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless 2022.
- I. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.

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METAL FABRICATIONS

- J. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- K. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications 2022.
- L. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates 2018.
- M. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength 2021.
- N. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes 2021a.
- O. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing 2021.
- P. ASTM A554 - Standard Specification for Welded Stainless Steel Mechanical Tubing 2021.
- Q. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- R. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength 2018a.
- S. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- T. ASTM B210/B210M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes 2019a.
- U. ASTM B211/B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire 2019.
- V. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength 2022.
- W. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination 2020.
- X. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification 2021.
- Y. AWS D1.1/D1.1M - Structural Welding Code - Steel 2020, with Errata (2022).
- Z. AWS D1.2/D1.2M - Structural Welding Code - Aluminum 2014, with Errata (2020).
- AA. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel AC172 2019.
- BB. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer 2004.
- CC. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic) 2019.
- DD. SSPC-SP 2 - Hand Tool Cleaning 2018.



#### 1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
  - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
  - 2. Design data: Submit drawings and supporting calculations, signed and sealed by a qualified professional structural engineer.
    - a. Include the following, as applicable:
      - 1) Design criteria.
      - 2) Engineering analysis depicting stresses and deflections.
      - 3) Member sizes and gauges.
      - 4) Details of connections.
      - 5) Support reactions.
      - 6) Bracing requirements.
- C. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.
- D. Designer's Qualification Statement.
- E. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172.

#### 1.05 QUALITY ASSURANCE

- A. Design connections under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.
- B. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and AWS D1.2/D1.2M and dated no more than 12 months before start of scheduled welding work.
- C. Fabricator Qualifications: A qualified steel fabricator that is accredited by IAS AC172.

### PART 2 PRODUCTS

#### 2.01 MATERIALS - STEEL

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.
- C. Plates: ASTM A283/A283M.
- D. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- E. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.02 MATERIALS - ALUMINUM

2.03 FABRICATION

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

2.04 FABRICATED ITEMS

2.05 Dark Bronze metal picket security fence with vandal proof curved top

- A. information to follow

2.06 FINISHES - STEEL

- A. Prime paint steel items.
  - 1. Exceptions: Galvanize items to be embedded in concrete, items to be embedded in masonry, and items specified for galvanized finish.
- B. Prepare surfaces to be primed in accordance with SSPC-SP2.
- C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- D. Prime Painting: One coat.
- E. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.
- F. Stainless Steel Finish: No. 4 Bright Polished finish.

2.07 FINISHES - ALUMINUM

- A. Exterior Aluminum Surfaces: Class I color anodized.
- B. Class II Color Anodized Finish: AAMA 611 AA-M12C22A32 Integrally colored anodic coating not less than 0.4 mils thick; light bronze.
- C. Class II Color Anodized Finish: AAMA 611 AA-M12C22A34 Electrolytically deposited colored anodic coating not less than 0.4 mils thick; light bronze.
- D. Pigmented Organic Coating System: AAMA 2603 polyester or acrylic baked enamel finish; color as indicated.
- E. High Performance Organic Coating System: AAMA 2604 multiple coat, thermally cured fluoropolymer system; color as indicated.
  - 1. Manufacturers:

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METAL FABRICATIONS

- a. Sherwin-Williams Company; POLANE Solar Reflective 2K Urethane Enamel:  
oem.sherwin-williams.com/#sle.

## 2.08 FABRICATION TOLERANCES

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

## PART 3 EXECUTION

### 3.01 EXAMINATION

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

### 3.02 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

### 3.03 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Obtain approval prior to site cutting or making adjustments not scheduled.

### 3.04 TOLERANCES

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

END OF SECTION 05 5000

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## SECTION 05 5133 METAL LADDERS

### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

- A. Shop-fabricated metal ladders.
- B. Prefabricated ladders.
- C. Custom color to match security fence
- D. Unless otherwise noted to be custom color provide all to be black galvanized steel per ASTM A53.

#### 1.02 RELATED REQUIREMENTS

- A. Section 05 5000 - Metal Fabrications
- B. Section 05 5213 - Pipe and Tube Railings.
- C. Section 09 9000 - Paint and Coatings: Exterior Paint finish.

#### 1.03 REFERENCE STANDARDS

- A. 29 CFR 1910.23 - Ladders Current Edition.
- B. 29 CFR 1926.1053 - Ladders Current Edition.
- C. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum 2020.
- D. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2021.
- E. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2021, with Errata (2022).
- F. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2020, with Errata (2022).
- G. ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements 2008 (Reaffirmed 2018).
- H. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- I. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- J. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless 2022.

- K. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- L. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates 2018.
- M. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength 2021.
- N. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes 2021a.
- O. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing 2021.
- P. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- Q. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength 2018a.
- R. ASTM B26/B26M - Standard Specification for Aluminum-Alloy Sand Castings 2018, with Editorial Revision.
- S. ASTM B85/B85M - Standard Specification for Aluminum-Alloy Die Castings 2018, with Editorial Revision.
- T. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2021a.
- U. ASTM B210/B210M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes 2019a.
- V. ASTM B211/B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire 2019.
- W. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength 2022.
- X. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination 2020.
- Y. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification 2021.
- Z. AWS D1.1/D1.1M - Structural Welding Code - Steel 2020, with Errata (2022).
- AA. AWS D1.2/D1.2M - Structural Welding Code - Aluminum 2014, with Errata (2020).
- BB. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel AC172 2019.
- CC. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer 2004.
- DD. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic) 2019.
- EE. SSPC-SP 2 - Hand Tool Cleaning 2018.

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METAL LADDERS

#### 1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
  - 1. Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
  - 2. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- C. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.
- D. Designer's Qualification Statement.
- E. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172.

#### 1.05 QUALITY ASSURANCE

- A. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and AWS D1.2/D1.2M and dated no more than 12 months before start of scheduled welding work.
- B. Fabricator Qualifications: A qualified steel fabricator that is accredited by IAS AC172.

### PART 2 PRODUCTS

#### 2.01 MATERIALS - STEEL

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.
- C. Plates: ASTM A283/A283M.
- D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.
- E. Mechanical Fasteners: Same material or compatible with materials being fastened; type consistent with design and specified quality level.
- F. Bolts, Nuts, and Washers: ASTM A307, plain.
- G. Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, plain.
- H. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- I. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- J. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

## 2.02 MATERIALS - ALUMINUM

- A. Extruded Aluminum: ASTM B211/B211M, 6063 alloy, T6 temper.
- B. Sheet Aluminum: ASTM B209/B209M, 5052 alloy, H32 or H22 temper.
- C. Aluminum-Alloy Drawn Seamless Tubes: ASTM B210/B210M, 6063 alloy, T6 temper.
- D. Aluminum-Alloy Bars: ASTM B211/B211M, 6061 alloy, T6 temper.
- E. Aluminum-Alloy Sand Castings: ASTM B26/B26M.
- F. Aluminum-Alloy Die Castings: ASTM B85/B85M .
- G. Bolts, Nuts, and Washers: Stainless steel.
- H. Welding Materials: AWS D1.2/D1.2M; type required for materials being welded.

## 2.03 FABRICATION

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

## 2.04 FABRICATED LADDERS

- A. Ladders: Steel; in compliance with ANSI A14.3; with mounting brackets and attachments; prime paint finish.
  - 1. Side Rails: 3/8 by 2 inches members spaced at 20 inches.
  - 2. Rungs: One inch diameter solid round bar spaced 12 inches on center.
  - 3. Space rungs 7 inches from wall surface.

## 2.05 PREFABRICATED LADDERS

- A. Prefabricated Ladder: Welded metal unit complying with ANSI A14.3; factory fabricated to greatest degree practical and in the largest components possible.
  - 1. Components: Manufacturer's standard rails, rungs, treads, handrails, returns, platforms and safety devices complying with the requirements of the MATERIALS article of this section.
  - 2. Materials: Aluminum; ASTM B211/B211M 6063 alloy, T52 temper.
  - 3. Finish: Powder coat; color to be selected by Architect from manufacturer's standard range.
  - 4. Manufacturers:
    - a. Industrial Ladder & Scaffolding, Inc.: [www.anyladder.com/#sle](http://www.anyladder.com/#sle).
    - b. O'Keeffe's Inc; Model 500: [www.okeeffes.com/#sle](http://www.okeeffes.com/#sle).
    - c. Precision Ladders, LLC; Fixed Aluminium Wall Ladder: [www.precisionladders.com/#sle](http://www.precisionladders.com/#sle).



## 2.06 FINISHES - STEEL

- A. Prime paint steel items.
  - 1. Do not prime surfaces in direct contact with concrete.
  - 2. Do not prime surfaces where field welding is required.
- B. Prepare surfaces to be primed in accordance with SSPC-SP2.
- C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- D. Prime Painting: One coat.
- E. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements. Provide minimum 1.7 oz/sq ft galvanized coating.
- F. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

## 2.07 FINISHES - ALUMINUM

- A. Exterior Aluminum Surfaces: Class I natural anodized.
- B. Interior Aluminum Surfaces: Class I natural anodized.
- C. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.
- D. Class I Color Anodized Finish: AAMA 611 AA-M12C22A42 Integrally colored anodic coating not less than 0.7 mils thick; light bronze.
- E. Class I Color Anodized Finish: AAMA 611 AA-M12C22A44 Electrolytically deposited colored anodic coating not less than 0.7 mils thick; light bronze.
- F. Class II Color Anodized Finish: AAMA 611 AA-M12C22A34 Electrolytically deposited colored anodic coating not less than 0.4 mils thick; light bronze.
- G. Pigmented Organic Coating System: AAMA 2603 polyester or acrylic baked enamel finish; color as indicated.
- H. High Performance Organic Coating System: AAMA 2604 multiple coat, thermally cured fluoropolymer system; color as indicated.
- I. Superior Performance Organic Coating System: AAMA 2605 multiple coat, thermally cured polyvinylidene fluoride system; color as indicated.
- J. Apply one coat of bituminous paint to concealed aluminum surfaces in contact with cementitious or dissimilar materials.

## 2.08 FABRICATION TOLERANCES

- A. Squareness: 1/8 inch maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.

- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

### PART 3 EXECUTION

#### 3.01 EXAMINATION

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

#### 3.02 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

#### 3.03 INSTALLATION

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

#### 3.04 TOLERANCES

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

END OF SECTION 05 5133

SECTION 05 5213  
PIPE AND TUBE RAILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Wall and guardrail mounted handrails.
- B. Dark Bronze (black galvanized steel per ASTM A53) metal picket security guardrail for Library at exterior and as indicated on drawings at roof.
- C. Dark Bronze Anodized Aluminum guardrail for Library at exterior stair well (wall and deck mounted) and as indicated on drawings for main entry step mounted handrail.
- D. Ramp railings and guardrails.
- E. Free-standing railings at ramp for Rec Center.
- F. All exterior Handrails and guardrails to be black galvanized steel per ASTM A53 UNO.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Placement of anchors in concrete.
- B. Section 04 2000 - Unit Masonry: Placement of anchors in masonry.
- C. Section 06 2000 - Finish Carpentry: Wood handrail repair.
- D. Section 09 2116 - Gypsum Board Assemblies: Placement of backing plates in stud wall construction.

1.03 REFERENCE STANDARDS

- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum 2020.
- B. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2021.
- C. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2021, with Errata (2022).
- D. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2020, with Errata (2022).
- E. ADA Standards - 2010 ADA Standards for Accessible Design 2010.
- F. AISC 201 - AISC Certification Program for Structural Steel Fabricators, Standard for Steel Building Structures 2006.
- G. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless 2022.

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PIPE AND TUBE RAILINGS

- H. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
  - I. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes 2021a.
  - J. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing 2021.
  - K. ASTM A780/A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings 2020.
  - L. ASTM B177/B177M - Standard Guide for Engineering Chromium Electroplating 2011 (Reapproved 2021).
  - M. ASTM B211/B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire 2019.
  - N. ASTM B241/B241M - Standard Specification for Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube 2016.
  - O. ASTM B429/B429M - Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube 2020.
  - P. ASTM B483/B483M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Tube and Drawn Pipe for General Purpose Applications 2021.
  - Q. ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings 2021.
  - R. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification 2021.
  - S. AWS D1.1/D1.1M - Structural Welding Code - Steel 2020, with Errata (2022).
  - T. AWS D1.6/D1.6M - Structural Welding Code - Stainless Steel 2017, with Amendment (2021).
  - U. AWS C3.4M/C3.4 - Specification for Torch Brazing 2016.
  - V. AWS C3.5M/C3.5 - Specification for Induction Brazing 2016, with Amendment (2017).
  - W. AWS C3.9M/C3.9 - Specification for Resistance Brazing 2020.
  - X. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic) 2019.
- 1.04 SUBMITTALS
- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
  - B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.
  - C. Samples: Submit two, 6 inch long samples of handrail. Submit two samples of elbow, wall bracket, and end stop.
  - D. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated within the previous 12 months.

## 1.05 QUALITY ASSURANCE

- A. Structural Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located, or personnel under direct supervision of such an engineer.
- B. Fabricator Qualifications:
  - 1. A qualified steel fabricator that is certified by the American Institute for Steel Construction (AISC) under AISC 201.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Handrails and Railings:
  - 1. Alumi-Guard: [www.alumi-guard.com/#sle](http://www.alumi-guard.com/#sle).
  - 2. Avcon Railing Systems; Presidential Aluminum: [www.avcon.com/#sle](http://www.avcon.com/#sle).
  - 3. ATR Technologies Inc; Aluminum Multi-Line Railing: <http://www.atr-technologies.com/#sle>.
  - 4. Kee Safety, Inc; Kee Klamp (steel): [www.keesafety.com/#sle](http://www.keesafety.com/#sle).
  - 5. KaneSterling: [www.sterlingdula.com/#sle](http://www.sterlingdula.com/#sle).
  - 6. Spaceguard Products; BeastWire Mezzanine Safety Railguard System: [www.spaceguardproducts.com/#sle](http://www.spaceguardproducts.com/#sle).
  - 7. The Wagner Companies: [www.wagnercompanies.com/#sle](http://www.wagnercompanies.com/#sle).
- B. Non-Weld Pipe Fittings:
  - 1. Kee Safety, Inc; Kee Klamp (steel): [www.keesafety.com/#sle](http://www.keesafety.com/#sle).
- C. Metal Rail Infill:
  - 1. The G-S Company: [www.g-sco.com/#sle](http://www.g-sco.com/#sle).
  - 2. The Western Group; Woven Wire: [www.architecturalwire.com/#sle](http://www.architecturalwire.com/#sle).
- D. Metal Cable Infill:
- E. Accessibility-Compliant Handrail Brackets:
  - 1. Rakks/Rangine Corporation; ADA Compliant HR-202: [www.rakks.com/#sle](http://www.rakks.com/#sle).

### 2.02 RAILINGS - GENERAL REQUIREMENTS

- A. Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of applicable local code.
- B. Distributed Loads: Design railing assembly, wall rails, and attachments to resist distributed force of 75 pounds per linear foot applied to the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E935
- C. Concentrated Loads: Design railing assembly, wall rails, and attachments to resist a concentrated force of 200 pounds applied at any point on the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E935
- D. Allow for expansion and contraction of members and building movement without damage to connections or members.
- E. Dimensions: See drawings for configurations and heights.

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PIPE AND TUBE RAILINGS

1. Top Rails and Wall Rails: 1-1/2 inches diameter, round.
  2. Top Rails and Wall Rails: Wood rails, specified in Section 06 2000.
  3. Intermediate Rails: 1-1/2 inches diameter, round.
  4. Intermediate Rails: 1-1/4 by 1 inch rectangular.
  5. Posts: 1-1/2 inches diameter, round.
  6. Posts: 1-1/2 inches square.
  7. Balusters: 1/2 inch square solid bar.
- F. Provide anchors and other components as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.
1. For anchorage to concrete, provide inserts to be cast into concrete, for bolting anchors.
  2. For anchorage to masonry, provide brackets to be embedded in masonry, for bolting anchors.
  3. For anchorage to stud walls, provide backing plates, for bolting anchors.
- G. Provide slip-on non-weld mechanical fittings to join lengths, seal open ends, and conceal exposed mounting bolts and nuts, including but not limited to elbows, T-shapes, splice connectors, flanges, escutcheons, and wall brackets.
- H. Welded and Brazed Joints: Make visible joints butt tight, flush, and hairline; use methods that avoid discoloration and damage of finish; grind smooth, polish, and restore to required finish.
1. Ease exposed edges to a small uniform radius.
  2. Welded Joints:
    - a. Carbon Steel: Perform welding in accordance with AWS D1.1/D1.1M.
    - b. Stainless Steel: Perform welding in accordance with AWS D1.6/D1.6M.
  3. Brass/Bronze Brazed Joints:
    - a. Perform torch brazing in accordance with AWS C3.4M/C3.4.
    - b. Perform induction brazing in accordance with AWS C3.5M/C 3.5.
    - c. Perform resistance brazing in accordance with AWS C3.9M/C3.9.

## 2.03 ALUMINUM MATERIALS

- A. Aluminum Pipe: Schedule 40; ASTM B429/B429M, ASTM B241/B241M, or ASTM B483/B483M.
- B. Aluminum Tube: Minimum wall thickness of 0.127 inch; ASTM B429/B429M, ASTM B241/B241M, or ASTM B483/B483M.
- C. Solid Bars and Flats: ASTM B211/B211M.
- D. Non-Weld Mechanical Fittings: Slip-on cast aluminum, for Schedule 40 pipe, with flush setscrews for tightening by standard hex wrench, no bolts or screw fasteners.
- E. Welding Fittings: No exposed fasteners; cast aluminum.
- F. Straight Splice Connectors: Concealed spigot; cast aluminum.
- G. Exposed Fasteners: No exposed bolts or screws.

## 2.04 STEEL RAILING SYSTEM

- A. Steel Tube: ASTM A500/A500M Grade B cold-formed structural tubing.

- B. Handrails and guardrails to be of stainless steel construction. Comply with ASCE "Specification for the Design of Cold-Formed Stainless Steel Structural Members." Bright, Directional Polish: Match AISI No. 4 finish.
- C. Steel Pipe: ASTM A53/A53M Grade B Schedule 80, black finish.
- D. Non-Weld Mechanical Fittings: Slip-on, galvanized malleable iron castings, for Schedule 40 pipe, with flush setscrews for tightening by standard hex wrench, no bolts or screw fasteners.
- E. Welding Fittings: Factory- or shop-welded from matching pipe or tube; seams continuously welded; joints and seams ground smooth.
- F. Exposed Fasteners: No exposed bolts or screws.
- G. Straight Splice Connectors: Steel concealed spigots.
- H. Galvanizing: In accordance with requirements of ASTM A123/A123M.
  - 1. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20 Type I - Inorganic.
- I. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

#### 2.05 FABRICATION

- A. Accurately form components to suit specific project conditions and for proper connection to building structure.
- B. Fit and shop assemble components in largest practical sizes for delivery to site.
- C. Fabricate components with joints tightly fitted and secured. Provide spigots and sleeves to accommodate site assembly and installation.
- D. Welded Joints:
  - 1. Exterior Components: Continuously seal joined pieces by intermittent welds and plastic filler. Drill condensate drainage holes at bottom of members at locations that will not encourage water intrusion.
  - 2. Interior Components: Continuously seal joined pieces by intermittent welds and plastic filler.
  - 3. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- E. Weld connections that cannot be shop welded due to size limitations.
  - 1. Weld in accordance with AWS D1.1/D1.1M.
  - 2. Match shop welding and bolting.
  - 3. Clean welds, bolted connections, and abraded areas.
  - 4. Touch up shop primer and factory-applied finishes.
  - 5. Repair galvanizing with galvanizing repair paint per ASTM A780/A780M.

#### 2.06 ALUMINUM FINISHES

- A. The following with approval are acceptable options to achieve color goals for special hand and guardrails at locations indicated on drawings:
- B. Class I Color Anodized Finish: AAMA 611 AA-M12C22A42 Integrally colored anodic coating not less than 0.7 mils thick.

- C. Class I Color Anodized Finish: AAMA 611 AA-M12C22A44 Electrolytically deposited colored anodic coating not less than 0.7 mils thick.
- D. Class II Color Anodized Finish: AAMA 611 AA-M12C22A32 Integrally colored anodic coating not less than 0.4 mils thick.
- E. Class II Color Anodized Finish: AAMA 611 AA-M12C22A34 Electrolytically deposited colored anodic coating not less than 0.4 mils thick.
- F. Pigmented Organic Coating System: AAMA 2603 polyester or acrylic baked enamel finish.
- G. High Performance Organic Coating System: AAMA 2604 multiple coat, thermally cured fluoropolymer system.
- H. Superior Performance Organic Coating System: AAMA 2605 multiple coat, thermally cured polyvinylidene fluoride system.
- I. Color: To be selected by Architect from manufacturer's standard line.
- J. Touch-Up Materials: As recommended by coating manufacturer for field application.

### PART 3 EXECUTION

#### 3.01 EXAMINATION

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

#### 3.02 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply items required to be cast into concrete or embedded in masonry with setting templates, for installation as work of other sections.
- C. Apply one coat of bituminous paint to concealed aluminum surfaces that will be in contact with cementitious or dissimilar materials.

#### 3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install components plumb and level, accurately fitted, free from distortion or defects, with tight joints.
- C. Install railings in compliance with ADA Standards for accessible design at applicable locations.
- D. Anchor railings securely to structure.
- E. Field weld anchors as indicated on drawings. Touch-up welds with primer. Grind welds smooth.
- F. Conceal anchor bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.



3.04 TOLERANCES

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

3.05 SCHEDULE

- A. Interior Ramp: Handrails and guardrails to be of stainless steel construction. Comply with ASCE "Specification for the Design of Cold-Formed Stainless Steel Structural Members." Bright, Directional Polish: Match AISI No. 4 finish.

END OF SECTION 05 5213

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## SECTION 05 5808 SECURITY SCREENS

### PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS

- A. Applicable provisions of Bidding Requirements, Contract Requirements in Division 0 and all applicable Division 01 sections.

#### 1.02 SUMMARY

- A. Section Includes: Security Screens and attachments for complete installation for locations indicated on drawings.
- B. Section Includes: The security screens shown on the plans and herein specified are the products of Kane Innovations, Erie, Pennsylvania. This manufacturer's name and products have been used to establish the standards of construction and quality of workmanship required for this project and per Rebuild standard. Manufacturers bidding on this project must be actively engaged in the fabrication of specified items for a minimum of five (5) years prior to the bid date. Manufacturers requesting approval to bid their products as equal must submit to the Architect full-size drawings, including details of construction, and a complete operating security screen sample, 10 days prior to the bid date. Provide LEVEL 5 Fixed Steel NarrowLine Security Screen Model: S-NR5-Z
- C. Related Sections:
  - 1. Division 4 for masonry
  - 2. Division 5 for other metals
  - 3. 079200 "Joint Sealants" for joint sealants installed as part of the aluminum sliding door system
  - 4. 085113 "Aluminum Windows"
  - 5. 084113 "Aluminum-Framed Entrances and Windows"
  - 6. 088100 "Glazing"

#### 1.03 DEFINITIONS

- A. Performance class designations according to AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS):
  - 1. AW: Architectural Window
- B. Performance grade number according to AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS):
  - 1. Design pressure number in pounds force per square foot used to determine the structural test pressure and water test pressure.
- C. Definitions: For fenestration industry standard terminology and definitions refer to American Architectural Manufacturers Association (AAMA) - AAMA Glossary (AAMA AG).

#### 1.04 PERFORMANCE REQUIREMENTS

- A. General: Provide complete system including masonry anchors, special finishes and operating hardware for window cleaning as shown on drawings.
- B. Structural Performance: Provide complete system including masonry anchors and setting adhesives in accordance with masonry sections and provisions on structural drawings.

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SECURITY SCREENS

## 1.05 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, fabrication methods, dimensions of individual components and profiles, hardware, finishes, and operating instructions for each type of window guard indicated.
  - 1. Security Screens: Keyed cam lock to match existing keying, include key number on shop drawing submittal
- B. Samples for Initial Selection: For units with factory-applied color finishes including samples of hardware and accessories involving color selection. Samples for Verification: For components required.
- C. Product Schedule: Use same designations indicated on Drawings.
- D. Shop Drawings: Manufacturer shall submit shop drawings, showing details of attachment to surround materials and elevations showing scope of the project and include plans, elevations, sections, details, hardware, attachments to other work, operational clearances and installation details.
- E. Samples of materials may be requested without cost to owner: frame sections, infill sections, fasteners, corner section, etc.

## 1.06 QUALITY ASSURANCE

- A. Installer Qualifications: An installer which has had successful experiences with installation of the same or similar units required for this project and other projects of similar size and scope.
- B. Manufacturer Qualifications: A manufacturer capable of fabricating Security Screens that meet or exceed performance requirements indicated and of documenting this performance by inclusion of test reports, and calculations.
- C. Source Limitations: Obtain Security Screens through one source from a single manufacturer.
- D. Product Options: Drawings indicate size, profiles, and dimensional requirements of aluminum windows and are based on the specific system indicated. Refer to Division 01 Section "Product Requirements." Do not modify size and dimensional requirements.
- E. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

## 1.07 PROJECT CONDITIONS

- A. Field Measurements: Verify Security Screens openings by field measurements before fabrication and indicate measurements on Shop Drawings.

## 1.08 WARRANTY

- A. The operation of the security screen supplied by Kane Innovations on the designated project is warranted for one (1) year against any proven defective material or parts, as called for in the specifications and approved shop drawings. This warranty does not cover abuse by others.
- B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty.
  - 1. Warranty Period: one (1) year from Date of Substantial Completion of the project provided however that the Limited Warranty shall begin in no event later than nine

months from date of shipment by manufacturer.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Basis-of-Design Product: LEVEL 5 Fixed Steel NarrowLine Security Screen Model: S-NR5-Z by
  - 1. Kane Innovations, Erie, PA
  - 2. (800) 773-2439
- B. Or equal and Subject to compliance with requirements, provide a complete system of a comparable product by the following and only if basis of design products are not readily available.
- C. Substitution Acceptance: Acceptance will be in written form, either as an addendum or modification, and documented by a formal change order signed by the Owner and Contractor.

### 2.02 MATERIALS

- A. Aluminum Extrusions: Alloy and temper recommended by aluminum window manufacturer for strength, corrosion resistance, and application of required finish and not less than 0.070" wall thickness at any location for the main frame and sash members.
  - 1. Recycled Content: Provide documentation indicating post-consumer recycled content plus one-half pre-consumer recycled content.
- B. Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with aluminum window members, trim, hardware, anchors, and other components.
- C. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated.
- D. Reinforcing Members: Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated.
- E. Sealant: For sealants required within fabricated windows, provide window manufacturer's standard, permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.

### 2.03 HARDWARE

- A. General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, or other corrosion-resistant material compatible with aluminum; designed to smoothly operate, tightly close, and securely lock windows guards.

### 2.04 Security Screens for Rec Center PPR Standard

- A. Basis of Design: Kane Level 5 (heavy vandalism) steel narrowline, operable side-hinged (SNR50) with 16-gauge (63% open) perforated panel. Bonderized with thermoplastic, polyester powder-coat finish, AAMA 2603. Roto-lift emergency egress release. Keyed cam lock to match existing keying, include key number on shop drawing submittal.

- B. Security Screens to be attached to masonry as indicated on drawings.
  - 1. Option to secure to window frames to be offered as available.

#### 2.05 Main Frame

- A. A. The main frame rails shall be not less than 16-gauge 1" [25.4mm] x 1" [25.4mm] seamless welded galvanized steel tubing with high strength die cast metal corners which are pneumatically inserted into the frame ends with an interference fit.
- B. B. A removable face plate, extruded from 6063-T6 aluminum alloy, .062-inch thick, .212 lbs./ft., shall be attached to the sides of the main frame using tamper resistant screws.

#### 2.06 FABRICATION

- A. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:
  - 1. Profiles that are sharp, straight, and free of defects or deformations.
  - 2. Accurately fit joints; make joints flush, hairline and weatherproof.
  - 3. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior of masonry anchors.
  - 4. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- B. Fabricate windows guards in sizes indicated to be confirm by field measurement. Include a complete system for assembling components and windows guards.

#### 2.07 Infill

- A. Wire Cloth
- B. Wire cloth shall be woven 12-mesh to the inch from .028 [0.71] inch diameter Type 304 stainless steel wire and double crimped.
- C. Wire cloth shall be woven 10-mesh to the inch from .047 [1.19] inch diameter Type 304 stainless steel wire and double crimped.
- D. Perforated Panel
- E. 16-gauge mill-galvanized with 63% open area
- F. 14-gauge mill-galvanized with 51% open area
- G. 12-gauge mill-galvanized with 51% open area
- H. 18-gauge stainless steel with 63% open area

#### 2.08 Infill Attachment

- A. The perforated panel shall be attached to the main frame with hex-head Tek Screws.
- B. Wire cloth shall be hemmed 180 degrees and retained by Hex-head Tek Screws. (for 12 mesh .028 wire cloth only)
- C. Hex-head Tek screws shall penetrate the infill and main frame approximately 4" [101.6] on center.

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## 2.09 ALUMINUM FINISHES

- A. The aluminum faceplates shall be thoroughly cleaned in a 5-step bonderizing process. An electrostatically applied thermoplastic, polyester powder coating (2.5 mil min. thickness) shall be applied and baked to a hard mar-resistant finish in one of Kane's standard colors. Coating shall meet or exceed AAMA 2603.
  - 1. White
  - 2. Gray
  - 3. Black
  - 4. Beige
  - 5. Dark Bronze
  - 6. Custom colors are available at additional cost with submission of color sample
  - 7. 215 R1 Clear Anodized
- B. The main and infill shall be thoroughly cleaned in a 5-step bonderizing process. An electrostatically applied black, thermoplastic, polyester powder coating (2.5 mil min. thickness) shall be applied and baked to a hard mar-resistant finish. Coating shall meet or exceed AAMA 2603.
- C. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- D. Factory Finishing: per basis of design standard.

## 2.10 FINISH

- A. Anodic Finish: All exposed areas of aluminum windows and components shall receive a two-step finish: clear anodize components, then color coat with electrostatically deposited finish UNO:
  - 1. Color: As noted in drawings otherwise:
  - 2. Color: To be selected by the Architect from the manufacturer's standard colors.
- B. Paint Finish: Finish all exposed areas of aluminum windows and components with the following UNO:
  - 1. 70 percent Kynar in accordance with AA-M12-C42-R1X, AAMA 2605-98
  - 2. Color: As noted in drawings otherwise:
  - 3. Color: To be selected by the Architect from the manufacturer's standard colors.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Inspection: Verify that openings fit allowable tolerances, are plumb, level, provide a solid anchoring surface and comply with approved shop drawings
- B. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work. Verify rough opening dimensions, levelness of sill plate and operational clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weather tight window installation.
  - 1. Masonry Surfaces: Visibly dry and free of excess mortar, sand, and other construction debris.

2. Metal Surfaces: Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.02 INSTALLATION

- A. Install in accordance with approved shop drawings and specifications.
- B. Plumb and align faces in a single plane and erect screens square and true, adequately anchored to structure.
- C. After completion of installation, screens shall be adjusted, in working order and cleaned.
- D. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing windows, hardware, accessories, and other components.
- E. Install aluminum framed storefront system level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.
- F. Set sill members in bed of sealant or with gaskets, as indicated, for weather tight construction.
- G. Install aluminum framed storefront system and components to drain condensation, water penetrating joints, and moisture migrating within sliding door to the exterior.
- H. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

### 3.03 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.
  1. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.
- B. Testing Services: Testing and inspecting of installed windows shall take place as follows:
  1. Testing Methodology: Testing Standard shall be per AAMA 502 including reference to ASTM E 783 for Air Infiltration Test and ASTM E 1105 for Water Penetration Test.
    - a. Air Infiltration Test: Conduct test in accordance with ASTM E 783 at a minimum uniform static test pressure of 1.57 psf (75 Pa) for CW or 6.24 psf (300 Pa) for AW. The maximum allowable rates of air leakage for field testing shall not exceed 1.5 times the project specifications.
    - b. Water Infiltration Test: Water penetration resistance tests shall be conducted in accordance with ASTM E 1105 at a static test pressure equal to 2/3 the specified water test pressure.
  2. Testing Extent: Architect shall select window units to be tested as soon as a representative portion of the project has been installed, glazed, perimeter caulked and cured. Conduct tests for air infiltration and water penetration with manufacturer's representative present.
  3. Test Reports: Shall be prepared according to AAMA 502.

### 3.04 ADJUSTING, CLEANING, AND PROTECTION

- A. Adjust operating sashes, screens, hardware, and accessories for a tight fit at contact points and weather stripping for smooth operation and weather tight closure. Lubricate hardware and



moving parts.

- B. Clean aluminum surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
- C. Clean glass immediately after installing windows. Comply with manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels, and clean surfaces.
- D. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.
- E. Protect window surfaces from contact with contaminating substances resulting from construction operations. In addition, monitor window surfaces adjacent to and below exterior concrete and masonry surfaces during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written recommendations.

### 3.05 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain window operating system. Refer to Section 017823 "Operating and Maintenance Manuals."

END OF SECTION 05 5808

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## SECTION 06 1000 ROUGH CARPENTRY

### PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS

- A. Applicable provisions of Bidding Requirements, Contract Requirements in Division 0 and all applicable Division 1 sections.

#### 1.02 SUMMARY

- A. Section Includes:
  1. Wood blocking and nailers.
  2. Plywood backing panels and decking where indicated on drawings.
  3. Wood studs for patching or extending existing walls.
  4. Other misc wood framing and bracing.
  5. Roof Sheathing: 1/2" sheathing for overlay of existing roof deck; APA min. standard securing sheathing to substrate existing rafters with break on rafterers.
    - a. GWB Sheathing where indicated.
    - b. Marine Grade Sheathing plywood where indicated.

#### 1.03 PRODUCT HANDLING

- A. Stack lumber and plywood; place spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

### PART 2 - PRODUCTS

#### 2.01 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.
  1. Factory mark each piece of lumber with grade stamp of grading agency.
  2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
  3. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal thickness or less, unless otherwise indicated.
- B. Plywood Panels:
  1. Plywood: DOC PS 1.
  2. Thickness: As needed to comply with requirements specified but not less than thickness indicated.
  3. Factory mark panels according to indicated standard.

#### 2.02 ROOF SHEATHING

- A. Plywood Sheathing: Marine Grade Plywood Exposure 1 sheathing; where indicated on drawings.
  1. Nominal Thickness: Not less than 15/32 inch

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- a. Roof Cover Board:
  - 2. Basis of Design: Marine Grade Plywood
  - 3. For marine grade plywood, high temperature self-adhering underlayment at days end.
- B. Fiberglass Mat Gypsum Roof Cover Board; where indicated on drawings.
  - 1. Fiberglass Faced, Polyisocyanurate-Foam Sheathing: ASTM C1289, Type I or Type II, Class 2, rigid, cellular, polyisocyanurate thermal insulation. Foam-plastic core and facings shall have a flame-spread index of 25 or less when tested individually.
  - 2. Basis of Design: DensDeck, Georgia-Pacific
  - 3. Manufacturers: Subject to compliance with requirements, provide products by one of the following: As indicated and:
  - 4. Thickness: 1/2 inch Or As otherwise indicated at special conditions.
  - 5. Flame Propagation Test: Materials and construction shall be as tested according to NFPA 285.
- C. Oriented-Strand-Board Sheathing: DOC PS 2, sheathing:
  - 1. Nominal Thickness: 2

## 2.03 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: AWPA UC2 (lumber) and AWPA UC3 (plywood).
  - 1. Preservative Chemical: Ammoniacal, or amine, copper quat (ACQ).
  - 2. Do not use chemicals containing chromium or arsenic.
- B. Kiln-dry material after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark each treated item with the treatment quality mark of an inspection agency approved by the American Lumber Standards Committee Board of Review.
- D. Application: Treat items indicated on Drawings, and the following:
  - 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
  - 2. Wood sills, sleepers, blocking, stripping, and similar concealed members in contact with masonry or concrete.

## 2.04 DIMENSION LUMBER

- A. General: Provide dimension lumber of grades indicated according to the American Lumber Standards Committee National Grading Rule provisions of the grading agency indicated.
- B. Miscellaneous Lumber: Provide lumber for support or attachment of other construction, including blocking and nailers.
- C. For items of dimension lumber size, provide Construction, Stud, or No. 2 grade lumber with 19 percent maximum moisture content and any of the following species:
  - 1. Mixed southern pine; SPIB.
  - 2. Hem-fir or Hem-fir (north); NLGA, WCLIB, or WWPA.
  - 3. Spruce-pine-fir (south) or Spruce-pine-fir; NELMA, NLGA, WCLIB, or WWPA.
  - 4. Eastern softwoods; NELMA.
  - 5. Northern species; NLGA.
  - 6. Western woods; WCLIB or WWPA.

2.05 PLYWOOD PANELS

- A. Telephone and Electrical Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 1/2 inch thick.

2.06 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
  - 1. Where miscellaneous carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
  - 2. Where miscellaneous carpentry is preservative-treated, provide fasteners of Type 304 or Type 316 stainless steel.
- B. Nails: FS FF-N-105.
- C. Power-Driven Fasteners: CABO NER-272.
- D. Wood Screws: ASME B18.6.1.
- E. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.
- F. Roof Sheathing Fasteners: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
  - 1. For roof parapet and wall sheathing, provide fasteners - p □ a  
ply T a e e a e Type s a less  
steel.
  - 2. For parapet wall sheathing, provide fasteners with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B117.
  - 3. Nails, Brads, and Staples: ASTM F1667.
  - 4. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- G. Expansion Anchors: (not permitted in exterior masonry unless needed and only with written approval) Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
  - 1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

- A. Discard units of material with defects that impair quality of carpentry and that are too small to use with minimum number of joints or optimum joint arrangement.
- B. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.

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ROUGH CARPENTRY

- C. Securely attach carpentry work as indicated and according to applicable codes and recognized standards.
- D. Use fasteners of appropriate type and length. Pre-drill members when necessary to avoid splitting wood.
- E. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- F. Cut sheathing panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- G. Securely attach sheathing panels to substrate by fastening as indicated, complying with the following:
  - 1. Table 2304.9.1, "Fastening Schedule," in the ICC's International Building Code.
  - 2. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in the ICC's International Residential Code for One- and Two-Family Dwellings.
  - 3. ICC-ES evaluation report for fastener.
- H. Use common wire nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.
- I. Coordinate roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- J. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
- K. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

### 3.02 WOOD STRUCTURAL PANEL INSTALLATION

- A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
- B. Fastening Methods: Fasten panels as indicated below:
  - 1. Roof Sheathing:
    - a. **a I** to wood framing
    - b. Screw to cold-formed metal framing.
    - c. Space panels 1/8 inch apart at edges and ends.

### 3.03 WOOD BLOCKING AND NAILER INSTALLATION

- A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.

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ROUGH CARPENTRY

3.04 PLYWOOD PANEL INSTALLATION

- A. Plywood Panels: Comply with applicable recommendations contained in APA Form No. E30K, "APA Design/Construction Guide: Residential & Commercial," for types of structural-use panels and applications indicated.

END OF SECTION 06 1000

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## SECTION 06 2000 FINISH CARPENTRY

### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

- A. Finish carpentry items as indicated on drawings including the following:
- B. Wood door frames, glazed frames.
- C. Wood casings and moldings.
- D. Dutchman repairs of existing window sill, frame and molding.
- E. Restore exterior fascia, skirting and surround of wood dormers.
- F. Hardware and attachment accessories.
- G. Other existing wood work indicated on drawings to be repaired / restored / replaced in kind.

#### 1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Support framing, grounds, and concealed blocking.
- B. Section 06 4100 - Architectural Wood Casework: Shop fabricated custom cabinet work.
- C. Section 08 1433 - Stile and Rail Wood Doors.
- D. Division 8 Sections for Windows and Doors in regard to existing wood trim repair as indicated on drawings.
- E. Section 09 9000 - PAINTS and COATINGS: Painting of finish carpentry items.
- F. Section 12 3600-Countertops and as indicated on drawings.

#### 1.03 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials Current Edition.
- B. ANSI A135.4 - Basic Hardboard 2012 (Reaffirmed 2020).
- C. ANSI A208.1 - American National Standard for Particleboard 2022.
- D. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test 2015 (Reaffirmed 2020).
- E. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- F. ASTM C1036 - Standard Specification for Flat Glass 2021.
- G. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass 2018.

- H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2022.
- I. AWI (QCP) - Quality Certification Program Current Edition.
- J. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition 2014, with Errata (2016).
- K. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards 2021, with Errata.
- L. AWPA U1 - Use Category System: User Specification for Treated Wood 2022.
- M. BHMA A156.9 - Cabinet Hardware 2020.
- N. GSA CID A-A-1936 - Adhesives, Contact, Neoprene Rubber 1996a (Validated 2013).
- O. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood 2020.
- P. NEMA LD 3 - High-Pressure Decorative Laminates 2005.
- Q. NHLA G-101 - Rules for the Measurement and Inspection of Hardwood and Cypress 2019.
- R. PS 1 - Structural Plywood 2009 (Revised 2019).
- S. PS 20 - American Softwood Lumber Standard 2021.
- T. WDMA I.S. 4 - Industry Specification for Preservative Treatment for Millwork 2019.
- U. WI (CCP) - Certified Compliance Program (CCP) Current Edition.

#### 1.04 ADMINISTRATIVE REQUIREMENTS

#### 1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data:
  1. Provide manufacturer's product data, storage and handling instructions for factory-fabricated units.
  2. Provide data on fire retardant treatment materials and application instructions.
- C. Shop Drawings: Indicate materials, component profiles and elevations matching existing decorative trim, moulding, brackets, window sills, dormer fascia, skirting, mullions, dormer casing at roof flashing, fastening methods, jointing details, and accessories.
- D. Samples: Submit two samples of wood trim 6 inch long.

#### 1.06 QUALITY ASSURANCE

- A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.
  1. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.
- B. Quality Certification:

1. Comply with WI (CCP) woodwork association quality certification service/program in accordance with requirements for work specified in this section  
[www.woodworkinstitute.com/#sle](http://www.woodworkinstitute.com/#sle).
2. Provide labels or certificates indicating that work complies with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade or grades specified.
3. Provide designated labels on shop drawings as required by certification program.
4. Provide designated labels on installed products as required by certification program.
5. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.

#### 1.07 MOCK-UPS

- A. Locate where directed.
- B. Mock-up may remain as part of the work.

#### 1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver factory-fabricated units to project site in original packages, containers or bundles bearing brand name and identification.
- B. Store finish carpentry items under cover, elevated above grade, and in a dry, well-ventilated area not exposed to heat or sunlight.
- C. Protect from moisture damage.
- D. Handle materials and products to prevent damage to edges, ends, or surfaces.

### PART 2 PRODUCTS

#### 2.01 FINISH CARPENTRY ITEMS

- A. Wood restoration products; Use Abatron Wood Restoration System with Liquid Wood consolidate, Wood Epoxy fillers and accessory wood preservation products, or equal.
- B. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
- C. Exterior Woodwork Items:
  1. Window Casings and Moldings: Softwood; prepare for paint finish.

#### 2.02 WOOD-BASED COMPONENTS

- A. Provide sustainably harvested wood, certified or labeled as specified in Section 01 6000 - Product Requirements.

#### 2.03 LUMBER MATERIALS

- A. Softwood Lumber: Radiata Pine, Accoya and Tricoya species, Common sawn, Accoya acetylated wood with a maximum moisture content of 3-5 percent; with vertical grain, A1 grade.
- B. Manufactured Panels: Tricoya treated wood panel.

## 2.04 SHEET MATERIALS

- A. Softwood Plywood, Not Exposed to View: Any face species, medium density fiberboard core; PS 1 Grade A-B, glue type as recommended for application.

## 2.05 PLASTIC LAMINATE AND SOLID SURFACE MATERIALS

- A. Plastic Laminate: NEMA LD 3; color as selected by Architect; textured, low gloss finish.
  - 1. Products:
    - a. Counter tops and Laminates as indicated on drawings and in strict accordance with manufacturers requirements. Provide Basis of Design products listed on drawings from the following manufacturer:
    - b. [www.wilsonart.com/#sle](http://www.wilsonart.com/#sle)
    - c. Counter tops indicated on drawings: refer to countertop section.
  - 2. Subject to compliance with requirements and only if basis of design products are not readily available:
    - a. Substitutions: See Section 01 6000 - Product Requirements.
- B. Solid Laminate: as indicated on drawings color, as indicated on drawings pattern, and gloss surface texture.
- C. Laminate Backing Sheet: NEMA LD 3, BKL; undecorated plastic laminate; as indicated on drawings manufactured by [www.wilsonart.com/#sle](http://www.wilsonart.com/#sle).
- D. Laminate Adhesive: Type recommended by laminate manufacturer to suit application; not containing formaldehyde or other volatile organic compounds.

## 2.06 FASTENINGS

- A. Adhesive for Purposes Other Than Laminate Installation: Suitable for the purpose; not containing formaldehyde or other volatile organic compounds.

## 2.07 ACCESSORIES

- A. Adhesive: Type recommended by fabricator to suit application.
- B. Plastic Edge Trim: Extruded convex shaped; smooth finish; self locking serrated tongue; of width to match component thickness; as indicated on drawings color.
- C. Wood Filler: Solvent base, tinted to match surface finish color.

## 2.08 HARDWARE

- A. Hardware: Comply with BHMA A156.9.
- B. Standard Shelf, Countertop, and Workstation Brackets:
  - 1. Material: Steel.
  - 2. Finish: Manufacturer's standard, factory-applied primer.
- C. Americans with Disabilities Act (ADA)-Compliant Vanity and Countertop Brackets:
  - 1. Material: Steel.
  - 2. Finish: Manufacturer's standard, factory-applied primer.

- D. Specialty Vanity Brackets:
  - 1. Material: Steel.
  - 2. Finish: Manufacturer's standard, factory-applied, textured powder coat.

## 2.09 WOOD TREATMENT

- A. Grading: In accordance with rules certified by ALSC; [www.alsc.org](http://www.alsc.org); ICC ESR 2825; FSC Certified WDMA I.S 4-15A, Cradle to Cradle: GOLD Overall; Platinum in Material Health.
- B. Grading: Provide A1 grade lumber.
- C. Factory-Treated Lumber: Comply with requirements of AWPA U1 - Use Category System for pressure impregnated wood treatments determined by use categories, expected service conditions, and specific applications.
- D. Wood Preservative (Surface Application): Colored, as indicated on drawings type, as indicated on drawings.
- E. Redry wood after pressure treatment to maximum 3-5 percent moisture content.

## 2.10 FABRICATION

- A. Shop assemble work for delivery to site, permitting passage through building openings.
- B. Cap exposed plastic laminate finish edges with plastic trim.
- C. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.
- D. Use exterior grade permanent adhesives recommended by treated wood manufacturer for all shop fabrications and field assembly.
- E. Use stainless steel for all fasteners and anchors.
  - 1. Use epoxy anchors at masonry.
  - 2. Countersink and fill all fasteners at exposed surfaces.
- F. Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.
- G. Apply laminate backing sheet to reverse face of plastic laminate finished surfaces.

## 2.11 SHOP FINISHING

- A. Sand work smooth and set exposed nails and screws.
- B. Apply wood filler in exposed nail and screw indentations.
- C. On items to receive transparent finishes, use wood filler that matches surrounding surfaces and is of type recommended for the applicable finish.
- D. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:
  - 1. Transparent:
    - a. System - 1, Lacquer, Nitrocellulose.

- b. Sheen: Flat.
- 2. Opaque:
  - a. System - 1, Lacquer, Nitrocellulose.
  - b. Color: As selected by Architect.
  - c. Sheen: Flat.

### PART 3 EXECUTION

#### 3.01 EXAMINATION

- A. Verify adequacy of backing and support framing.
- B. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

#### 3.02 INSTALLATION

- A. Install custom fabrications in accordance with AWI/AWMA/WI (AWS) or AWMA/WI (NAAWS) requirements for grade indicated.
- B. Set and secure materials and components in place, plumb and level.
- C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.

#### 3.03 SITE APPLIED WOOD TREATMENT

- A. Apply preservative treatment in accordance with manufacturer's instructions.
- B. Brush apply one coats of preservative treatment on wood in contact with cementitious materials. Treat site-sawn cuts.
- C. Allow preservative to dry prior to erecting members.

#### 3.04 PREPARATION FOR SITE FINISHING

- A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.
- B. Site Finishing: See Painting and Coating Section.

#### 3.05 TOLERANCES

- A. Maximum Variation from True Position: 1/16 inch.
- B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

END OF SECTION 06 2000

SECTION 06 4100  
ARCHITECTURAL WOOD CASEWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Where indicated on drawings for the following:
- B. Specially fabricated casework and cabinet units.
- C. Counter Tops and Laminates as indicated on drawings and in strict accordance with manufacturers requirements.
- D. Hardware.
- E. Factory finishing.
- F. Preparation for installing utilities.

1.02 RELATED REQUIREMENTS

- A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 06 1000 - Rough Carpentry: Support framing, grounds, and concealed blocking.
- C. Section 12 3600 - Countertops and as indicated on drawings.

1.03 REFERENCE STANDARDS

- A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition 2014, with Errata (2016).
- B. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards 2021, with Errata.
- C. BHMA A156.9 - Cabinet Hardware 2020.
- D. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood 2020.
- E. NEMA LD 3 - High-Pressure Decorative Laminates 2005.
- F. UL (DIR) - Online Certifications Directory Current Edition.

1.04 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.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.

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ARCHITECTURAL WOOD CASEWORK

1. Provide information as required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).
- C. Product Data: Provide data for hardware accessories.
- D. Samples: Submit actual samples of architectural cabinet construction, minimum 12 inches square, illustrating proposed cabinet, countertop, and shelf unit substrate and finish.
- E. Samples: Submit actual sample items of proposed pulls, hinges, shelf standards, and locksets, demonstrating hardware design, quality, and finish.
- F. Certificate: Submit labels and certificates required by quality assurance and quality control programs.
- G. Sustainable Design Submittal: Documentation for sustainably harvested wood-based components.

#### 1.06 QUALITY ASSURANCE

- A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.
  1. Company with at least one project in the past 5 years with value of woodwork within 20 percent of cost of woodwork for this Project.
  2. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.
  3. Single Source Responsibility: Provide and install this work from single fabricator.
- B. Quality Certification:
  1. Provide labels or certificates indicating that the installed work complies with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade or grades specified.
  2. Provide designated labels on shop drawings as required by certification program.
  3. Provide designated labels on installed products as required by certification program.
  4. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.
  5. Replace, repair, or rework all work for which certification is refused.

#### 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Protect units from moisture damage.

#### 1.08 FIELD CONDITIONS

- A. During and after installation of custom cabinets, maintain temperature and humidity conditions in building spaces at same levels planned for occupancy.

### PART 2 PRODUCTS

#### 2.01 MANUFACTURERS

- A. Single Source Responsibility: Provide and install this work from single fabricator.



## 2.02 CABINETS

- A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
- B. Cabinets at Kitchen 2xx:
  - 1. Finish - Exposed Exterior Surfaces: Wood.
  - 2. Finish - Exposed Interior Surfaces: Wood.
  - 3. Finish - Semi-Exposed Surfaces: Wood
  - 4. Casework Construction Type: Type A - Frameless.
  - 5. Cabinet Design Series: As indicated on drawings.
  - 6. Cabinet Style: Flush overlay.
  - 7. Cabinet Doors and Drawer Fronts: Flush style.
  - 8. Drawer Side Construction: Multiple-dovetailed.
  - 9. Drawer Construction Technique: Dovetail joints.

## 2.03 WOOD-BASED COMPONENTS

- A. Wood fabricated from old growth timber is not permitted.

## 2.04 LAMINATE MATERIALS

- A. Manufacturers:
  - 1. Wilsonart LLC; as indicated on drawings: [www.wilsonart.com/#sle](http://www.wilsonart.com/#sle).

## 2.05 COUNTERTOPS

- A. Countertops: See Section 12 3600.

## 2.06 ACCESSORIES

- A. Adhesive: Type recommended by fabricator to suit application.
- B. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; galvanized or chrome-plated finish in concealed locations and stainless steel or chrome-plated finish in exposed locations.
- C. Concealed Joint Fasteners: Threaded steel.
- D. Adjustable Drawer Organization Systems: Drawer trays, dividers, and connectors.

## 2.07 HARDWARE

- A. Hardware: BHMA A156.9, types as recommended by fabricator for quality grade specified.
- B. Metal Z-Shaped Wall Cabinet Support Clips: Paired, cleated, structural anchorage components applied to back of cabinets and walls for wall cabinet mounting.
- C. Adjustable Shelf Supports: Standard back-mounted system using surface mounted metal shelf standards and coordinated cantilevered shelf brackets, satin chrome finish, for nominal 1 inch spacing adjustments.
- D. Fixed Standard Shelf, Countertop, and Workstation Brackets:

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ARCHITECTURAL WOOD CASEWORK

- E. Drawer and Door Pulls: "U" shaped wire pull, steel with chrome finish, as indicated on drawings inch centers.
- F. Cabinet Catches and Latches:
- G. Drawer Slides:
  - 1. Type: Extension types as indicated.
  - 2. Static Load Capacity: Commercial grade.
  - 3. Mounting: Side mounted.
  - 4. Stops: Integral type.
  - 5. Features: Provide self closing/stay closed type.

## 2.08 SHOP TREATMENT OF WOOD MATERIALS

- A. Provide UL (DIR) listed and approved identification on fire retardant treated material.
- B. Deliver fire retardant treated materials cut to required sizes. Minimize field cutting.

## 2.09 FABRICATION

- A. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.
- B. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.
- C. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.
- D. Matching Wood Grain: Comply with requirements of quality standard for specified Grade and as follows:
- E. Provide cutouts for plumbing fixtures. Verify locations of cutouts from on-site dimensions. Prime paint cut edges.

## 2.10 SHOP FINISHING

- A. Sand work smooth and set exposed nails and screws.
- B. For opaque finishes, apply wood filler in exposed nail and screw indentations and sand smooth.
- C. On items to receive transparent finishes, use wood filler matching or blending with surrounding surfaces and of types recommended for applied finishes.
- D. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:
  - 1. Transparent:
    - a. Sheen: Satin.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify adequacy of backing and support framing.

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ARCHITECTURAL WOOD CASEWORK

B. Verify location and sizes of utility rough-in associated with work of this section.

3.02 INSTALLATION

A. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.

3.03 ADJUSTING

A. Adjust installed work.

B. Adjust moving or operating parts to function smoothly and correctly.

3.04 CLEANING

A. Clean casework, counters, shelves, hardware, fittings, and fixtures.

END OF SECTION 06 4100

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SECTION 07 0150.19  
PREPARATION FOR RE-ROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Removal of existing steep slope roofing system and built-in gutters in preparation for entire new gutter and roofing system.
- B. Removal of existing flashing and non-built-in counterflashings.
- C. Temporary roofing protection.

1.02 SUMMARY OF ROOFING WORK

- A. The Work of Project is defined by the Contract Documents and consists of the following:
  - 1. Low Slope for Library ONLY.
    - a. Flushing of the existing roof drains and provide a report of findings.
    - b. Tear off and removal of all existing roofing insulation, flashing and related materials.
    - c. Remove and replace deteriorated wood decking.
    - d. Re-nail existing 1x6 T&G wood deck to rafters.
    - e. Saw cutting of reglets.
    - f. Complete all masonry work above roof prior to roof demolition.
    - g. Provide new roof scuttle at existing scuttle location.
    - h. Installation of insulation and tapered insulation gussets.
    - i. Installation of insulation cover board in urethane adhesive.
    - j. Installation of SBS roofing and flashing system.
    - k. Fabrication and installation of sheet metal flashing.
    - l. Removal of all debris and project related items and materials.
  - 2. Steep Slope
    - a. Items a-d inclusive apply to steep slope roof at (Library).
    - b. Provide ½" marine grade plywood covering gutter and upslope 24".
    - c. Provide SPF blocking at eaves, hips, and ridge locations.
    - d. Provide 1.5" rigid insulation covering entire roof deck from 2' upslope to ridge (Library).
    - e. Overlay entire steep slope roof deck with ½" roof sheathing.
    - f. Remove and replace all existing roof drains as specified.
    - g. Provide new adjustable cast iron roof drains at all existing low slope roof drain locations complete with cast iron strainers.
    - h. Secure marine grade plywood and sheathing, through insulation, into rafters in compliance with APA publications.
    - i. Cover entire gutter and upslope 24" with self-adhering underlayment
    - j. Provide multiply SBS gutter liner up to 24" from transition to steep roof
    - k. Provide asphalt fiberglass shingle roofing system in accordance with roofing manufacturer's requirements.
      - 1) Minimum 6 nails per shingle.
    - l. Installation of insulation, tapered insulation and insulation cover board set in urethane adhesive at low slope roof areas.
    - m. Installation of SBS roofing and flashing system.
    - n. Provide sheet metal flashings.

- o. Removal of all debris and project related tools and materials.

1.03 RELATED REQUIREMENTS

- A. Section 061000 – Rough Carpentry – Blocking, sheathing and built-in gutter underlayment.
- B. Section 07 5200 - Modified Bituminous Membrane Roofing.
- C. Section 07 6200 - Sheet Metal Flashing and Trim: Replacement of flashing and counterflashings.
- D. Section 07 3113 – Asphalt Shingles
- E. Section 07 7200 – Roof Accessories

1.04 REFERENCE STANDARDS

- A. ASTM D2178/D2178M - Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing 2015a (Reapproved 2021).
- B. ASTM D41/D41M - Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing 2011 (Reapproved 2016).
- C. ASTM D3462/D3462M – Standard Specification for Asphalt Fiberglass Shingles Used in Roofing.
- D. ASTM D7379 –Standard Specification for Modified Bituminous Roofing Base Ply Materials (Gutter Liner).

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with affected mechanical and electrical work associated with roof penetrations.
- B. Preinstallation Meeting: Convene one week before starting work of this section.
  - 1. Attendees:
    - a. Architect.
    - b. Contractor.
    - c. Owner.
    - d. Architect/Consultant
    - e. Installer.
  - 2. Meeting Agenda: Provide agenda to participants prior to meeting in preparation for discussions on the following:
    - a. Removal and installation schedule.
    - b. Necessary preparatory work.
    - c. All adjacent masonry and sealing work to be completed prior to roof removal.
    - d. Protection before, during, and after roofing system installation.
    - e. Removal of existing asphalt shingle roofing system and SBS gutter system and underlayments.
    - f. Temporary roofing and daily terminations.
    - g. Installation of new 1.5" polyisocyanurate insulation over entire roof deck .
    - h. Installation of new ½" sheathing covering new insulation at Library and existing insulation and coverboard.
      - 1) Secure sheathing and insulation penetrating the existing T&G deck not less than ½"

- 2) Secure sheathing and insulation in accordance with APA fastening requirements.
        - i. Installation of self-adhering underlayments and asphalt shingle roofing system.
        - j. Installation of temporary roof drain/scupper and related rain water conductors.
  - C. Schedule work to coincide with commencement of installation of new roofing system.
- 1.06 SUBMITTALS
- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
  - B. Product Data: Submit for each type of material.
  - C. Shop Drawings: Indicate size, configuration, and installation details.
  - D. Materials Removal Company Qualification Statement.
- 1.07 QUALITY ASSURANCE
- A. Materials Removal Company Qualifications: Company specializing in performing work of type specified with at least three five years of documented experience projects of similar size, scope, and historic nature.
    - 1. Comply with EPA notification regulations prior to start of roofing removal work.
    - 2. Comply with removal and disposal regulations of local authorities having jurisdiction (AHJ).
- 1.08 DELIVERY, STORAGE, AND HANDLING
- A. Ensure storage and staging of materials does not exceed static and dynamic load-bearing capacities of roof decking.
  - B. Protect all roofing materials from weather with plastic sheathing and/or tarpaulins.
- 1.09 FIELD CONDITIONS
- A. Existing Roof Deck Assembly at Steep Slope Roofs.
    - 1. Original 1x6 T&G wood roof deck
    - 2. Asphalt saturated felt underlayment
  - B. Asphalt saturated felt underlayment Existing Roof Deck Assembly at Library Low Slope Roof.
    - 1. Original 1x6 T&G wood roof deck.
    - 2. Polyisocyanurate Insulation.
    - 3. EPDM.
  - C. New Roof Assembly at Recreation Center.
    - 1. Original 1x6 T&G wood roof deck
    - 2. Underlayment
    - 3. Rigid insulation (Existing)
    - 4. ½" Sheathing
    - 5. Breathable Underlayment
    - 6. SBS gutters
    - 7. Asphalt shingles
  - D. New Roof Assembly at Library Roof.

1. Original 1x6 T&G wood roof deck
2. Underlayment
3. Existing Rigid Insulation
4. Existing gypsum or sheathing
5. New Sheathing (If currently Gypsum)
6. Self-adhering Underlayment
7. Asphalt Shingles

## PART 2 PRODUCTS

### 2.01 COMPONENTS

- A. Refer to following sections for additional information on components relating to this work:
  1. Replacement and removal of existing roofing system in preparation for entire new roofing system, see Section 07 5100 SBS And Section 073110 Asphalt Shingles.
  2. All existing counterflashings to remain in place for reuse.
  3. Remove existing insert and reglet flashings and counterflashings in preparation for replacement of these materials as part of this work, see Section 07 6200 for material requirements.
    - a. Do not remove built-in counterflashings unless noted on drawings.

### 2.02 MATERIALS

- A. Temporary Roofing Protection Materials:
  1. Contractor's responsibility to select appropriate materials for temporary protection of roofing areas as determined necessary for this work.

### 2.03 ACCESSORIES

- A. Fasteners: Type and size as required and compatible with existing and new roofing system to resist local wind uplift.
- B. Base Sheet: Non-perforated, asphalt-coated glass fiber base sheet, Type II in accordance with ASTM D4601/D4601M.
- C. Asphalt Primer: Masonry walls to receive SBS flashings at chimney, parapet, and rising wall conditions, Type II in accordance with ASTM D41/D41M.
- D. Temporary through wall scupper
- E. Additional sheet metal flashings and terminations as required to maintain a water tight roof.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that existing roof surface has been cleared of materials being removed from existing roofing system and ready for next phase of work as required, including setting all existing nail heads.
- B. Remove items identified to be removed and replaced including roof drains and provide temporary flashings.



3.02 PREPARATION

- A. Sweep roof surface clean of loose matter.
- B. Remove loose refuse and dispose of properly off-site.

3.03 MATERIAL REMOVAL

- A. Remove only existing roofing materials that can be replaced with new and/or long term temporary materials the same day.
- B. Remove all non built-in sheet metal counter flashings unless otherwise noted on drawings.
- C. Remove loose and/or damaged vapor retarder, sheathing paper, underlay, and existing roof drains gypsum board.
- D. Remove and replace deteriorated (T&G) wood deck surface in kind to provide smooth working surface for new roof system.

3.04 INSTALLATION

- A. Coordinate scope of this work with requirements for installation of new roofing system, see Section 07 5200 for additional requirements.
- B. Install sheathing over insulation

3.05 FIELD QUALITY CONTROL

- A. Manufacturer standard inspections

3.06 PROTECTION

- A. Provide temporary protective sheeting over uncovered deck surfaces.
- B. Turn sheeting up and Under built-in counterflashings
- C. Provide for surface drainage from sheeting to existing drainage/scuppers facilities.
- D. Do not allow debris to enter subgrade drainage system.
- E. Do not permit traffic over unprotected or repaired deck surface.

3.07 SCHEDULES

- A. Entire Roofing Area: Remove existing gutter flashings, shingles, and related underlayments.
- B. Entire Low Slope Roofing Area: SBS Roofing

END OF SECTION 07 0150.19

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## SECTION 07 1300 SHEET WATERPROOFING

### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

- A. Supply labor, materials, plant, tools and equipment to complete the Work as shown on the Drawings and as specified herein including, but not limited to the following:
  - 1. Coordination of elevator pit foundation walls and pit slab with concrete / pre-fab 24x24x24 sump.
  - 2. Primer & Self-Adhered SBS Modified Asphalt Waterproofing Membrane,
  - 3. Drain Board/Protection Board,
  - 4. Specified Backfill.
- B. Pre-applied over wet concrete prior to rebar and concrete placement composite sheet membrane.
- C. Self-adhered modified bituminous sheet membrane.
- D. Both pre-installed before pit slab and post-installed on pit walls modified bituminous sheet membrane.
- E. Performance requirements for complete system and coordination with concrete formwork and pours.
- F. Underslab HDPE reinforced sheet membrane.

#### 1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Concrete substrate.
- B. Section 07 2100 - Thermal Insulation: Insulation used for protective cover.
- C. Section 07 6200 - Sheet Metal Flashing and Trim: Metal parapet, coping, and counterflashing.
- D. Section 22 1006 - Plumbing Piping Specialties: Roof drain and plumbing vent flashing flanges.

#### 1.03 ABBREVIATIONS

- A. CPE - Chlorinated Polyethylene.
- B. EPDM - Ethylene Propylene Diene Monomer.
- C. HDPE - High-Density Polyethylene.
- D. IIR - Isobutene-Isoprene Rubber.
- E. NRCA - National Roofing Contractors Association.
- F. PUMA - Polyurethane-Methacrylate.
- G. PVC - Polyvinyl Chloride.
- H. SBS - Styrene-Butadiene-Styrene.

- I. TPO - Thermoplastic Polyolefin.

#### 1.04 REFERENCE STANDARDS

- A. ASTM C836/C836M - Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course 2018 (Reapproved 2022).
- B. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension 2016 (Reapproved 2021).
- C. ASTM D570 - Standard Test Method for Water Absorption of Plastics 1998 (Reapproved 2018).
- D. ASTM D882 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting 2018.
- E. ASTM D903 - Standard Test Method for Peel or Stripping Strength of Adhesive Bonds 1998 (Reapproved 2017).
- F. ASTM D1876 - Standard Test Method for Peel Resistance of Adhesives (T-Peel Test) 2008, with Editorial Revision (2015).
- G. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection 2021.
- H. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness 2015 (Reapproved 2021).
- I. ASTM D4068 - Standard Specification for Chlorinated Polyethylene (CPE) Sheeting for Concealed Water-Containment Membrane 2017 (Reapproved 2022).
- J. ASTM D4541 - Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers 2022.
- K. ASTM D4551 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Flexible Concealed Water-Containment Membrane 2017.
- L. ASTM D4632/D4632M - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles 2015a.
- M. ASTM D4637/D4637M - Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane 2015 (Reapproved 2021).
- N. ASTM D5295/D5295M - Standard Guide for Preparation of Concrete Surfaces for Adhered (Bonded) Membrane Waterproofing Systems 2018.
- O. ASTM D5385/D5385M - Standard Test Method for Hydrostatic Pressure Resistance of Waterproofing Membranes 2020.
- P. ASTM D6506/D6506M - Standard Specification for Asphalt Based Protection Board for Below-Grade Waterproofing 2001, with Editorial Revision (2018).
- Q. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials 2022.
- R. ASTM E154/E154M - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover 2008a (Reapproved 2019).

- S. ASTM F2130 - Standard Test Method for Measuring Repellency, Retention, and Penetration of Liquid Pesticide Formulation Through Protective Clothing Materials 2011 (Reapproved 2018).
- T. ICC-ES AC308 - Acceptance Criteria for Termite Physical Barrier Systems 2014, with Editorial Revision (2017).
- U. NRCA (WM) - The NRCA Waterproofing Manual 2021.

#### 1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate special joint or termination conditions and conditions of interface with other materials.
- C. Certificate: Certify that products meet or exceed specified requirements.
- D. Manufacturer's Installation Instructions: Indicate special procedures.
- E. Manufacturer's qualification statement.
- F. Installer's qualification statement.
- G. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.
- H. Specimen Warranty.

#### 1.06 QUALITY ASSURANCE

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

#### 1.07 FIELD CONDITIONS

- A. Maintain ambient temperatures above 40 degrees F for 24 hours before and during application and until liquid or mastic accessories have cured.

#### 1.08 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Contractor to correct defective Work within period of five years after Date of Substantial Completion; remove and replace materials concealing waterproofing at no extra cost to Owner.
- C. Provide five year manufacturer warranty for waterproofing failing to resist penetration of water and as indicated on drawings, 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

### 2.01 SHEET WATERPROOFING APPLICATIONS

- A. Self-Adhered Modified Bituminous Sheet Membrane:
  - 1. Location: elevator pit walls.
- B. Self-Adhered HDPE Sheet Membrane:
  - 1. Location: as needed per basis of design.
- C. Underslab HDPE Reinforced Sheet Membrane:
  - 1. Location: under elevator pit slab including under and around sump.
- D. Blindside HDPE Reinforced Sheet Membrane:
  - 1. Location: at elevator pit wall against existing foundation.
  - 2. Cover with drainage panel.
- E. Modified Bituminous Sheet Membrane:
  - 1. Location: as required by basis of design.
  - 2. Vertical Surfaces: Adhesive bonded to substrate.
  - 3. Horizontal Surfaces: Adhesive bonded to substrate.
  - 4. Cover with protection board.

### 2.02 SHEET WATERPROOFING MATERIALS

- A. WATERPROOFING MEMBRANE complete system for entire elevator pit Basis-of-Design:
  - 1. Blueskin  WP200 manufactured by Henry
- B. Performance requirements: total and complete system with all need component and field modification for field conditions for excavation within an existing building for a new elevator pit.
- C. Strictly follow basis of design requirements and guidelines to meet the proceeding.
- D. Primary sheet applied self-adhered waterproofing membrane shall be Blueskin<sup>®</sup> WP200 manufactured by Henry, 1.5mm (60 mils) SBS modified bitumen, self-adhering sheet membrane with a cross-laminated polyethylene film, and having the following physical properties:
  - 1. Thickness: 1.5 mm (60 mils) min.,
  - 2. Flexibility: Pass @ -40 degrees C to ASTM D1970,
  - 3. Vapour permeance: 2.8 ng/Pa.s.m<sup>2</sup> ( 0.05 perms) to ASTM E96,
  - 4. Tensile strength (membrane): 2.24 MPa to ASTM D412,
  - 5. Tensile strength (film): 34.5 MPa to ASTM D882,
  - 6. Elongation: 300% to ASTM D412,
  - 7. Puncture resistance: 222 N min. to ASTM E154.
- E. Primer for self-adhering membranes at temperatures above 25 degrees F shall be Aquatac<sup>®</sup> Primer manufactured by Henry, a polymer emulsion based adhesive, quick setting, having the following physical properties:
  - 1. Colour: Aqua;
  - 2. Weight: 8.7 lbs/gal;
  - 3. Solids by weight: 53%;
  - 4. Water based, no solvent odours
  - 5. Drying time (initial set): 30 minutes at 50% RH and 70 degrees F

- F. LIQUID MEMBRANE & TERMINATION SEALANT
1. Termination Sealant shall be HE925 BES Sealant manufactured by Henry; a moisture cure, medium modulus polymer modified sealing compound having the following physical properties:
  2. Compatible with sheet air barrier, roofing and waterproofing membranes and substrate,
  3. Complies with Fed. Spec. TT-S-00230C, Type II, Class A
  4. Complies with ASTM C 920, Type S, Grade NS, Class 25
  5. Elongation: 450 – 550%
  6. Remains flexible with aging
  7. Seals construction joints up to 1 inch wide
- G. PREFABRICATED DRAIN BOARDS: Two part prefabricated geocomposite drain board consisting of a formed polystyrene or PVC core covered on one side with a woven or non-woven polypropylene filter fabric:
1. Henry DB 200: For vertical and horizontal installations, shallower depths.
  2. Henry DB 500: For vertical installations requiring high compressive strength and high flow capacity.
  3. Henry DB 650: For horizontal applications requiring high compressive strength, high flow capacity & woven geotextile. Suitable for use under topping slab in split slab applications.
- H. PREFABRICATED DRAIN BOARD ACCESSORIES:
1. Securement Bars: Continuous 1/4 inch x 3/4 inch HDPE bar for screw attachment.
  2. Moulding Strip: Continuous 3 □ inch wide 'Z' flashing strip to fit over exposed top edge of drain board.
  3. Drain Board Plugs & Nails: HDPE pre-moulded washer to fit dimples c/w high strength, corrosion resistant concrete nails, UCAN AFH 37 or equal.
- I. Pre-Applied Over Wet Concrete Prior to Rebar and Concrete Placement Composite Sheet Membrane:
1. Thickness: 32 mil, 0.032 inch, nominal.
  2. Sheet Width: 39-3/8 inches, minimum.
  3. Sheet Length: 65.6 feet, minimum.
  4. Tensile Strength: 2,400 psi, minimum, measured in accordance with ASTM D412.
  5. Elongation: 800 percent, minimum, measured in accordance with ASTM D412.
  6. Water Vapor Permeance: 0.01 perm, maximum, measured in accordance with ASTM E96/E96M, Method B.
  7. Low Temperature Flexibility: Unaffected when tested in accordance with ASTM D1970/D1970M at minus 20 degrees F.
  8. Peel Adhesion to Concrete: 5 lb/inch, minimum, when tested in accordance with ASTM D903.
  9. Lap Peel Adhesion: 6.9 lb/inch, minimum, when tested in accordance with ASTM D1876.
  10. Puncture Resistance: 110 lb, minimum, measured in accordance with ASTM E154/E154M.
  11. Water Absorption: 0.4 percent increase in weight, maximum, measured in accordance with ASTM D570, 24-hour immersion.
  12. Hydrostatic Pressure Resistance: Membrane resists leakage for at least one hour from pressure equivalent to 231 feet head of water applied in accordance with test method ASTM D5385/D5385M.
  13. Adhesives, Sealants, Tapes, and Accessories: As recommended by membrane manufacturer.
  14. Products:
    - a. Henry Company; Blueskin □ WP200: [www.henry.com/#sle](http://www.henry.com/#sle).
    - b. And the following as required by field conditions:
    - c. Henry Company; Blueskin PreSeal 320: [www.henry.com/#sle](http://www.henry.com/#sle).

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SHEET WATERPROOFING

- d. Henry Company; Blueskin PreSeal 435: [www.henry.com/#sle](http://www.henry.com/#sle).
- J. Self-Adhered Modified Bituminous Sheet Membrane:
- 1. Thickness: 60 mil, 0.060 inch, minimum.
  - 2. Sheet Width: 36 inches, minimum.
  - 3. Tensile Strength:
    - a. Film: 5,000 psi, minimum, measured in accordance with ASTM D882 and at grip-separation rate of 2 inches per minute.
    - b. Membrane: 325 psi, minimum, measured in accordance with ASTM D412 Method A, using die C and at spindle-separation rate of 2 inches per minute.
  - 4. Elongation at Break: 300 percent, minimum, measured in accordance with ASTM D412.
  - 5. Water Vapor Permeance: 0.05 perm, maximum, measured in accordance with ASTM E96/E96M.
  - 6. Low Temperature Flexibility: Unaffected when tested in accordance with ASTM D1970/D1970M at minus 20 degrees F, 180 degree bend on 1 inch mandrel.
  - 7. Adhesion: 150 psi, minimum, measured in accordance with ASTM D4541.
  - 8. Water Absorption: 0.1 percent increase in weight, maximum, measured in accordance with ASTM D570, 24 hour immersion.
  - 9. Hydrostatic Pressure Resistance: Membrane resists leakage for at least one hour from pressure equivalent to 200 feet head of water applied in accordance with test method ASTM D5385/D5385M.
  - 10. Adhesives, Sealants, Tapes, and Accessories: As recommended by membrane manufacturer.
  - 11. Products:
    - a. Henry Company; Blueskin WP 200: [www.henry.com/#sle](http://www.henry.com/#sle).
- K. Self-Adhered HDPE Sheet Membrane: Recommended by manufacturer for placement below concrete slabs and on outside face of below grade walls before placement of concrete.
- 1. Sheet Thickness: 32 mil, 0.032 inch, minimum.
  - 2. Low Temperature Flexibility: Unaffected when tested in accordance with ASTM D1970/D1970M at minus 20 degrees F, 180 degree bend on 1 inch mandrel.
  - 3. Hydrostatic Pressure Resistance: Membrane resists leakage for at least one hour from pressure equivalent to 231 feet head of water applied in accordance with test method ASTM D5385/D5385M.
  - 4. Elongation at Break: 500 percent, minimum, measured in accordance with ASTM D412.
  - 5. Tensile Strength, Film: 3,500 psi, minimum, measured in accordance with ASTM D412.
  - 6. Adhesion: 150 psi, minimum, measured in accordance with ASTM D4541.
  - 7. Water Vapor Permeance: 0.01 perm, maximum, measured in accordance with ASTM E96/E96M.
  - 8. Lateral Water Migration Resistance: Resists pressure of 231 ft head of water, when tested in accordance with ASTM D5385/D5385M.
  - 9. Adhesives, Sealants, Tapes, and Accessories: As recommended by membrane manufacturer.
  - 10. Products:
    - a. As per basis of design.
- L. Underslab HDPE Sheet Membrane and Insect Barrier: Recommended by manufacturer for placement below concrete slabs before placement of concrete, with 4 inch wide self-adhered overlap seam along one edge.
- 1. Sheet Thickness: 95 mil, 0.095 inch, minimum.
  - 2. Sheet Width: 50 inches, minimum.
  - 3. Termite Resistance: 100 percent when tested in accordance with ICC-ES AC380.
  - 4. Low Temperature Flexibility: Unaffected when tested in accordance with ASTM D1970/D1970M at minus 20 degrees F, 180 degree bend on 1 inch mandrel.



5. Hydrostatic Pressure Resistance: Membrane resists leakage for at least one hour from pressure equivalent to 231 feet head of water applied in accordance with test method ASTM D5385/D5385M.
  6. Elongation at Break: Greater than 1,000 percent, measured in accordance with ASTM D412.
  7. Tensile Strength, Geotextile Layer: 80 pounds, minimum at 1 inch wide, measured in accordance with ASTM D4632/D4632M.
  8. Adhesion: 150 psi, minimum, measured in accordance with ASTM D4541.
  9. Water Vapor Permeance: 0.01 perm, maximum, measured in accordance with ASTM E96/E96M.
  10. Lateral Water Migration Resistance: Resists the weight of 231 feet when tested in accordance with ASTM D5385/D5385M.
  11. Adhesives, Sealants, Tapes, and Accessories: As recommended by membrane manufacturer.
  12. Products:
    - a. As per basis of design.
- M. Underslab HDPE Reinforced Sheet Membrane: Sheet membrane with cross-laminated, high-density HDPE backing laminated to waterproofing adhesive compound integrated into nonwoven geotextile fabric.
1. Application: Install horizontally over prepared sub bases with concrete slab on grade.
  2. Sheet Thickness: 85 mil, 0.085 inch, minimum.
  3. Puncture Resistance: 217 lb, minimum, in accordance with ASTM E154/E154M.
  4. Adhesion: 150 psi, minimum, measured in accordance with ASTM D4541.
  5. Products:
    - a. As per basis of design.
- N. Blindside HDPE Reinforced Sheet Membrane: Sheet membrane with cross-laminated, high-density HDPE backing laminated to waterproofing adhesive compound integrated into nonwoven geotextile fabric.
1. Application: Install vertically, over sheet steel piling substrate with composite drainage system, in accordance with project requirements.
  2. Sheet Thickness: 73 mil, 0.073 inch, minimum.
  3. Puncture Resistance: 217 lb, minimum, in accordance with ASTM E154/E154M.
  4. Adhesion: 150 psi, minimum, measured in accordance with ASTM D4541.
  5. Products:
- O. Modified Bituminous Sheet Membrane: Asphalt and polymer modifiers of SBS type, reinforced with nonwoven glass fibers; smooth surfaced.
1. Formulated for seaming by heat welding.
  2. Thickness: 100 mil, 0.10 inch, minimum.
  3. Sheet Width: 19-11/16 inches, minimum.

## 2.03 ACCESSORIES

- A. Attachment Materials:
1. Battens: As per basis of design.
  2. Disc Washers and Screws: As per basis of design.
  3. Circular Membrane Discs: As per basis of design.
  4. Reglet Strip Devices: As per basis of design.
- B. Seaming Materials: As recommended by membrane manufacturer.
- C. Membrane Sealant: As recommended by membrane manufacturer.

- D. Sealant for Cracks and Joints In Substrates: Resilient elastomeric joint sealant compatible with substrates and waterproofing materials.
- E. Temporary Wood Protection Waterproofing Sheet: Self-adhered moisture protection for wood components during construction phase.
  - 1. Composition: Flexible nonwoven polypropylene (PO) with antislip layer and acrylic-based adhesive.
  - 2. Thickness: 20 mil, 0.020 inch thick.
  - 3. Width: As required for application.
  - 4. Water Vapor Permeability: 0.5 perm, measured in accordance with ASTM E96/E96M.
  - 5. Products:
    - a. As per basis of design.
- F. Protection Board: Provide type capable of preventing damage to waterproofing due to backfilling and construction traffic.
  - 1. Hardboard, 1/8 inch thick.
  - 2. Asphalt impregnated wood fiberboard, 1/4 inch thick.
  - 3. Polystyrene foam board, 1 inch thick.
  - 4. Multilayer internally-reinforced asphaltic panels, 1/8 inch thick, nominal, complying with ASTM D6506/D6506M.
  - 5. Recycled or reclaimed closed-cell foam plastic with nonwoven filter fabric cover; 1 inch thick.
  - 6. Semi-rigid glass fiber board; unaffected by water, freeze-thaw, fungus, or soil bacteria; containing no formaldehyde, phenol, acrylic, or artificial color; 3/4 inch thick, nominal.
  - 7. Products:
    - a. As per basis of design.
- G. Drainage Panel: Drainage layer with geotextile filter fabric on earth side.
  - 1. Composition: Dimpled polystyrene, polyethylene, or polypropylene core; polypropylene filter fabric.
  - 2. Thickness: As indicated on drawings.
  - 3. Products:
    - a. As per basis of design.
- H. Preformed Flashing Shapes: Injected or vacuum molded one piece shapes used for detailing of inside and outside corners, protrusions, and transitions.
  - 1. Color: Black.
  - 2. Products:
    - a. As per basis of design.
- I. Flexible Flashings: Type recommended by membrane manufacturer.
- J. Adhesives: As recommended by membrane manufacturer.
- K. Thinner and Cleaner: As recommended by adhesive manufacturer, compatible with sheet membrane.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify existing conditions are acceptable prior to starting work.

- B. Verify substrate surfaces are durable; free of matter detrimental to adhesion or application of waterproofing system.
- C. Verify that items penetrating surfaces to receive waterproofing are securely installed.
- D. Where existing conditions are responsibility of another installer, notify Architect of unsatisfactory conditions.
- E. Do not proceed with work until unsatisfactory conditions have been corrected.

### 3.02 PREPARATION

- A. All surfaces must be sound, dry, clean and free of oil, grease, dirt, excess mortar, frost or other contaminants. Fill spalled areas in substrate to provide an even plane.
- B. New concrete should be cured for a minimum of 7 days and must be dry before waterproofing membranes are applied. Lightweight structural concrete must be cured a minimum of 14 days.
- C. Use appropriate waterproofing membrane primer as recommended by manufacturer based on air and surface temperature at time of application.
- D. Protect adjacent surfaces from damage not designated to receive waterproofing.
- E. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions; vacuum substrate clean.
- F. Do not apply waterproofing to surfaces unacceptable to membrane manufacturer.
- G. Fill nonmoving joints and cracks with a filler compatible with waterproofing materials.
- H. Seal moving cracks with sealant and nonrigid filler, using procedures recommended by sealant and waterproofing manufacturers.
- I. Prepare building expansion joints at locations as indicated on drawings.
- J. Surfaces for Adhesive Bonding: Apply surface conditioner at a rate recommended by manufacturer, and protect conditioner from rain or frost until dry.
- K. Primer
  - 1. Apply primer for self-adhered membrane by roller or spray at rate recommended by manufacturer.
  - 2. Allow minimum 30 minute open time. Primed surfaces not covered by waterproofing membrane during the same working day must be re-primed.
- L. Concrete Surfaces for Adhesive Bonding: Prepare concrete substrate in accordance with ASTM D5295/D5295M.
  - 1. Remove substances that inhibit adhesion including form release agents, curing compounds admixtures, laitance, moisture, dust, dirt, grease and oil.
  - 2. Repair surface defects including honeycombs, fins, tie holes, bug holes, sharp offsets, rutted cracks, ragged corners, deviations in surface plane, spalling and delaminations, as described in reference standard.
  - 3. Remove and replace areas of defective concrete; see Section 03 3000.
  - 4. Prepare concrete for adhesive bonded waterproofing using mechanical or chemical methods described in referenced standard.
  - 5. Test concrete surfaces as described in referenced standards, and verify surfaces are ready to receive adhesive bonded waterproofing membrane system.

### 3.03 INSTALLATION - MEMBRANE

- A. Install membrane waterproofing in accordance with manufacturer's instructions and NRCA (WM) applicable requirements.
- B. Roll out membrane, and minimize wrinkles and bubbles.
- C. Self-Adhering Membrane: Remove release paper layer, and roll out onto substrate with a mechanical roller to provide full contact bond.
- D. Adhesive Bonded Membrane: Apply adhesive in accordance with manufacturer's instructions, and bond sheet to substrate except in those areas directly over or within 3 inches of a control or expansion joint.
- E. Overlap edges and ends, minimum 3 inches, seal permanently waterproof by method recommended by manufacturer, and apply uniform bead of sealant to joint edge.
- F. Reinforce membrane with multiple thickness of membrane material over joints, whether joints are static or dynamic.
- G. Weather lap joints on sloped substrate in direction of drainage, and seal joints and seams.
- H. Flexible Flashings: Seal items watertight that penetrate through waterproofing membrane with flexible flashings.
- I. Seal membrane and flashings to adjoining surfaces.

### 3.04 INSTALLATION - DRAINAGE PANEL and PROTECTION BOARD

- A. Place drainage panel directly against membrane, butt joints, place to encourage drainage downward; scribe and cut boards around projections, penetrations, and interruptions.
- B. Place protection board directly against drainage panel; butt joints, and scribe and cut boards around projections, penetrations, and interruptions.
- C. Adhere protection board to substrate with compatible adhesive.

### 3.05 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements for additional requirements.
- B. Owner will provide testing services, and Contractor to provide temporary construction and materials for testing.
- C. Upon completion of horizontal membrane installation, dam installation area in preparation for flood testing.
  - 1. Flood to minimum depth of 1 inch with clean water, and after 48 hours inspect for leaks.
  - 2. If leaking is found, remove water, repair leaking areas with new waterproofing materials as directed by Architect; repeat flood test, and repair damage to building.
  - 3. When area is proven watertight, drain water and remove dam.

### 3.06 PROTECTION

- A. Do not permit traffic over unprotected or uncovered membrane.

3.07 SCHEDULE

- A. Under Concrete Elevator Pit Slab and Sump
- B. Between New Concrete Elevator Pit and Existing Foundation
- C. On Concrete Elevator Pit Walls

END OF SECTION 07 1300

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## SECTION 07 2100 THERMAL INSULATION

### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

- A. Batt insulation for interior walls between metal and wood stud framing in walls and where otherwise indicated as acoustical insulation on drawings.
- B. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.
- C. Additional criteria for Board insulation and integral vapor retarder over roof deck called out in the roof membrane sections and in roof details.

#### 1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Installation requirements for board insulation over steep slope roof sheathing or roof structure.
- B. Section 07 5200 - Modified Bituminous Membrane Roofing: Installation requirements for board insulation over low slope roof deck specified in this section.

#### 1.03 REFERENCE STANDARDS

- A. ASTM C240 - Standard Test Methods for Testing Cellular Glass Insulation Block 2021.
- B. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method 2022.
- C. ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation 2022.
- D. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications 2013 (Reapproved 2019).
- E. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation 2022.
- F. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation 2014 (Reapproved 2019).
- G. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing 2017.
- H. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board 2022.
- I. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2022.
- J. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials 2022.
- K. ASTM E136 - Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C 2019a.

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THERMAL INSULATION

- L. ASTM E1414/E1414M - Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum 2021a.
- M. ASTM E2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies 2018.
- N. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components 2019.

#### 1.04 SUBMITTALS

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

#### 1.05 QUALITY ASSURANCE

- A. Air Barrier Association of America (ABAA) Quality Assurance Program (QAP); [www.airbarrier.org/#sle](http://www.airbarrier.org/#sle):

#### 1.06 FIELD CONDITIONS

- A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

### PART 2 PRODUCTS

#### 2.01 APPLICATIONS

- A. Insulation in Wood and Metal Framed Walls: Sound attenuation Batt insulation with no vapor retarder.
- B. Insulation Over Roof Deck: Extruded polystyrene (XPS), Expanded Polystyrene (EPS) board and or as otherwise indicated on drawings and in roofing sections.
- C. Miscellaneous Insulation indicated on drawings.

#### 2.02 FOAM BOARD INSULATION MATERIALS

- A. Expanded Polystyrene (EPS) Board Insulation: Complies with ASTM C578.
  1. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
  2. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
  3. Complies with fire resistance requirements indicated on drawings as part of an exterior non-load-bearing exterior wall assembly when tested in accordance with NFPA 285.
  4. Board Size: 48 inch by 96 inch.
  5. Board Thickness: 1-1/2 inch.
  6. Board Edges: Square.
  7. Type and Compressive Resistance: Type XI, 5 psi (35 kPa), minimum.
  8. Type and Water Absorption: Type XI, 4.0 percent by volume, maximum, by total immersion.



9. Type and Thermal Resistance, R-value: Type XI, 3.1 (0.55) per 1 inch thickness at 75 degrees F mean temperature.
  10. Products:
    - a. AFM Corp: [www.r-control.com/#sle](http://www.r-control.com/#sle).
    - b. Diversifoam Products: [www.diversifoam.com/#sle](http://www.diversifoam.com/#sle).
    - c. InsulFoam LLC: [www.insulfoam.com/#sle](http://www.insulfoam.com/#sle).
    - d. InsulFoam LLC: [www.insulfoam.com/#sle](http://www.insulfoam.com/#sle).
- B. Extruded Polystyrene (XPS) Board Insulation: Complies with ASTM C578 with either natural skin or cut cell surfaces.
1. Type and Compressive Resistance: Type IV, 25 psi (173 kPa), minimum.
  2. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
  3. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
  4. Type and Thermal Resistance, R-value: Type IV, 5.0 (0.88) per 1 inch thickness at 75 degrees F mean temperature.
  5. Complies with fire resistance requirements indicated on drawings as part of an exterior non-load-bearing exterior wall assembly when tested in accordance with NFPA 285.
  6. Board Edges: Square.
  7. Type and Water Absorption: Type IV, 0.3 percent by volume, maximum, by total immersion.
  8. Products:
    - a. DuPont de Nemours, Inc; Styrofoam Brand as recommended : [building.dupont.com/#sle](http://building.dupont.com/#sle).
    - b. Kingspan Insulation LLC; GreenGuard XPS Type IV, 25 psi: [www.kingspan.com/#sle](http://www.kingspan.com/#sle).
- C. Extruded Polystyrene (XPS) Continuous Insulation (CI) Board: Complies with ASTM C578, and manufactured using carbon black technology.
1. Type and Compressive Resistance: Type IV, 25 psi (173 kPa), minimum.
  2. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
  3. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
  4. Type and Thermal Resistance, R-value: Type IV, 5.6 (0.98), minimum, per 1 inch thickness at 75 degrees F mean temperature.
  5. Complies with fire resistance requirements indicated on drawings as part of an exterior non-load-bearing exterior wall assembly when tested in accordance with NFPA 285.
  6. Board Size: 48 inch by 96 inch.
  7. Board Thickness: 1-3/4 inch.
  8. Board Edges: Shiplap, at long edges.
  9. Type and Water Absorption: Type IV, 0.3 percent by volume, maximum, by total immersion.
  10. Products:
    - a. DuPont de Nemours, Inc; Styrofoam Brand Ultra SL (Shiplap): [building.dupont.com/#sle](http://building.dupont.com/#sle).
- D. Rigid Thermoset Board Insulation: Fiber-free phenolic insulation with zero Ozone Depletion Potential (ODP) blowing agent and faced on both sides with low emissivity composite foil.
1. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
  2. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
  3. Board Width, Nominal: 47-1/4 inch.
  4. Board Length, Nominal: 16 inch.
  5. Board Thickness, Nominal: 1-3/16 inch.

6. Board Edges: Square.
  7. Water Absorption: 1.2 percent by volume, maximum.
  8. Compressive Strength: 15 psi (104 kPa), minimum.
  9. Thermal Resistance: R-value of 8.05 per inch at 75 degrees F, minimum, when tested according to ASTM C518.
- E. Polyisocyanurate (ISO) Board Insulation: Rigid cellular foam, complying with ASTM C1289.
1. Classifications:
    - a. Type I: Faced with aluminum foil on both major surfaces of the core foam.
      - 1) Class 1 - Non-reinforced core foam.
      - 2) Compressive Strength: 16 psi, minimum.
      - 3) Thermal Resistance, R-value: At 1-1/2 inch thick; 9.0 at 75 degrees F.
    - b. Type II: Faced with either organic felt facers or glass fiber mat facers on both major surfaces of the core foam.
      - 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 1 - 16 psi (110 kPa), minimum.
      - 3) Thermal Resistance, R-value: At 1-1/2 inch thick; Class 1, Grades 1-2-3 - 8.4 (1.48) at 75 degrees F.
  2. Board Size: 48 inch by 96 inch.
  3. Board Thickness: 1.5 inch.
  4. Products:
    - a. Atlas Roofing Corporation; ACFoam-II Polyiso Roof Insulation: [www.atlasroofing.com/#sle](http://www.atlasroofing.com/#sle).
    - b. Atlas Roofing Corporation; EnergyShield CGF PRO: [www.atlasroofing.com/#sle](http://www.atlasroofing.com/#sle).
    - c. Carlisle Coatings & Waterproofing, Inc; R2+ Matte: [www.carlisleccw.com/#sle](http://www.carlisleccw.com/#sle).
    - d. DuPont de Nemours, Inc: [building.dupont.com/#sle](http://building.dupont.com/#sle).
    - e. GAF; EnergyGuard Polyiso Insulation: [www.gaf.com/#sle](http://www.gaf.com/#sle).
    - f. GAF; EnergyGuard Perlite Roof Insulation: [www.gaf.com/#sle](http://www.gaf.com/#sle).
    - g. GAF; EnergyGuard HD PLUS Polyiso Insulation: [www.gaf.com/#sle](http://www.gaf.com/#sle).
    - h. Hunter Panels; Xci Foil (Class A): [www.hunterpanels.com/#sle](http://www.hunterpanels.com/#sle).
    - i. Johns Manville; AP Foil-Faced: [www.jm.com/#sle](http://www.jm.com/#sle).
    - j. Ox Engineered Products; ISO Red Max (Polyiso Class A): [www.oxengineeredproducts.com/#sle](http://www.oxengineeredproducts.com/#sle).
    - k. Rmax Inc; ECOMAXci FR: [www.rmax.com/#sle](http://www.rmax.com/#sle).
- F. Glass-Fiber-Reinforced Polyisocyanurate (ISO) Board Insulation with Facers Both Sides and Providing Interior Finish System: Rigid cellular foam, complying with ASTM C1289.
1. Compressive Strength: 16 psi, minimum.
  2. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
  3. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
  4. Board Size: 48 inch by 96 inch.
  5. Board Thickness: 1 inch.
  6. Board Edges: Square.
  7. Exposed Facer: 4 mil, 0.004 inch embossed white thermoset-coated aluminum.
  8. Non-Exposed Facer: 1.25 mil, 0.00125 inch embossed aluminum.
  9. Water Absorption: 0.1 percent by volume, maximum, by total immersion.
  10. Products:
    - a. DuPont de Nemours, Inc; Thermax Heavy Duty: [building.dupont.com/#sle](http://building.dupont.com/#sle).
- G. Polyisocyanurate (ISO) Board Insulation with Facers Both Sides: Rigid cellular foam, complying with ASTM C1289.

1. Classifications:
    - a. Type I: Faced with aluminum foil on both major surfaces of core foam.
      - 1) Class 2 - Glass fiber reinforced or non-reinforced core foam.
      - 2) Compressive Strength: 16 psi, minimum.
      - 3) Thermal Resistance, R-value: At 1-1/2 inch thick; 9.0 at 75 degrees F.
    - b. Type II: Faced with either organic felt facers or glass fiber mat facers on both major surfaces of the core foam.
      - 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 1 - 16 psi (110 kPa), minimum.
      - 3) Thermal Resistance, R-value: At 1-1/2 inch thick; Class 1, Grades 1-2-3 - 8.4 (1.48) at 75 degrees F.
  2. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
  3. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
  4. Complies with fire resistance requirements indicated on drawings as part of an exterior non-load-bearing exterior wall assembly when tested in accordance with NFPA 285.
  5. Board Size: 48 inch by 96 inch.
  6. Board Thickness: 1 inch.
  7. Products:
    - a. Atlas Roofing Corporation; ACFoam-II Polyiso Roof Insulation: [www.atlasroofing.com/#sle](http://www.atlasroofing.com/#sle).
    - b. Carlisle Coatings & Waterproofing, Inc; R2+ Matte: [www.carlisleccw.com/#sle](http://www.carlisleccw.com/#sle).
    - c. DuPont de Nemours, Inc: [building.dupont.com/#sle](http://building.dupont.com/#sle).
    - d. GAF; EnergyGuard Polyiso Insulation: [www.gaf.com/#sle](http://www.gaf.com/#sle).
    - e. GAF; EnergyGuard Perlite Roof Insulation: [www.gaf.com/#sle](http://www.gaf.com/#sle).
    - f. GAF; EnergyGuard HD PLUS Polyiso Insulation: [www.gaf.com/#sle](http://www.gaf.com/#sle).
    - g. Hunter Panels; Xci Foil (Class A): [www.hunterpanels.com/#sle](http://www.hunterpanels.com/#sle).
    - h. Johns Manville; AP Foil-Faced: [www.jm.com/#sle](http://www.jm.com/#sle).
    - i. Ox Engineered Products; ISO Red Max (Polyiso Class A): [www.oxengineeredproducts.com/#sle](http://www.oxengineeredproducts.com/#sle).
    - j. Rmax Inc; ECOMAXci FR: [www.rmax.com/#sle](http://www.rmax.com/#sle).
- H. Polyisocyanurate (ISO) Board Insulation with Facers Both Sides and Water-Resistive Barrier: Rigid cellular foam, complying with ASTM C1289.
1. Classifications:
    - a. Type II: Faced with either organic felt facers or glass fiber mat facers on both major surfaces of the core foam.
      - 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 1 - 16 psi (110 kPa), minimum.
      - 3) Thermal Resistance, R-value: At 1-1/2 inch thick; Class 1, Grades 1-2-3 - 8.4 (1.48) at 75 degrees F.
  2. Flame Spread Index (FSI): Class B - 26 to 75, when tested in accordance with ASTM E84.
  3. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
  4. Complies with fire resistance requirements indicated on drawings as part of an exterior non-load-bearing exterior wall assembly when tested in accordance with NFPA 285.
  5. Board Size: 48 by 96 inch.
  6. Board Thickness: 1 inch.
  7. Board Edges: Square.

8. Water Vapor Permeance: 1.2 perm, maximum, at 1 inch thickness, and when tested in accordance with ASTM E96/E96M, desiccant method.
9. Products:
  - a. Atlas Roofing Corporation; EnergyShield CGF PRO: [www.atlasroofing.com/#sle](http://www.atlasroofing.com/#sle).
- I. Composite Polyisocyanurate (ISO) Board Insulation Faced with Plywood: Rigid cellular foam, complying with ASTM C1289.
  1. Classifications:
    - a. Type V: Faced with oriented strand board (OSB) or plywood on one major surface of core foam and glass fiber reinforced cellulosic felt or uncoated or coated polymer-bonded glass fiber mat facer on other major surface of core foam.
      - 1) Compressive Strength: 16 psi, minimum.
      - 2) Thermal Resistance, R-value: At 1-1/2 inch thick; 6.2 at 75 degrees F.
  2. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
  3. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.

## 2.03 FIBERBOARD INSULATION MATERIALS

- A. Where fiberboard insulation is indicated, either rock, slag, or glass mineral fiberboard insulation may be used, at Contractor's option.
- B. Mineral Fiberboard Insulation: Rigid mineral fiber, in accordance with ASTM C612.
  1. Facing: None, unfaced.
  2. Flame Spread Index: 25 or less, when tested with facing, if any, in accordance with ASTM E84.
  3. Smoke Developed Index: 50 or less, when tested with facing, if any, in accordance with ASTM E84.
  4. Board Size: 48 by 48 inch.
  5. Board Thickness: 1 inch.
- C. Mineral Fiberboard Insulation: Rigid or semi-rigid mineral fiber, ASTM C612 or ASTM C553; unfaced flame spread index of 0 (zero) when tested in accordance with ASTM E84.
  1. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.

## 2.04 BATT INSULATION MATERIALS

- A. Where batt insulation is indicated, either glass fiber or mineral fiber batt insulation may be used, at Contractor's option.
- B. Glass Fiber Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C665; friction fit.
  1. Flame Spread Index: 75 or less, when tested in accordance with ASTM E84.
  2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
  3. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
  4. Formaldehyde Content: Zero.
  5. Thermal Resistance: R-value of R3 per inch.
  6. Facing: Aluminum foil, flame spread 25 rated; one side.
  7. Products:
    - a. CertainTeed Corporation: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
    - b. Johns Manville: [www.jm.com/#sle](http://www.jm.com/#sle).
    - c. Owens Corning Corporation; EcoTouch PINK FIBERGLAS Insulation: [www.ocbuildingspec.com/#sle](http://www.ocbuildingspec.com/#sle).

- C. Mineral Fiber Batt Insulation: Flexible or semi-rigid preformed batt or blanket, complying with ASTM C665; friction fit; unfaced flame spread index of 0 (zero) when tested in accordance with ASTM E84.
  - 1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
  - 2. Smoke Developed Index: 0 (zero), when tested in accordance with ASTM E84.
  - 3. Provide foil facing on one side, at locations indicated on drawings.
  - 4. Thermal Resistance: R-value of R3 per inch.
  - 5. Products:
    - a. Johns Manville; MinWool Sound Attenuation Fire Batts: [www.jm.com/#sle](http://www.jm.com/#sle).
    - b. Knauf Insulation; EcoBatt Insulation: [www.knaufinsulation.com/#sle](http://www.knaufinsulation.com/#sle).
    - c. ROCKWOOL (ROXUL, Inc); COMFORTBATT: [www.rockwool.com/#sle](http://www.rockwool.com/#sle).
    - d. ROCKWOOL (ROXUL, Inc); AFB: [www.rockwool.com/#sle](http://www.rockwool.com/#sle).
    - e. ROCKWOOL (ROXUL, Inc); AFB evo™: [www.rockwool.com/#sle](http://www.rockwool.com/#sle).
    - f. Thermafiber, Inc; SAFB: [www.thermafiber.com/#sle](http://www.thermafiber.com/#sle).
    - g. Thermafiber, Inc; SAFB FF: [www.thermafiber.com/#sle](http://www.thermafiber.com/#sle).

## 2.05 ACCESSORIES

- A. Sheet Vapor Retarder: See Section 07 2500.
- B. Sheet Vapor Retarder: Black polyethylene film for above grade application, 10 mil, 0.010 inch thick.
- C. Interior Vapor Retarder: Modified polyethylene/polyacrylate (PE/PA) film reinforced with polyethylene terephthalate (PET) fibers, 12 mils, 0.012 inch thick.
- D. Tape: Reinforced polyethylene film with acrylic pressure sensitive adhesive.
  - 1. Application: Sealing of interior circular penetrations, such as pipes or cables.
  - 2. Width: As required for application.
  - 3. Temperature Resistance: Minus 40 degrees F to 212 degrees F
- E. Flashing Tape: Special reinforced film with high performance adhesive.
  - 1. Application: Window and door opening flashing tape.
  - 2. Width: As required for application.
  - 3. Primer: Tape manufacturer's recommended product.
- F. Tape: Bright aluminum self-adhering type, mesh reinforced, 2 inch wide.
- G. Tape joints of rigid insulation in accordance with roofing and insulation manufacturers' instructions.
- H. Insulation Fasteners: Lengths of unfinished, 13 gauge, 0.072 inch high carbon spring steel with chisel or mitered tips, held in place by tension, length to suit insulation thickness and substrate, capable of securely supporting insulation in place.
- I. Insulation Fasteners: Impaling clip of unfinished steel with washer retainer and clips, to be adhered to surface to receive insulation, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place.
- J. Nails or Staples: Steel wire; electroplated or galvanized; type and size to suit application.
- K. Wire Mesh: Galvanized steel, hexagonal wire mesh.
- L. Protection Board for Below Grade Insulation: Cementitious, 1/4 inch thick.

- M. Adhesive: Type recommended by insulation manufacturer for application.

### PART 3 EXECUTION

#### 3.01 EXAMINATION

- A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.
- B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

#### 3.02 BOARD INSTALLATION OVER LOW SLOPE ROOF DECK

- A. Board Installation Over Roof Deck, General:
  - 1. See applicable roofing specification section for specific board installation requirements.
  - 2. Ensure vapor retarder is clean and dry, continuous, and ready for application of roofing system.
  - 3. Fasten insulation to deck in accordance with roofing manufacturer's written instructions and applicable Factory Mutual requirements.
  - 4. Do not apply more insulation than can be covered with roofing on the same day.

#### 3.03 BATT INSTALLATION

- A. Install insulation and vapor retarder in accordance with manufacturer's instructions.
- B. Install in exterior wall and roof spaces without gaps or voids. Do not compress insulation.
- C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.
- E. Install with factory-applied vapor retarder membrane facing warm side of building spaces. Lap ends and side flanges of membrane over framing members.
- F. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.
- G. At wood framing, place vapor retarder on warm side of insulation by stapling at 6 inches on center. Lap and seal sheet retarder joints over face of member.
- H. At metal framing, place vapor retarder on warm side of insulation; lap and seal sheet retarder joints over face of member
- I. Tape seal tears or cuts in vapor retarder.

#### 3.04 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements for additional requirements.
- B. Coordination of Air Barrier Association of America (ABAA) Tests and Inspections:
  - 1. Provide testing and inspection required by ABAA Quality Assurance Program (QAP).
  - 2. Notify ABAA in writing of schedule for air barrier work, and allow adequate time for testing and inspection.

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3. Cooperate with ABAA testing agency.
4. Allow access to air barrier work areas and staging.
5. Do not cover air barrier work until tested, inspected, and accepted.

3.05 Schedule

- A. Thermal Insulation shall conform to the following minimum standard: IECC 2015 (adopted by Philadelphia as of October 2018) OR greater as indicated on drawings; exceptions per IEBC:
  1. ALL Insulation panel joints to be sealed; air sealing required.

3.06 PROTECTION

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

END OF SECTION 07 2100

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## SECTION 07 2126 BLOWN INSULATION

### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

- A. Exterior Walls: Blown insulation pneumatically placed into wall spaces through access holes.
- B. Ceiling and Attic: Blown insulation pneumatically placed into joist spaces through access holes.

#### 1.02 REFERENCE STANDARDS

- A. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- B. ASTM C739 - Standard Specification for Cellulosic Fiber Loose-Fill Thermal Insulation 2021a.
- C. ASTM C764 - Standard Specification for Mineral Fiber Loose-Fill Thermal Insulation 2019.
- D. ASTM C1015 - Standard Practice for Installation of Cellulosic and Mineral Fiber Loose-Fill Thermal Insulation 2017.

#### 1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance criteria, and limitations.
- C. Certificates: Certify that products of this section meet or exceed specified requirements.
- D. Manufacturer's Installation Instructions: Indicate procedure for preparation and installation.

### PART 2 PRODUCTS

#### 2.01 MANUFACTURERS

- A. Blown Insulation:
  - 1. CertainTeed Corporation: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
  - 2. GreenFiber: [www.greenfiber.com/#sle](http://www.greenfiber.com/#sle).
  - 3. Johns Manville: [www.jm.com/#sle](http://www.jm.com/#sle).
  - 4. Thermafiber, Inc: [www.thermafiber.com/#sle](http://www.thermafiber.com/#sle).

#### 2.02 MATERIALS

- A. Applications: Provide blown insulation in attic, exterior walls, and ceiling as indicated on drawings.
- B. Provide blown insulation in accordance with requirements of Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

- C. Blown Insulation: ASTM C764, fiberglass type, nodulated for pour and bulk for pneumatic placement.
  - 1. Thermal Transmittance (U-value): 0.27 BTU/hr sq ft deg F, maximum.
  - 2. Thermal Resistance (R-value: 11.0 sq ft hr deg F/BTU inch, minimum.

#### 2.03 Accessories

- A. Roof Ventilation Baffles: Prefabricated ventilation channels for placement under roof sheathing with baffles to prevent wind-washing.
  - 1. Material: Polyvinyl chloride (PVC).
  - 2. Roof Joist/Truss Spacing: 16 inch on center, nominal.
  - 3. Manufacturers:
    - a. Brentwood Industries, Inc; AccuVent Original: [www.brentwoodindustries.com/#slc](http://www.brentwoodindustries.com/#slc).

### PART 3 EXECUTION

#### 3.01 EXAMINATION

- A. Verify that substrate and adjacent materials are dry and ready to receive insulation.
- B. Verify that light fixtures have thermal cut-out device to restrict over-heating in soffit or ceiling spaces.
- C. Verify spaces are unobstructed to allow for proper placement of insulation.

#### 3.02 INSTALLATION

- A. Install insulation and ventilation baffle in accordance with ASTM C1015 and manufacturer's instructions.
- B. Drill 2 inch diameter insulation access ports in fascia boards to permit equipment access.
- C. Place insulation pneumatically to completely fill stud, joist, and rafter spaces.
- D. Pour insulation to completely fill stud, joist, and rafter spaces.
- E. Place insulation against baffles, and do not impede natural attic ventilation to soffit.
- F. Place against and behind mechanical and electrical services within the plane of insulation.
- G. Completely fill intended spaces leaving no gaps or voids.
- H. Repair and reseal insulation access ports, and refinish to match adjacent work.

#### 3.03 CLEANING

- A. Remove loose insulation residue.

#### 3.04 SCHEDULES

- A. Existing Exterior Walls: Pneumatically placed into wall stud spaces through open holes at exterior wall boards.

- B. Attic Spaces: Pour insulation between ceiling joists to achieve an R-value of 19.  
END OF SECTION 07 2126

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## SECTION 07 3113 ASPHALT SHINGLES

### PART 1 GENERAL

#### 1.01 DESCRIPTION

- A. The scope of work of this Section shall include, but not limited to the following items:
  - 1. This section makes provisions for the installation for asphalt shingles at station building.

#### 1.02 RELATED SECTIONS

- A. Division 1 General Requirements
- B. Section 061000 – Rough Carpentry
- C. Section 061000 – Rough Carpentry – Sheathing and built-in gutter underlayment.
- D. Section 076000 – Sheet Metal Flashing and Trim
- E. Section 077200 – Roof Accessories

#### 1.03 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For each type of asphalt shingle, ridge and hip cap shingles indicated.
  - 1. Include similar Samples of trim and accessories involving color selection.
- C. Samples for Verification: For the following products, of sizes indicated, to verify color selected.
  - 1. Asphalt Shingle: Full-size asphalt shingle strip.
  - 2. Ridge and Hip Cap Shingles: Full-size ridge and hip cap asphalt shingle.
  - 3. Self-Adhering Underlayment: 12 inches square.
- D. Qualification Data: For Installer, including certificate signed by asphalt shingle manufacturer stating that Installer is approved, authorized, or licensed to install roofing system indicated.
- E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency or by manufacturer and witnessed by a qualified testing agency, for asphalt shingles.
- F. Research/Evaluation Reports: For asphalt shingles.
- G. Maintenance Data: For asphalt shingles to include in maintenance manuals.
- H. Warranties: Special warranties specified in this Section.

#### 1.04 QUALITY ASSURANCE

- A. Installer Qualifications: A firm or individual that is approved, authorized, or licensed by asphalt shingle roofing system manufacturer to install roofing system indicated.

- B. Source Limitations: Obtain ridge and hip cap shingles ridge vents felt underlayment and self-adhering sheet underlayment through one source from a single asphalt shingle manufacturer.
- C. Fire-Test-Response Characteristics: Provide asphalt shingle and related roofing materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
  - 1. Exterior Fire-Test Exposure: Class A; ASTM E 108 or UL 790, for application and roof slopes indicated.

#### 1.05 DEFINITIONS

- A. Roofing Terminology: Refer to ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definitions of terms related to roofing work in this Section.

#### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store roofing materials in a dry, well-ventilated, weathertight location according to asphalt shingle manufacturer's written instructions. Store underlayment rolls on end on pallets or other raised surfaces. Do not double-stack rolls.
  - 1. Handle, store, and place roofing materials in a manner to avoid significant or permanent damage to roof deck or structural supporting members.
- B. Protect unused underlayment from weather, sunlight, and moisture when left overnight or when roofing work is not in progress.

#### 1.07 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit asphalt shingle roofing to be performed according to manufacturer's written instructions and warranty requirements.
  - 1. Install self-adhering sheet underlayment within the range of ambient and substrate temperatures recommended by manufacturer.

#### 1.08 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace asphalt shingles that fail in materials or workmanship within specified warranty period. Materials failures include manufacturing defects and failure of asphalt shingles to self-seal after a reasonable time.
  - 1. Material Warranty Period: lifetime from date of Substantial Completion, nonprorated.
  - 2. Wind-Speed Warranty Period: Asphalt shingles will resist blow-off or damage caused by wind speeds up to 100 mph lifetime from date of Substantial Completion.
  - 3. Algae-Discoloration Warranty Period: Asphalt shingles will not discolor 10 years from date of Substantial Completion.
  - 4. Workmanship Warranty Period: 10 years from date of Substantial Completion.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
  - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.

### 2.02 WOOD DECK COVERING UNDERLAYMENT

- A. Felts: ASTM D 226, Type I, asphalt-saturated organic felts, nonperforated
  - 1. 30 lb. 200 square feet per roll

### 2.03 INSULATION

- A. Rigid Insulation: 1.5 Inch Polyisocyanurate insulation with glass fiber facer at Library ONLY.

### 2.04 ROOF SHEATHING

- A. Insulation Cover Overlay Sheathing
  - 1. APA Rated ½" roof sheathing covering insulation.

### 2.05 GLASS-FIBER-REINFORCED ASPHALT SHINGLES

- A. Three-Tab-Strip, SBS-Modified Asphalt Shingles: ASTM D 3462, glass-fiber reinforced, mineral-granule surfaced, and self-sealing; complying with UL 2218, Class IV.
  - 1. Available Products:
    - a. Basis of Design - Certaineed Corporation; Grand Manor
    - b. Or Equal of the following subject to compliance with requirements:
    - c. GAF Materials Corporation; Weather Watch.
    - d. Johns Manville International, Inc.; Roof Defender.
    - e. Owens Corning; WeatherLock G.
  - 2. Strip Size: [Manufacturer's standard] 18" x 36"
  - 3. Color and Blends: As selected by Architect from manufacturer's full range.
- B. Hip and Ridge Shingles: Manufacturer's standard units to match asphalt shingles.

### 2.06 UNDERLAYMENT MATERIALS

- A. Self-Adhering Sheet Underlayment, Granular Surfaced: ASTM D 1970, minimum of 55-mil-thick sheet; glass-fiber-mat-reinforced, SBS-modified asphalt; mineral-granule surfaced; with release paper backing; cold applied.
  - 1. Products:
    - a. Basis of Design - Certain Teed Corporation; WinterGuard.
    - b. Or Equal of the following subject to compliance with requirements:
    - c. GAF Material Corporation; Weather Watch.
    - d. Owens Corning; WeatherLock G.

## 2.07 ACCESSORIES

- A. Asphalt Roofing Cement: ASTM D 4586, Type II, asbestos free.
- B. Roofing Nails: ASTM F 1667; stainless-steel, copper, shingle nails, minimum 0.120-inch-diameter, barbed shank, sharp-pointed, with a minimum 3/8-inch- diameter flat head and of sufficient length to penetrate 3/4 inch into solid wood decking or extend at least 1/8 inch through OSB or plywood sheathing.
  - 1. Where nails are in contact with metal flashing, use nails made from same metal as flashing.
- C. Felt Underlayment Nails: Aluminum, stainless-steel, or hot-dip galvanized steel wire with low profile capped heads or disc caps, 1-inch minimum diameter.

## 2.08 METAL FLASHING AND TRIM

- A. Sheet Metal Flashing and Trim: Comply with requirements in Division 7 Section "Sheet Metal Flashing and Trim."
- B. Fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
  - 1. Examine roof sheathing to verify that sheathing joints are supported by framing and blocking or metal clips and that installation is within flatness tolerances.
  - 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and completely anchored; and that provision has been made for flashings and penetrations through asphalt shingles.
  - 3. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.02 UNDERLAYMENT INSTALLATION

- A. Double-Layer Felt Underlayment: Install double layer of felt underlayment on roof deck perpendicular to roof slope in parallel courses. Lap sides a minimum of 2 inches over underlying course. Lap ends a minimum of 4 inches. Stagger end laps between succeeding courses at least 72 inches. Fasten with roofing nails.
  - 1. Install felt underlayment on roof deck not covered by self-adhering sheet underlayment. Lap sides of felt over self-adhering sheet underlayment not less than over self-adhering sheet underlayment.
- B. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free, on roof deck. Comply with low-temperature installation restrictions of underlayment manufacturer if applicable. Install at locations indicated on Drawings, lapped in direction to shed water. Lap sides not less than 3-1/2 inches. Lap ends not less than 6 inches staggered 24 inches between

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ASPHALT SHINGLES



courses. Roll laps with roller. Cover underlayment within seven days.

1. Prime masonry surfaces to receive self-adhering sheet underlayment.
2. Valleys: Extend from lowest to highest point 18 inches on each side.
3. Hips: Extend 18 inches on each side.
4. Ridges: Extend 36 inches on each side without obstructing continuous ridge vent slot.
5. Sidewalls: Extend beyond sidewall 18 inches and return vertically against sidewall not less than 4 inches.
6. Dormers, Cheek Walls, Chimneys, and other Roof-Penetrating Elements: Extend beyond penetrating element 18 inches and return vertically against penetrating element not less than 4 inches.

C. Metal-Flashed Open Valley Underlayment: Install two layers of 36-inch- wide felt underlayment centered in valley. Stagger end laps between layers at least 72 inches. Lap ends of each layer at least 12 inches in direction to shed water, and seal with asphalt roofing cement. Fasten each layer to roof deck with roofing nails.

1. Lap roof deck felt underlayment over first layer of valley felt underlayment at least 6 inches.

### 3.03 METAL FLASHING INSTALLATION

A. General: Install metal flashings and other sheet metal to comply with requirements in Division 7 Section "Sheet Metal Flashing and Trim."

1. Install metal flashings according to recommendations in ARMA's "Residential Asphalt Roofing Manual" and asphalt shingle recommendations in NRCA's "The NRCA Roofing and Waterproofing Manual."

### 3.04 ASPHALT SHINGLE INSTALLATION

A. Install asphalt shingles according to manufacturer's written instructions, recommendations in ARMA's "Residential Asphalt Roofing Manual," and asphalt shingle recommendations in NRCA's "The NRCA Roofing and Waterproofing Manual."

B. Install starter strip along lowest roof edge, consisting of an asphalt shingle strip with tabs removed at least 11 inches wide with self-sealing strip face up at roof edge.

1. Extend asphalt shingles 3/4 inch over fascia at eaves and rakes.

C. Install first and remaining courses of asphalt shingles stair-stepping diagonally across roof deck with manufacturer's recommended offset pattern at succeeding courses, maintaining uniform exposure.

D. Fasten asphalt shingle strips with a minimum of six roofing nails located according to manufacturer's written instructions.

1. When ambient temperature during installation is below 50 deg F, seal asphalt shingles with asphalt roofing cement spots.

E. Open Valleys: Cut and fit asphalt shingles at open valleys, trimming upper concealed corners of shingle strips. Maintain uniform width of exposed open valley 1/8 inch in 12 inches from highest to lowest point.

1. Set valley edge of asphalt shingles in a 3-inch- wide bed of asphalt roofing cement.

F. Ridge and Hip Cap Shingles: Maintain same exposure of cap shingles as roofing shingle exposure. Lap cap shingles at ridges to shed water away from direction of prevailing winds. Fasten with roofing nails of sufficient length to penetrate sheathing.

1. Fasten ridge cap asphalt shingles to cover ridge vent without obstructing airflow.

END OF SECTION 07 3113

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ASPHALT SHINGLES

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SECTION 07 5200  
SBS MODIFIED BITUMINOUS MEMBRANE ROOFING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings, Specifications and general provisions of the Contract, including "General Provisions for Construction Contracts" (General Provisions) and Supplementary General Provisions and all documents included within this Contract apply to this Section.
- B. Submittal requirements shall be coordinated with Division 01.

1.02 SECTION INCLUDES

- A. Modified bituminous roofing membrane multiple ply.
  - 1. Type 1 – Uninsulated: Steep slope roof built-in gutter liner.
  - 2. Type 2 – Insulated: Low slope roof areas
- B. Insulation, flat and tapered for gussets; Library ONLY.
  - 1. Insulation will not meet Philadelphia Energy Code targets as the existing parapet height restricts more than 4" of insulation.
  - 2. Due to parapet restrictions, the ¼" per foot slope may not be met. Specification requires two layers of flat 2" insulation.
- C. Marine Grade Plywood: For use as Built-in Gutter Liner.
  - 1. ½" nominal
- D. Insulation cover boards, high density gypsum ½". Low Slope Roofs Only at Library ONLY.
- E. Vapor retarders.
- F. Base flashings.
- G. Roofing cant strips and, accessories; Library ONLY.

1.03 RELATED REQUIREMENTS

- A. Drawings, Specifications and general provisions of the Contract.
- B. Section 04 2000 - Unit Masonry: Metal flashings embedded in masonry.
- C. Section 06 1000 - Rough Carpentry: Wood nailers for sheet metal work.
- D. Section 06 1000 - Rough Carpentry: Field fabricated roof step.
- E. Section 07 7200 - Roof Accessories: Manufactured metal roof curbs and scuttle.
- F. Section 07 9200 - Joint Sealants: Sealing non-lap joints between sheet metal fabrications and adjacent construction.
- G. MPE Sections: Mechanical work projecting through roof and Prefab Mech Curbs.

#### 1.04 REFERENCE STANDARDS

- A. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
- B. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
- C. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
- D. ASTM D41/D41M - Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
- E. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free.
- F. ASTM D4601/D4601M - Standard Specification for Asphalt-Coated Glass Fiber Base Sheet Used in Roofing.
- G. ASTM D6162/D6162M - Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements.
- H. ASTM E1980 - Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces.
- I. FM DS 1-28 - Wind Design; Factory Mutual Research Corporation; ANSI-SPRI ES-1.
- J. NRCA ML104 - The NRCA Roofing and Waterproofing Manual; National Roofing Contractors Association.

#### 1.05 ADMINISTRATIVE REQUIREMENTS

- A. Preconstruction Meeting: Convene not later than one week before starting work of this section.
  - 1. Review preparation and installation procedures and coordinating and scheduling required with related work.

#### 1.06 SUBMITTALS

- A. Product Data: Provide manufacturer's catalog data for membrane and bitumen materials, base flashing materials, insulation, vapor retarder, surfacing, and all other components of the roofing system.
  - 1. Sustainable Design Submittal: Include testing documentation of solar reflectance index.
- B. Shop Drawings: Indicate joint or termination detail conditions, conditions of interface with other materials, setting plan for tapered insulation, and mechanical fastener layout.
- C. Manufacturer's Qualification Statement.
- D. Installer's Qualification Statement.
- E. Manufacturer's Installation Instructions: Indicate special procedures.
- F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- G. Manufacturer's Field Reports: Indicate procedures followed.

- H. Warranty: Submit manufacturer warranty and ensure forms have been completed in City of Philadelphia Department of Parks and Recreation name and registered with manufacturer.
  - 1. Installer's Workmanship Guarantee

#### 1.07 QUALITY ASSURANCE

- A. Perform work in accordance with NRCA Roofing and Waterproofing Manual and manufacturer's instructions.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum five (5) years documented experience, and approved by manufacturer.
- C. Comply with all published OHA / OSHA standards and regulations.

#### 1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products in manufacturer's original containers, dry, undamaged, with seals and labels intact.
- B. Store products in weather protected environment, clear of ground and moisture, protected from weather.
- C. Protect foam insulation from direct exposure to sunlight. Provide tarpaulin cover

#### 1.09 FIELD CONDITIONS

- A. Do not apply roofing membrane when environmental conditions are outside the ranges recommended by manufacturer.
- B. Do not apply roofing membrane during unsuitable weather.
- C. Do not apply roofing membrane when ambient temperature is below 40 degrees F.
- 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. Saw-cut reglets 1 ½" deep and ½" wide where shown on drawings. Notify Architect after removal of roof membrane for evaluation for placement of reglet.

#### 1.10 WARRANTY

- A. See Section 01 78 00 Div 01- Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a two five (5) year period after Date of Substantial Completion.
- C. Provide twenty thirty (30) year manufacturer's material and labor warranty to cover failure to prevent penetration of water.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Membrane Materials:
  - 1. Siplast: [www.siplast.com](http://www.siplast.com).
  - 2. Garland: GAF: [www.gaf.com/sle](http://www.gaf.com/sle).
  - 3. Siplast: [www.siplast.com](http://www.siplast.com).
  - 4. Tremco: Tamko Roofing Products, Inc.: [www.tamko.com](http://www.tamko.com).
- B. Insulation (polyisocyanurate):
  - 1. Hunter:
  - 2. Dow Chemical Company: [www.dow.com](http://www.dow.com).
  - 3. GAF: [www.gaf.com/sle](http://www.gaf.com/sle).
  - 4. Owens Corning Corporation: [www.owenscorning.com](http://www.owenscorning.com).

### 2.02 ROOFING

- A. Modified Bituminous Roofing: Two-ply membrane, with insulation and cover board. Low Slope Roofs Only at Library ONLY.
- B. Modified Bituminous Roofing: Two-ply membrane, over nailed fiberglass base sheet at built-in roofing gutters at base of all steep slope roofs.
- C. Roofing Assembly Requirements; Low Slope Roofs Only at Library ONLY:
  - 1. Solar Reflectance Index (SRI): 78, minimum, calculated in accordance with ASTM E1980, based on 3-year aged data.
    - a. Field applied coating may not be used to achieve specified SRI.
  - 2. Internal Fire Spread Classification: Factory Mutual Class 1, FM-approved.
  - 3. Wind Resistance Classification: Factory Mutual I-9075, in accordance with FM DS 1-28.
  - 4. Insulation Thermal Value (R), minimum: 25; provide insulation of thickness required in Philadelphia energy code.
  - 5. Surfacing: Mineral granules. Color: White.
- D. Self-Adhering Vapor Retarder
- E. Acceptable Insulation Types - Constant Thickness Application: Any of the types specified.
  - 1. Minimum 2 layers of polyisocyanurate board.
  - 2. Bottom layer 2" of polyisocyanurate board mechanically secured to roof deck.
  - 3. Top layer 2" of polyisocyanurate board set in urethane adhesive.
- F. Insulation cover board – High Density Gypsum Board ½" set in urethane adhesive.
- G. Acceptable Insulation Types - Tapered Application: Any of the types specified.
  - 1. Tapered polyisocyanurate board for gussets.
  - 2. Uniform Thickness polyisocyanurate board.
    - a. Two layers 2" stagger joints.

### 2.03 MEMBRANE AND SHEET MATERIALS

- A. Membrane: Polymer modified asphalt, reinforced with non-woven fabric; granule surfaced; with the following characteristics:

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SBS MODIFIED BITUMINOUS MEMBRANE ROOFING

1. Minimum Quality: ASTM 6163G/6163S Type II; styrene-butadiene-styrene (SBS) modified, glass fiber and polyester reinforced.
  2. Thermal Emissivity: 0.80, minimum, initial, and 0.85, minimum, 3-year, certified by Cool Roof Rating Council.
  3. Color: BlackWhite.
    - a. White
- B. Base Sheet: ASTM D4601/D4601M Type I; asphalt-coated glass fiber; unperforated.
- C. Fire ResistantSelf-adhering Vapor Retarder: foil and Fibrous mesh laminate complying with requirements of fire rating classification; compatible with roofing and insulation materials.
  1. Siplast - SA Vapor Retarder
  2. Garland – Hydroshell SA
  3. Tremco – AVC Membrane
- D. Flexible Flashing Material: Flexible PMAA flashing. Same material as membr
  1. Siplast – ParaPro
  2. Garland – Liquitec
  3. Tremco – AlphaGuard PUMA Thix
- 2.04 BITUMINOUS MATERIALS
- A. Primer: ASTM D41/D41M, asphalt type.
- B. Roof Cement: ASTM D4586/D4586M, Type II.
- 2.05 DECK SHEATHING AND COVER BOARDS
- A. Deck Sheathing: Glass mat faced gypsum panels, ASTM C1177/C1177M, fire resistant type, 1/2" inch thick.
  1. Manufacturers:
    - a. Georgia-Pacific DensDeck Prime: [www.densdeck.com](http://www.densdeck.com).
- 2.06 INSULATION
- A. Polyisocyanurate Board Insulation: Rigid cellular foam, complying with ASTM C1289, Type II; Class 1, non-reinforced foam core, and with the following characteristics:
  1. fiberglass both faces.
  2. Compressive Strength: 20 psi.
  3. Board Size: 48 by 48 inch.
  4. Flat board: 2 layers 2" for Library Low Slope Roofs; Library ONLY.
  5. Flat Board: 1.5" for Library Steep Slope Roof; Library ONLY.
  6. Tapered Board: Slope as indicated; minimum thickness 1/2 inch; fabricate of fewest layers possible for Library gussets; Library ONLY.
  7. Board Edges: Square.
  8. Manufacturers:
    - a. Hunter Panels, LLC; H Shield: [www.hpanels.com](http://www.hpanels.com)
    - b. Dow Chemical Co.: [www.dow.com](http://www.dow.com).
    - c. GAF; EnergyGuard PolyIso Insulation: [www.gaf.com/sle](http://www.gaf.com/sle).
    - d. Hunter Panels, LLC; H-Shield: [www.hpanels.com](http://www.hpanels.com).

## 2.07 ACCESSORIES

- A. Cant Strips: Wood:
  - 1. Spruce, Pine, Fir.
- B. Insulation Fasteners: Appropriate for purpose intended and approved by roofing manufacturer.
  - 1. Length as required for thickness of insulation material and penetration of deck substrate, with metal platewashers.
    - a. STD fasteners 3.5" for first layer at low slope roof areas; Library ONLY.
  - 2. One fastener per 1.5 SF of roof area.
  - 3. #12 common nail for steep slope roof areas; Library ONLY.
- C. Sealants: As recommended by membrane manufacturer.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that surfaces and site conditions are ready to receive work.
- B. Verify that roof openings, curbs, and penetrations through roof are solidly set, and cant strips are in place.

### 3.02 WOOD DECK PREPARATION

- A. Verify deck is supported and secure.
- B. Verify all existing fasteners are fully seated.
- C. Re-nail entire T&G deck to rafters; Library ONLY.
- D. For steep slope roof gutter provide marine grade plywood overlay and secured to rafters.
- E. Provide dimensional wood blocking as required and as follows:
  - 1. Provide step and scuttle blocking at Recreation Center scuttle; Recreation Center ONLY.
  - 2. Provide at existing scuttle and HVAC unit curbs; Library ONLY.
- F. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, or fasteners properly sloped and suitable for installation of roof system.
- G. Conventional Application: Apply fire resistant vapor retarder with fire-retardant adhesive.

### 3.03 VAPOR RETARDER INSTALLATION - CONVENTIONAL APPLICATION

- A. Thoroughly clean deck. Broom surface to remove demolition debris. Use magnet to extricate nails.
- B. Fire-retardant Vapor Retarder: Apply to place on clean, nail-free deck surface and remove peel sheet (with adhesive) in accordance with roofing and vapor retarder manufacturers' instructions. Roll VR with steel roller to assure adhesion.
- C. Extend vapor retarder to cover under cant strips and blocking. Turn up vertical surfaces and secure.



- D. Install flexible flashing from vapor retarder to air seal material of wall construction, lap and seal to provide continuity of the air barrier plane.

#### 3.04 INSULATION PLACEMENT AT LOW SLOPE ROOF AREAS; LIBRARY ONLY.

- A. Ensure vapor retarder is clean and dry, continuous, and ready for application of roofing system.
- B. At Library Steep Slope Roof: Lay ½" boards over vapor retarder. Temporarily secure until placement of sheathing.
- C. Attachment of Insulation at Library Low Slope Roofs:
  - 1. Mechanically fasten first layer of insulation to deck in accordance with roofing manufacturer's instructions and Factory Mutual requirements.
  - 2. Use fastener type and fastening pattern as required to achieve wind resistance FM – 1-90.
- D. Attachment of Top Layer of Insulation: Fasten top layer of insulation to first layer using urethane insulation adhesive in accordance with roofing manufacturer's instructions and Factory Mutual requirements.
- E. Place tapered insulation to the required gusset slope pattern.
- F. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.
  - 1. Spaces between boards larger than ¼" must be filled.
- G. At roof drains, use factory-tapered boards to slope down to roof drains over a distance of 18 inches.
- H. Do not apply more insulation than can be covered with membrane in same day.
- I. See Section 06 10 00 "Sheathing" for plywood overlay at Recreation Center.
  - 1. Secure sheathing in accordance with APA requirements.
  - 2. Secure to existing rafters through insulation.

#### 3.05 BUILT-IN GUTTER (GUTTER for STEEP SLOPED ROOF AREAS) WITH MGP SELF-ADHERING UNDERLAYMENT

- A. High-Temperature Self-Adhering Underlayment (HT-SAU): place on deck surface and remove peel sheet in accordance with roofing and HT-SAU manufacturers' instructions. Roll HT-SAU with steel roller to assure adhesion.
- B. Install High-Temperature Self-Adhering Underlayment to cover all marine grade plywood sheathing.
- C. Install High-Temperature Self-Adhering Underlayment to cover entire low slope roof areas.
- D. See Section 06 10 00 "Sheathing" for plywood underlayment of gutters, tie off rail and 24" up slope overlay.
  - 1. Secure sheathing in accordance with APA requirements.
  - 2. Secure to existing rafters through insulation.

#### 3.06 MEMBRANE APPLICATION

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

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- B. Apply membrane; lap and seal edges and ends permanently waterproof.
- C. Apply smooth, free from air pockets, wrinkles, fish-mouths, or tears. Ensure full bond of membrane to substrate.
- D. At end of day's operation, install waterproof cut-off. Remove cut-off before resuming roofing.
- E. At intersections with vertical surfaces:
  - 1. Extend membrane over cant strips and up a minimum of 8 inches onto vertical surfaces.
  - 2. Apply flexible flashing over membrane.
- F. Extend membrane and base sheet under counterflashing. Turn down over blocking and nail for temporary protection.
- G. Around roof penetrations, and seal flanges and flashings with flexible flashing.
- H. Coordinate installation of roof drains, scuppers, and sumps and related flashings.

### 3.07 FIELD QUALITY CONTROL

- A. Require site attendance of roofing and insulation material manufacturers at Pre-Roofing meeting, Punch List and Final Completion of roofing during installation of the Work.

### 3.08 CLEANING

- A. Remove bituminous markings from finished surfaces.
- B. In areas where finished surfaces are soiled by bitumen or other source of soiling caused by work of this section, consult manufacturer of surfaces for cleaning advice and conform to their documented instructions.
- C. Repair or replace defaced or damaged finishes caused by work of this section.

### 3.09 PROTECTION

- A. Protect installed roofing and flashings from construction operations.
- B. Where traffic must continue over finished roof membrane, protect surfaces using durable materials.

END OF SECTION 07 5200

SECTION 07 6200  
SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fabricated sheet metal items, including flashings, counterflashings, gutters, downspouts, sheet metal roofing, exterior penetrations, formed metal scuppers, horizontal siding and closures, and other items indicated in Schedule.
  - 1. And other items indicated on drawings.
- B. Sealants for joints within sheet metal fabrications.
- C. Sheet metal splash pans only where indicated.
- D. Library sheet metal: Copper and/or ZT Coated Copper.
- E. Recreation Center Sheet Metal: 302 Stainless Steel.
- F. Sheet Metal Flashing and Trim shall conform to the following minimum Owner's standards:
  - 1. Two-piece Counter Flashing, Overflow Scupper Flashing, Through Wall Flashing: Stainless Steel ASTM A167, Type 302, 26 gauge UNO.
  - 2. Fascias, clips, and coping: Stainless steel; ASTM A167, Type 302, Shop formed, 0.0375 inch thick minimum (19 to 20 gauge); finish No. 2d (dull cold rolled mill finish).
  - 3. Turn masonry flashings up a minimum of 8 inches and bed into mortar joint of masonry. Lap end joints min. 6 inches and seal watertight.
  - 4. Vandal resistant Exposed downspouts and wall bracket and anchors.

1.02 RELATED REQUIREMENTS

- A. Section 04 2000 - Unit Masonry: Metal flashings embedded in masonry.
- B. Section 06 1000 - Rough Carpentry: Wood nailers for sheet metal work.
- C. Section 06 1000 - Rough Carpentry: Wood blocking for batten seams.
- D. Section 06 1000 - Rough Carpentry: Field fabricated roof curbs.
- E. Section 07 3113 - Asphalt Shingles: Non-metallic flashings associated with shingle roofing.
- F. Section 07 7100 - Roof Specialties: Manufactured copings, flashings, and expansion joint covers.
- G. Section 07 7200 - Roof Accessories: Manufactured metal roof curbs.
- H. Section 07 9200 - Joint Sealants: Sealing non-lap joints between sheet metal fabrications and adjacent construction.

1.03 REFERENCE STANDARDS

- A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- B. ASTM B32 - Standard Specification for Solder Metal 2020.

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SHEET METAL FLASHING AND TRIM

- C. ASTM B370 - Standard Specification for Copper Sheet and Strip for Building Construction 2022.
- D. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2018.
- E. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing 2017.
- F. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free 2007 (Reapproved 2018).
- G. CDA A4050 - Copper in Architecture - Handbook current edition.
- H. SMACNA (ASMM) - Architectural Sheet Metal Manual 2012.

#### 1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week before starting work of this section.
- B. Provide a 5-year extended warranty.

#### 1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Sustainable Design Submittals: For products containing recycled content, include documentation indicating the percentages of recycled content by weight, of postconsumer plus one-half of the pre consumer recycled content.
- C. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details. Submit for review and approval shop drawings indicating material profile and installation details of copings, fascias, hanging gutters, downspouts, scuppers, panels, and siding.
- D. Samples: Submit two samples, 6 by 6 inch in size illustrating material of typical standing seam.
- E. Samples: Submit two samples 6 by 6 inch in size illustrating metal finish color.
- F. Submit for review and approval shop drawings indicating material profile and installation details of copings, fascias, hanging gutters, downspouts, scuppers, panels, and siding.

#### 1.06 Warranty

- A. Provide a 5-year extended warranty.

#### 1.07 QUALITY ASSURANCE

- A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.
- B. Maintain one copy of each document on site.
- C. Fabricator and Installer Qualifications: Company specializing in sheet metal work with 5 years of documented experience.

1.08 DELIVERY, STORAGE, AND HANDLING

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

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Sheet Metal Flashing and Trim Manufacturers; Member of SMACNA or other industry association required:
  - 1. Member of SMACNA or other industry association.
- B. Exterior Penetration Flashing Panel Manufacturers; Member of SMACNA or other industry association required:
  - 1. Quickflash Weatherproofing Products, Inc: [www.quickflashproducts.com/#sle](http://www.quickflashproducts.com/#sle).
  - 2. Member of SMACNA or other industry association.

2.02 SHEET MATERIALS

- A. Stainless Steel: ASTM A666, Type 304 alloy, soft temper, 28 gauge, (0.0156 inch) thick; smooth No. 4 - Brushed finish.
- B. Terne Coated Steel: 28 gauge, 0.0149 inch thick copper bearing carbon steel core material with 0.092 lb/sq ft terne alloy coating on both sides of core metal.
- C. ZT coated Copper: cold-rolled copper sheet, not less than 16 oz./sq. ft., both sides coated unless otherwise indicated.
- D. COPPER: ASTM B 370; temper H00, cold rolled except where temper 060 is required for forming; not less than 16 oz/sq. ft., (24 gauge) (0.0216 inch thick); natural finish, unless otherwise indicated.
  - 1. For use in forming corners at built-in copper flashings.
  - 2. For use to replace copper built-in flashings.

2.03 MISCELLANEOUS MATERIALS AND ACCESSORIES

- A. Solder: ASTM B 32, Grade Sn50, used with rosin flux.
- B. Termination Bars: 1/8 x 1-inch copper bars pre-punched at 6-inches on center.
- C. Fasteners: Same metal as sheet metal flashing or other non-corrosive metal as recommended by sheet metal manufacturer. Match finish of exposed heads with material being fastened.
- D. Nails: Copper nails
- E. Rivets: Copper rivets with brass mandrel
- F. Screws: 300 series stainless steel self tapping screws with 14 threads per inch.
- G. Sheet Metal Screws: Brass self-tapping pan head sheet metal screws.
  - 1. For use at sheet metal to sheet metal applications where rivets are not acceptable.

## 2.04 FABRICATION

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Form pieces in longest possible lengths.
- C. Hem exposed edges on underside 1/2 inch; miter and seam corners.
- D. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- E. Tin edges of copper sheet to be soldered; solder shop formed metal joints, and after soldering, remove flux, wipe and wash solder joints clean; provide weathertight joints.
- F. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.
- G. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.
- H. When dissimilar metals come into contact with each other, back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 30 mils.

## 2.05 SCUPPER AND DOWNSPOUT FABRICATION

- A. Gutters: SMACNA (ASMM) Rectangular profile.
- B. Downspouts: Rectangular profile.
- C. Scupper Drains: Fabricate to match existing profile.
- D. Downspouts: Size for rainfall intensity determined by a storm occurrence of 1 in 10 years in accordance with SMACNA (ASMM) but not less than 6" x 6".
- E. Accessories: Profiled to suit gutters and downspouts.
  - 1. Anchorage Devices: In accordance with SMACNA (ASMM) requirements.
  - 2. Downspout Supports: Brackets.
- F. Splash Pans and cornice wash: Same metal type as scupper, formed to size; rolled sides of high for inverted pan placement.
- G. Downspout Boots: Cast Iron.
- H. Downspout Extenders: Same material and finish as downspouts.
- I. Seal metal joints.

## 2.06 EXTERIOR PENETRATION FLASHING PANELS

- A. Flashing Panels for Exterior Wall Penetrations: Premanufactured components and accessories as required to preserve integrity of building envelope; suitable for conduits and facade materials to be installed.

## 2.07 ACCESSORIES

- A. Fasteners: Stainless steel / EPDM washers.

1. no expansion fasters allowed (without written approval and where only is absolutely needed).
- B. Underlayment: ASTM D226/D226M, organic roofing felt, Type I (No. 15).
- C. Underlayment: Polyethylene, 6 mils thick.
- D. Primer: Zinc chromate type.
- E. Concealed Sealants: Non-curing butyl sealant.
- F. Exposed Sealants: ASTM C920; elastomeric sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; color to match adjacent material.
  1. Manufacturers:
    - a. Franklin International, Inc; Titebond WeatherMaster Metal Roof Sealant:  
[www.titebond.com/#sle](http://www.titebond.com/#sle).
- G. Plastic Cement: ASTM D4586/D4586M, Type I.
- H. Reglets: Shop formed to insert into sawcut reglet.
- I. Solder: ASTM B32; Sn50 (50/50) type.
- J. Two-piece Cap Flashing, Scupper Flashing, Insert flashing, receiver flashing Flashing: Stainless Steel ASTM A167, Type 302, 26 gauge UNO at Recreation Center and copper at Library.
- K. Scuppers, and overflows, clips, and coping: Stainless steel; ASTM A167, Type 302, Shop formed, 0.0375 inch thick minimum (19 to 20 gauge); finish No. 2d (dull cold rolled mill finish).

### PART 3 EXECUTION

#### 3.01 EXAMINATION

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

#### 3.02 PREPARATION

- A. Install starter and edge strips, and cleats before starting installation.
- B. Install surface mounted reglets true to lines and levels, and seal top of reglets with sealant.
- C. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil.

#### 3.03 INSTALLATION

- A. Comply with drawing details.
  1. AND SMACNA (ASMM), Details.
- B. Insert flashings into reglets to form tight fit; secure in place with lead wedges; pack remaining spaces with lead wool; seal flashings into reglets with sealant.

- C. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted..
- D. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- E. Turn masonry flashings up a minimum of 8 inches and bed into mortar joint of masonry. Lap end joints min. 6 inches and seal watertight.
- F. Solder metal joints for full metal surface contact, and after soldering wash metal clean with neutralizing solution and rinse with water.
- G. Secure downspouts in place with concealed fasteners.
- H. Connect downspouts to downspout boots, and grout connection watertight.
- I. Set splash pans under downspouts, and set in place with [\_\_\_\_\_].

#### 3.04 FIELD QUALITY CONTROL

- A. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

#### 3.05 SCHEDULE

- A. Through-Wall Flashing in Masonry:
  1. Material: Stainless Steel at Recreation Center.
  2. Material: 16 oz. ZT Coated Copper at Library.
  3. Material: 16 oz. Copper at Library.
- B. Scuppers and Downspouts:
- C. Coping, Cap, Parapet, Sill and Ledge Flashings:
- D. Flashings Associated with Shingle Roofing, including Valley, Hip, Ridge, Eave, Gutter Edge, Gable Edge, Chimney:
- E. Counterflashings at Roofing Terminations (over roofing base flashings):
- F. Counterflashings at Curb-Mounted Roof Items, including HVAC Equipment curbs and roof hatches:
- G. Roofing Penetration Flashings, for Pipes, and Equipment Supports:

END OF SECTION 07 6200



## SECTION 07 7200 ROOF ACCESSORIES

### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

- A. Roof curbs.
- B. Roof Edge Safety Anchour and Cable System
- C. Equipment rails and Equipment supports – 14 gauge galvanized steel, 3 □ inches wide by height as needed.
- D. Roof penetrations mounting curbs.
- E. Roof hatches with access ladders.
- F. Roof Scuttles to be provided for roof access – Aluminum curb frame and lid with insulation, provide additional aluminum liner on outside face of curb installation.

#### 1.02 REFERENCE STANDARDS

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.

#### 1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used.
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
  - 4. Maintenance requirements.
- C. Warranty Documentation:
  - 1. Submit manufacturer warranty.
  - 2. Ensure that forms have been completed in Owner's name and registered with manufacturer.

#### 1.04 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.
- C. Provide five year manufacturer warranty for all items listed..

## PART 2 PRODUCTS

### 2.01 ROOF CURBS

- A. Manufacturers:
1. AES Industries Inc: [www.aescurb.com/#sle](http://www.aescurb.com/#sle).
  2. The Pate Company: [www.patecurbs.com/#sle](http://www.patecurbs.com/#sle).
  3. LMCurbs; Roof Curbs: [www.lmcurbs.com/#sle](http://www.lmcurbs.com/#sle).
  4. MKT Metal Manufacturing: [www.mktduct.com/#sle](http://www.mktduct.com/#sle).
  5. Roof Products & Systems (RPS): [www.rpscurbs.com/#sle](http://www.rpscurbs.com/#sle).
- B. Roof Curbs Mounting Assemblies: Factory fabricated hollow sheet metal construction, internally reinforced, and capable of supporting superimposed live and dead loads and designated equipment load with fully mitered and sealed corner joints welded or mechanically fastened, and integral counterflashing with top and edges formed to shed water.
1. Applications: Roof curbs used for roof penetrations/openings as indicated on drawings.
  2. Roof Curb Mounting Substrate: Curb substrate consists of standing seam metal roof panel system.
  3. Sheet Metal Material:
    - a. Aluminum: 0.080 inch minimum thickness, with 3003 alloy, and H14 temper.
      - 1) Finish: Mill finish.
      - 2) Color: As selected by Architect from manufacturer's standard line of colors.
  4. Roofing Cants: Provide integral sheet metal roofing cants dimensioned to begin slope at top of roofing system at 1:1 slope; minimum cant height 4 inches.
  5. Fabricate curb bottom and mounting flanges for installation directly on metal roof panel system to match slope and configuration of system.
    - a. Extend side flange to next adjacent roof panel seam and comply with seam configurations and seal connection, providing at least 6 inch clearance between curb and metal roof panel flange allowing water to properly flow past curb.
    - b. Where side of curb aligns with metal roof panel flange, attach fasteners on upper slope of flange to curb connection allowing water to flow past below fasteners, and seal connection.
    - c. Maintain at least 12 inch clearance from curb, and lap upper curb flange on underside of down sloping metal roof panel, and seal connection.
    - d. Lap lower curb flange overtop of down sloping metal roof panel and seal connection.
  6. Provide layouts and configurations indicated on drawings.

### 2.02 ROOF HATCHES AND VENTS

- A. Roof Hatch Manufacturers:
1. Subject to compliance with requirements established by basis of design and performance requirements for complete system of roof hatch with integral roof curb, guard rail and ladder:
  2. Basis of Design by Bilco Company: [www.bilco.com/#sle](http://www.bilco.com/#sle).
    - a. Type S-50 (Library)
    - b. Type L-50TB (Recreation Center)
  3. Subject to compliance with requirements Approved Equal by the following:
  4. Activar Construction Products Group, Inc. - JL Industries: [www.activarcp.com/#sle](http://www.activarcp.com/#sle).
  5. Acudor Products Inc; Galvanized Steel Roof Hatch: [www.acudor.com/#sle](http://www.acudor.com/#sle).
  6. Babcock-Davis; ThermalMAX: [www.babcockdavis.com/#sle](http://www.babcockdavis.com/#sle).

7. Best Access Doors; Series BA-GRH - Ladder Access Roof Hatch, Galvanized: [www.bestaccessdoors.com/#sle](http://www.bestaccessdoors.com/#sle).
  8. Dur-Red Products: [www.dur-red.com/#sle](http://www.dur-red.com/#sle).
  9. Elmdor Stoneman: [www.elmdorstoneman.com/#sle](http://www.elmdorstoneman.com/#sle).
  10. FAKRO America LLC; Flat Roof Access Hatch DRL: [www.fakrousa.com/#sle](http://www.fakrousa.com/#sle).
  11. LMCurbs; Roof Hatch: [www.lmcurbs.com/#sle](http://www.lmcurbs.com/#sle).
  12. Milcor, Inc: [www.milcorinc.com/#sle](http://www.milcorinc.com/#sle).
  13. Nystrom, Inc: [www.nystrom.com/#sle](http://www.nystrom.com/#sle).
  14. Precision Ladders, LLC; Model PH-A: [www.precisionladders.com/#sle](http://www.precisionladders.com/#sle).
- B. Roof Access Hatches with Ladder: Factory-assembled roof hatch with frame and flat cover and metal access ladder, complete with operating and release hardware.
1. Provide Basis of Design Product: Furnish and install where indicated on plans metal roof hatch Type L-50TB, size width: 30" (762mm) x length: 96" (2438mm). Length denotes hinge side. The roof hatch shall be single leaf. The roof hatch shall be pre-assembled from the manufacturer.
    - a. Library Basis-of-Design Manufacturer: Type S Roof Hatch by The BILCO Company, P.O. Box 1203, New Haven, CT 06505, 1-800-366-6530, Fax: 1-203-535-1582, Web: [www.BILCO.com](http://www.BILCO.com)
      - 1) S-50: 36" x 30"
    - b. Rec Center Basis-of-Design Manufacturer: Type L-50TB Roof Hatch by The BILCO Company, P.O. Box 1203, New Haven, CT 06505, 1-800-366-6530, Fax: 1-203-535-1582, Web: [www.BILCO.com](http://www.BILCO.com)
      - 1) L-50TB: 30" x 96"
  2. Mounting: Provide frames and curbs suitable for mounting conditions as indicated on drawings.
  3. Thermally Broken Hatches: Provide insulation within hatch frame and cover.
  4. Folding Ladder Access: Triple section ladder, upper roof hatch door with PVC frame and lower insulated door with wood box to enclose and support ladder; 23-1/2 by 47 inches rough opening.
    - a. Ladder Room Height Range: 91-3/4 to 110-1/4 inches, nominal.
- C. Frames and Curbs: One-piece curb and frame with integral cap flashing to receive roof flashings; extended bottom flange to suit mounting.
1. Insulation: Manufacturer's standard; 1 inch rigid glass fiber, located on outside face of curb.
  2. Curb Height: 12 inches from finished surface of roof, minimum.
- D. Hardware: Steel, zinc coated and chromate sealed, unless otherwise indicated or required by manufacturer.
1. Lifting Mechanisms: Compression or torsion spring operator with shock absorbers that automatically opens upon release of latch; capable of lifting covers despite 10 psf load.
  2. Hinges: Heavy duty pintle type.
  3. Hold open arm with vinyl-coated handle for manual release.
  4. Latch: Upon closing, engage latch automatically and reset manual release.
  5. Manual Release: Pull handle on interior.
  6. Locking: Padlock hasp on interior.

## 2.03 ROOF HATCH Performance characteristics

- A. General:
1. Cover shall be reinforced to support a minimum live load of 40 psf (195kg/m<sup>2</sup>) with a maximum deflection of 1/150th of the span or 20 psf (97kg/m<sup>2</sup>) wind uplift.

2. Operation of the cover shall be smooth and easy with controlled operation throughout the entire arc of opening and closing.
  3. Operation of the cover shall not be affected by temperature.
  4. Entire hatch shall be weather tight with fully welded corner joints on cover and curb.
- B. Cover: Shall be [select: 14 gauge (1.9mm) paint bond G-90 galvanized steel or 11 gauge (2.3mm) aluminum] with a 3" (76mm) beaded flange with formed reinforcing members. Cover shall have a heavy extruded EPDM rubber gasket that is bonded to the cover interior to assure a continuous seal when compressed to the top surface of the curb.
- C. Cover insulation: Shall be fiberglass of 1" (25mm) thickness, fully covered and protected by a metal liner 22 gauge (.8mm) paint bond G-90 galvanized steel or 18 gauge (1mm) aluminum.
- D. Curb: Shall be 12" (305mm) in height and of [select: 14 gauge (1.9mm) paint bond G-90 galvanized steel or 11 gauge (2.3mm) aluminum]. The curb shall be formed with a 3-1/2" (89mm) flange with 7/16" (11mm) holes provided for securing to the roof deck. The curb shall be equipped with an integral metal capflashing of the same gauge and material as the curb, fully welded at the corners, that features the Bil-Clip<sup>®</sup> flashing system, including stamped tabs, 6" (153mm) on center, to be bent inward to hold single ply roofing membrane securely in place.
- E. Curb insulation: Shall be rigid, high-density fiberboard of 1" (25mm) thickness on outside of curb.
- F. Lifting mechanisms: Manufacturer shall provide compression spring operators enclosed in telescopic tubes to provide, smooth, easy, and controlled cover operation throughout the entire arc of opening and closing. The upper tube shall be the outer tube to prevent accumulation of moisture, grit, and debris inside the lower tube assembly. The lower tube shall interlock with a flanged support shoe [for aluminum construction: welded to the curb assembly; for steel construction: through bolted to the curb assembly].
- G. Hardware
1. Heavy pintle hinges shall be provided
  2. Cover shall be equipped with a spring latch with interior and exterior turn handles
  3. Roof hatch shall be equipped with interior and exterior padlock hasps.
  4. The latch strike shall be a stamped component bolted to the curb assembly.
  5. Cover shall automatically lock in the open position with a rigid hold open arm equipped with a 1" (25mm) diameter red vinyl grip handle to permit easy release for closing.
  6. All hardware shall be zinc plated and chromate sealed. [For installation in highly corrosive environments or when prolonged exposure to hot water or steam is anticipated, specify Type 316 stainless steel hardware.
  7. Cover hardware shall be bolted into heavy gauge channel reinforcing welded to the underside of the cover and concealed within the insulation space.
- H. Finishes: Factory finish shall be [select: alkyd based red oxide primed steel or mill finish aluminum.

## 2.04 NON-PENETRATING ROOFTOP SUPPORTS/ASSEMBLIES

- A. Non-Penetrating Rooftop Support/Assemblies: Manufacturer-engineered and factory-fabricated, with pedestal bases that rest on top of roofing membrane, and not requiring any attachment to roof structure and not penetrating roofing assembly.
1. Design Loadings and Configurations: As required by applicable codes.
  2. Support Spacing and Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
  3. Steel Components: Stainless steel, or carbon steel hot-dip galvanized after fabrication in accordance with ASTM A123/A123M.

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### ROOF ACCESSORIES

4. Hardware, Bolts, Nuts, and Washers: Stainless steel, or carbon steel hot-dip galvanized after fabrication in accordance with ASTM A153/A153M.

#### 2.05 Roof Edge Safety Systems

- A. Roof Edge Safety Anchor and Cable System
  1. System by ROOFSAFE for use at edge flat roof area.
- B. Roof Edge Safety Anchor and Rail System
  1. Unirail system by ROOFSAFE for use at bottom of pitched roof area.
- C. Provide complete system; see drawings for location of anchors.

### PART 3 EXECUTION

#### 3.01 EXAMINATION

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

#### 3.02 PREPARATION

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

#### 3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions, in manner that maintains roofing system weather-tight integrity.
- B. When dissimilar metals come into contact with each other, back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 30 mils.

#### 3.04 CLEANING

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

#### 3.05 PROTECTION

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

END OF SECTION 07 7200

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SECTION 07 8410  
FIRE STOPPING AND SMOKE STOPPING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Applicable provisions of Contract Requirements in Division 0 and all applicable Division 1 sections including all LEED requirements and submittals.

1.02 SECTION INCLUDES:

- A. Furnish and Install: Fire stopping, smoke stopping, and identification labels.
  - 1. Renovation Work: Work of this Section also applies to existing construction and assemblies.
- B. Extent of Fire Stopping: Stop the passage of flame and products of combustion including smoke:
  - 1. At all penetrations through fire barrier and smoke barrier assemblies including empty openings and openings containing penetrations.
  - 2. At all items interrupting the continuity of fire barrier and smoke barrier assemblies.
  - 3. At the entire perimeter of fire barrier and smoke barrier assemblies.
  - 4. At locations specified in the Building Code.
- C. Extent of Smoke Stopping: Stop the passage of products of combustion including smoke:
  - 1. At all penetrations through smoke partition assemblies including empty openings and openings containing penetrations.
  - 2. At all items interrupting the continuity of smoke partition assemblies.
  - 3. At the entire perimeter of smoke partition assemblies.
  - 4. At locations specified in the Building Code.
- D. Definition: All of the following are "fire barriers" and "smoke barriers".
  - 1. Assemblies identified on the drawings as fire rated.
  - 2. Assemblies containing a fire rated door.
  - 3. All assemblies enclosing: mechanical rooms, electric rooms, stairs, elevator machine rooms, elevator hoistways, shafts, chases, and storage rooms.

1.03 SUBMITTALS:

- A. Product Data: For each material and product used, submit manufacturer's product data including instructions, recommendations, and restrictions.
  - 1. Performance Requirements: Highlight product data to show compliance with specified performance requirements.
- B. Installer Qualifications: Submit evidence of installer qualifications.

1.04 QUALITY ASSURANCE:

- A. Installer Qualification: Factory Mutual 4991 Approved Contractor, unless otherwise allowed by Owner.
- B. In Place Samples of Visible Work:
  - 1. Comply with Section 01 4337 In Place Samples.

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FIRE STOPPING AND SMOKE STOPPING

2. Running Work: Provide minimum 8 feet long samples.
3. Localized Work: Provide one sample of each condition and detail.

1.05 DELIVERY, STORAGE, HANDLING:

- A. Comply with Division 01 General Requirements and manufacturer's instructions and recommendations.

PART 2 - PRODUCTS

2.01 MANUFACTURERS:

- A. Hilti Corporation [www.us.hilti.com](http://www.us.hilti.com)
- B. Nelson Firestop Products [www.nelsonfirestop.com](http://www.nelsonfirestop.com)
- C. The RectorSeal Corporation [www.rectorseal.com](http://www.rectorseal.com) including brands:
  1. Bio Fireshield [www.biofireshield.com](http://www.biofireshield.com)
  2. Metacaulk [www.metacaulk.com](http://www.metacaulk.com)
- D. Specified Technologis, Inc., [www.stifirestop.com](http://www.stifirestop.com)
- E. 3M Corporation, [www.3m.com](http://www.3m.com)

2.02 FIRE STOPPING AND SMOKE STOPPING PERFORMANCE SPECIFICATIONS:

- A. Building Codes: Meet Building Codes and requirements of authorities having jurisdiction.
- B. Tested, Listed Fire Stop Systems Required: For each location and condition, provide fire stop systems tested, classified, and listed by nationally recognized independent testing agencies.
- C. Single Source: For all fire stop systems, provide systems from one manufacturer.
- D. Standards: Comply with:
  1. ASTM E 84 UL 723 Standard Test Method For Surface Burning Characteristics of Building Materials.
  2. ASTM E 119 UL 263 Methods of Fire Tests of Building Construction and Materials.
  3. ASTM E 814 UL 1479 Standard Test Method For Fire Tests of Through-Penetration Firestops. ASTM E 1399 Test Method for Cyclic Movement and Measuring Minimum and Maximum Joint Width.
  4. ASTM E 1966 UL 2079 Test Method For Resistance of Building Joint Systems.
  5. ASTM E 2307 Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-Story Test Apparatus
- E. Material Fire Performance:
  1. ASTM E84 Flame Spread: 25.
  2. ASTM E84 Smoke Developed: 50.
- F. In Service Temperature: Provide materials with in service temperature range appropriate for installation location.
- G. Water Resistance Performance: Provide water resistant systems [after curing] when in contact with:
  1. Floors.
  2. Exterior assemblies.

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FIRE STOPPING AND SMOKE STOPPING



- 3. Water vapor to liquid water condensing surfaces.
  - H. Acoustical Performance: Equal or greater than STC of the assembly in which the system is installed.
  - I. Mold Resistance Performance: Required for material before and after curing.
    - 1. Standard: ASTM D3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
    - 2. Performance: 10, no mold growth.
  - J. Solvent Restriction: When in contact with plastic, provide materials which do not damage plastic.
  - K. Environmental Characteristics:
    - 1. VOC Limit: Maximum 250 grams per liter, less water.
    - 2. Mineral Fiber Recycled Content: Minimum 70 percent postindustrial Thermafiber, Inc.
    - 3. Odors: Provide materials with no objectionable odors.
    - 4. Regulated Materials: Provide materials free of asbestos, lead, PCBs, and regulated materials.
    - 5. Regulated Waste: Provide materials which do not require special waste disposal.
  - L. Maintenance and Renovation Requirements: For locations requiring routine maintenance or renovation, provide either:
    - 1. Modular, "pillow" systems which can be easily removed and reinstalled without damage.
    - 2. Pathway" system which provide performance whether empty or full example: "EZ-Path", Specified Technologies Inc., [www.stifirestop.com](http://www.stifirestop.com).
  - M. FM Global Approved Materials: Required.
- 2.03 ADDITIONAL REQUIREMENTS FOR FIRE RATED SMOKE BARRIERS:
- A. Provide smoke (1 hr fire) stopping systems meeting Contract requirements.
- 2.04 ADDITIONAL REQUIREMENTS FOR NON FIRE RATED SMOKE PARTITIONS:
- A. Material: Provide materials:
    - 1. Consistent with the Building Code "Construction Classification.
    - 2. Approved by the local Building Inspector, Fire Inspector, and authorities having jurisdiction.
  - B. Maximum Air Leakage: 0.1 cubic foot of air per minute per square foot of surface area at pressure difference of 0.30 inch water gage at both ambient temperature and at 400 degrees F.
- 2.05 ADDITIONAL REQUIREMENTS FOR SYSTEM ACCESSORIES:
- A. Provide all materials, products, components, and accessories needed including, without limitation: temporary forms, primers, sealants, collars, cover plates, sleeves, anchors, fasteners, masking tape, and other materials and products.
- 2.06 FIRE STOPPING AND SMOKE STOPPING IDENTIFICATION LABELS:
- A. Basic Requirements:
    - 1. Material: Self-adhesive "peel and stick" water resistant label.
    - 2. Size: Minimum 6 x 6 inches.

3. Colors: Black copy on yellow or orange label.
  4. Copy Size: Minimum 0.2 inch high capital letters.
  5. Font: Helvetica initial capitals.
  6. Printing: Waterproof ink.
- B. Copy: Provide the following information on each label.
1. "Fire Stop/Smoke Stop - Do Not Disturb".
  2. "This Is An Important Building Fire Safety System".
  3. "UL Design Number = Contractor complete with UL Design Number".
  4. "Fire Rating Hours = [Contractor complete with hourly rating]".
  5. Installation contractor's name, address, telephone.
  6. Installation date.
  7. Manufacturer's name of products used.

### PART 3 - EXECUTION

#### 3.01 FIRE STOPPING AND SMOKE STOPPING INSTALLATION REQUIREMENTS:

- A. Comply with manufacturer's instructions and recommendations.
- B. Meet Contract requirements.
- C. Install to match tested and listed systems and designs, or approved engineering judgments.
- D. If multiple layers of ceramic or fiber materials are used, offset joints at least 6 inches.
- E. If stick clip supports are used, mechanically attach. Adhesive alone is not acceptable.
- F. Clean and remove excess and spilled materials.
- G. Protect installed materials from contamination, damage, and deterioration.

#### 3.02 COORDINATION AND INSPECTION:

- A. Standards:
  1. ASTM E 2174 Standard Practice for On-Site Inspection of Installed Fire Stops
  2. ASTM E 2393 Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers
- B. Coordinate fire and smoke stop work with other work to minimize disturbance of installed stops.
- C. Inspect before inspection by Owner and authorities having jurisdiction.
- D. Make corrections, if needed, before inspection by Owner and authorities having jurisdiction.
- E. Obtain inspection and approval from Owner and authorities having jurisdiction before concealing.

#### 3.03 WORK VISIBLE IN THE COMPLETED PROJECT: DETAIL AS SHOWN OR, IF NOT SHOWN:

- A. Provide smooth, flat, planar fire stop and smoke stop surfaces flush with the adjacent surface.
- B. Do not expose any mineral fiber, glass fiber, ceramic fiber, or any other fiber in the completed work.

- C. Tool visible surface to create uniform architectural appearance matching approved samples.
- D. Provide visible color to match adjacent visible finish material.

3.04 INSTALLATION OF FIRE STOP AND SMOKE STOP IDENTIFICATION LABELS:

- A. Locations: Adjacent to every installed fire stop and smoke stop on both sides of the assembly.
  - 1. Labels are not required on inaccessible side of assembly.
- B. Location Restriction: Do not install labels at locations normally visible to building occupants such as public accessible spaces without ceilings.
- C. Installation:
  - 1. Clean substrates and apply labels.
  - 2. Install labels to be easy to read by maintenance staff.

END OF SECTION 078410 07 8410

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## SECTION 07 9200 JOINT SEALANTS

### PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS:

- A. Applicable provisions of Bidding Requirements, Contract Requirements in Division 0 and all applicable Division 1 sections.

#### 1.02 SECTION INCLUDES:

- A. Furnish and Install: Joint sealants.
- B. Extent: As shown and additionally:
  - 1. All joints between dissimilar materials.
  - 2. All joints between similar materials.
  - 3. Interior control joints.
  - 4. Exterior control joints.
  - 5. Vertical concave inside corner masonry to masonry joints.
  - 6. Visible perimeters of door frames, other frames, and trims
  - 7. Completely around all plumbing fixtures, fittings, and trim at counter tops, walls, and floors.
  - 8. Perimeters of all exterior penetrations.

#### 1.03 RELATED SECTIONS:

- A. Section 075200 Modified Bituminous Membrane Roofing.
- B. Section 092500 Gypsum Board.

#### 1.04 SUBMITTALS:

- A. Product Data: Manufacturer's data including instructions, recommendations, and restrictions.
  - 1. Primers: Submit information on primer to be used for each sealant and substrate.
- B. Sustainable Design Submittals; Submit a completed Green Building Materials Certification Form that lists permanently installed products and indicates material costs. Attach letter from manufacturer(s) describing product(s) contribution to LEED v4, including, but not limited to, the following:
  - 1. Product data for EQc2: Provide compliant General Emissions Evaluation and VOC content for wet applied products for adhesives and sealants, in accordance with the California Department of Public Health (CDPH) Standard Method v1.1–2010, using the applicable exposure scenario. The manufacturers or third-party certification must state the exposure scenario used to determine compliance. Manufacturers' claims of compliance with the above requirements must also state the range of total VOCs after 14 days (336 hours), measured as specified in the CDPH Standard Method v1.1.
    - a. All adhesives and sealants wet-applied on site must meet the applicable chemical content requirements of SCAQMD Rule 1168, July 1, 2005, Adhesive and Sealant Applications, as analyzed by the methods specified in Rule 1168.
- C. Initial Selection Samples: 2 inches long.

1.05 DELIVERY, STORAGE, HANDLING:

- A. Comply with Division 01 General Requirements and manufacturer's instructions and recommendations.

1.06 WARRANTY:

- A. Manufacturer's standard warranty.
- B. Manufacturers' Warranty Period for Exterior Sealants: 20 years.

PART 2 - PRODUCTS

2.01 MANUFACTURERS:

- A. Bostik, Inc., [www.bostik.com](http://www.bostik.com)
- B. DAP, Inc., [www.dap.com](http://www.dap.com).
- C. Dow Corning Corporation, [www.dowcorning.com](http://www.dowcorning.com)
- D. Emseal Joint Systems, Ltd, [www.emseal.com](http://www.emseal.com)
- E. Franklin Adhesives, [www.franklinadhesives.com](http://www.franklinadhesives.com)
- F. GE Sealants, [www.geadvancedmaterials.com](http://www.geadvancedmaterials.com), Momentive Performance Materials, Inc.
- G. Henkel Corporation, [www.osiproseries.com](http://www.osiproseries.com)
- H. Pecora Corporation, [www.pecora.com](http://www.pecora.com)
- I. Sika Corporation, [www.sikaconstruction.com](http://www.sikaconstruction.com)
- J. Sonneborn, BASF Chemical Company, [www.buildingsystems.basf.com](http://www.buildingsystems.basf.com)
- K. Tremco, Inc. [and Vulkem], RPM Company, [www.tremcosealants.com](http://www.tremcosealants.com).
- L. USG Corporation, [www.usg.com](http://www.usg.com).

2.02 JOINT SEALANT TYPE 1: Low modulus, one part, silicone sealant.

- A. Basis of Design: "790 Silicone Building Sealant", Dow Corning,
  - 1. Do Not Use For: Structural sealant, water immersion, confined space atmospheric cures.
- B. Movement Capability: Plus 100 percent expansion, minus 50 percent compression
- C. Colors: Selected by Architect from manufacturer's range of 11 standard colors.
- D. VOC Content: 50 g/l
- E. Primer - Porous Substrates, Masonry, Cast Stone, Mortar: None.
- F. Primer - Non Porous Substrates, Painted Aluminum: "1200" or "1593", Dow Corning.
- G. Backer Rod: Closed cell, expanded polyethylene.

1. Standard: ASTM C1330 Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.
- H. Bond Breaker Tape: "CRL Bond Breaker Tape", C. R. Laurence Company, [www.crlaurence.com](http://www.crlaurence.com)
- 2.03 JOINT SEALANT TYPE 2: Paintable interior sealant.
- A. Basis of Design: "Tremflex 834", Tremco, Inc. [www.tremcosealants.com](http://www.tremcosealants.com)
  - B. Movement Capability: □12 percent.
  - C. Colors: Selected by Architect from manufacturer's complete range of standard colors.
  - D. VOC Content: =25 g/l
  - E. Primers: Not required for most substrates. Comply with sealant manufacturer's instructions.
  - F. Backer Rod: Closed cell polyethylene.
    1. Standard: ASTM C1330 Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.
  - G. Bond Breaker Tape: "CRL Bond Breaker Tape", C. R. Laurence Company, [www.crlaurence.com](http://www.crlaurence.com)
- 2.04 JOINT SEALANT TYPE 3: Sanitary interior sealant.
- A. Basis of Design: "Tremsil 200" With Fungicide, Tremco Inc., [www.tremcosealants.com](http://www.tremcosealants.com)
  - B. Colors: Selected by Architect from manufacturer's complete range of standard colors.
  - C. VOC Content: =5 g/l
  - D. Primers: Comply with sealant manufacturer's instructions.
  - E. Backer Rod: Closed cell polyethylene.
    1. Standard: ASTM C1330 Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.
  - F. Bond Breaker Tape: "CRL Bond Breaker Tape", C. R. Laurence Company, [www.crlaurence.com](http://www.crlaurence.com)
- 2.05 JOINT SEALANT TYPE 4: Multi part polyurethane, traffic bearing sealant.
- A. Basis of Design: "THC900/901", Tremco, Inc. [www.tremcosealants.com](http://www.tremcosealants.com)
    1. Use Restriction: Not for water immersion.
  - B. Movement Capability: □25 percent.
  - C. Colors: Selected by Architect from manufacturer's complete range of tintable base colors.
  - D. VOC Content: =250 g/l
  - E. Primer - Porous Substrates: "Deckline Primer", Tremco, Inc. [www.tremcosealants.com](http://www.tremcosealants.com)
  - F. Primer - Non Porous Substrates: "TremPrime", Tremco, Inc. [www.tremcosealants.com](http://www.tremcosealants.com)

- G. Backer Rod: Closed cell or reticulated polyethylene.
  1. Standard: ASTM C1330 Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.
- H. Bond Breaker Tape: "CRL Bond Breaker Tape", C. R. Laurence Company, [www.crlaurence.com](http://www.crlaurence.com)

2.06 JOINT SEALANT TYPE 5: PRECOMPRESSED SEALANT TAPE.

- A. Basis of Design: "Seismic Colorseal", Emseal Joint Systems, Ltd., [www.emseal.com](http://www.emseal.com)
- B. Movement Capability:  $\pm$ 50 percent.
- C. Colors: Selected by Architect from manufacturer's range of 26 colors.
- D. Terminations and Transitions: Provide factory fabricated "Universal 90's".
- E. Joint Sealant: Furnished by sealant tape manufacturer and color matched to sealant tape.

2.07 JOINT SEALANT TYPE 6: Precompressed acoustical sealant tape.

- A. Basis of Design: Quiet Joint SHG", Emseal Joint Systems, [www.emseal.com](http://www.emseal.com)
- B. Coated Sides: Three.
- C. Colors: Selected by Architect from manufacturer's range of 26 colors.

PART 3 - EXECUTION

3.01 JOINT SEALANT INSTALLATION:

- A. Comply with manufacturer's instructions and recommendations including, without limitation, environmental limits, substrate temperature, substrate moisture, substrate preparation.
- B. Standard: ASTM C1193 Standard Guide for Use of Joint Sealants.
- C. Joint Sealant Width and Depth: Comply with sealant manufacturer's recommendations:
  1. Joint Width:  $\approx$ 4 times expected joint movement and  $\approx$ 0.25 inch.
  2. Joint Depth: One half of joint width and  $\approx$ 0.375 inch.
- D. Preparation:
  1. Clean and prepare substrates and sealant contact surfaces.
  2. Roughen surfaces to which sealant is adhered to improve bond.
  3. Remove loose and friable substrate materials down to sound materials.
  4. Remove laitance, soil, grease, oil, and all contamination.
- E. Masking: Mask adjacent surfaces to control liquid sealant and primer spillage.
- F. Primer: Comply with manufacturer's instructions and recommendations.
  1. Do not over prime.
  2. Allow primer to dry.
  3. Apply sealant immediately after primer is sufficiently dry.
- G. Backer Rod:
  1. Install backer rods wherever possible, but not for pre-compressed sealant tape.



2. Sealant cross section shall be "hour glass" shape with wide adhesion and thin center.
  3. Control depth of backer rod to control sealant shape and sealant depth thickness.
  4. Control depth of backer rod so compressed sealant does not protrude from joint.
  5. Install backer rods without twisting or distortion.
  6. Do not puncture or damage closed cell back rods to prevent outgassing and sealant bubbles.
- H. Bond Breaker Tape: Where joint depth cannot accommodate backer rod, provide bond breaker tape at back of joint to prevent three side adhesion.
- I. Liquid Joint Sealant Installation:
1. Provide uniform, continuous sealant without air gaps and voids.
  2. Force sealant into joints. Do not drag sealant into joints.
  3. Tool visible sealants to provide smooth, uniform, continuous, slightly concave sealant surfaces.
  4. Do not tool with water, soap solutions, alcohol, or solvents.
  5. Control and manage curing of sealants.
  6. Remove masking and temporary protection.
  7. Remove spilled and excess sealant.
- J. Precompressed Sealant Tape Installation:
1. Remove release agent from silicone facing with sealant tape manufacturer's recommended solvent and clean wipes.
  2. Apply sealant to end of silicone facing.
  3. Remove adhesive release paper and install sealant tape into joint from bottom up.
  4. Do not pull, stretch, or twist sealant tape.
  5. Provide uniform appearance, tape tension, face plane, and face depth.
  6. Form and seal joints as directed by manufacturer.
  7. After sealant tape is fully expanded into joint, provide continuous, tooled, sealant "corner beads" at both edges of sealant tape.
  8. Visually match approved samples.
- K. Weep Holes: Do not seal over weep holes. Do not seal over, then reopen weep holes.
- 3.02 INCOMPATIBLE SEALANTS: Where incompatible sealants intersect:
- A. Provide 0.032 inch thick aluminum septum between the incompatible sealants.
  - B. Adhere both sealants to the aluminum septum.
  - C. Conceal the aluminum septum in the sealant joint.
- 3.03 ADDITIONAL REQUIREMENTS FOR SEALANTS IN CONTACT WITH AIR BARRIERS:
- A. Comply with air barrier manufacturer's Section 072500 Weather Barriers and joint sealant manufacturer's compatibility recommendations and curing recommendations.

END OF SECTION 07 9200

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## SECTION 08 1113 HOLLOW METAL FRAMES

### PART 1 GENERAL

#### 1.01 RELATED DOCUMENTS

- A. Applicable provisions of Bidding Requirements, Contract Requirements in Division 0 and all applicable Division 1 sections.

#### 1.02 SUMMARY

##### A. Section Includes:

1. Standard and custom hollow metal frames.
2. Steel sidelight, borrowed lite and transom frames.
3. Louvers installed in hollow metal doors.
4. Light frames and glazing installed in hollow metal doors.

##### B. Related Sections:

1. Section 042000 "Unit Masonry" for embedding anchors for hollow metal work into masonry construction.
2. Section 081416 "Flush Wood Doors".
3. Section 088100 "Glazing" for glass view panels in hollow metal doors.
4. Section 087100 "Door Hardware".
5. Section 099000 "Paints and Coatings for field painting hollow metal frames.

##### C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.
3. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
5. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.
6. ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
7. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
8. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
9. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus.
10. ANSI/BHMA A156.115 - Hardware Preparation in Steel Doors and Frames.
11. ANSI/SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
12. ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
13. ANSI/NFPA 105: Standard for the Installation of Smoke Door Assemblies.
14. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.

15. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
16. UL 1784 - Standard for Air Leakage Tests of Door Assemblies.

### 1.03 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, hardware reinforcements, profiles, anchors, fire-resistance rating, and finishes.
- B. Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the steel door and frame supplier in order to prepare the doors and frames to receive the finish hardware items.
- C. Shop Drawings: Include the following:
  1. Elevations of each door design.
  2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
  3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
  4. Locations of reinforcement and preparations for hardware.
  5. Details of anchorages, joints, field splices, and connections.
  6. Details of accessories.
  7. Details of moldings, removable stops, and glazing.
  8. Details of conduit and preparations for power, signal, and control systems.
- D. Samples for Verification:
  1. Samples are only required by request of the architect and for manufacturers that are not current members of the Steel Door Institute.

### 1.04 QUALITY ASSURANCE

- A. Source Limitations: Obtain hollow metal doors and frames through one source from a single manufacturer wherever possible.
- B. Quality Standard: In addition to requirements specified, furnish SDI-Certified manufacturer products that comply with ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames".
- C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to UL10C (neutral pressure at 40" above sill) or UL 10C.
  1. Oversize Fire-Rated Door Assemblies Construction: For units exceeding sizes of tested assemblies, attach construction label certifying doors are built to standard construction requirements for tested and labeled fire rated door assemblies except for size.
  2. Temperature-Rise Limit: Where indicated and at vertical exit enclosures (stairwell openings) and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.
  3. Smoke Control Door Assemblies: Comply with NFPA 105.
    - a. Smoke "S" Label: Doors to bear "S" label, and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.
- D. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257. Provide labeled glazing material.

- E. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for installing hollow metal doors and frames and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware.

#### 1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project site storage. Do not use non-vented plastic.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch high wood blocking. Do not store in a manner that traps excess humidity.
  - 1. Provide minimum 1/4-inch space between each stacked door to permit air circulation. Door and frames to be stacked in a vertical upright position.

#### 1.06 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

#### 1.07 COORDINATION

- A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

#### 1.08 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
- B. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

### PART 2 PRODUCTS

#### 2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide steel doors and frames from a SDI Certified manufacturer:
  - 1. CECO Door Products (C).
  - 2. Curries Company (CU).
  - 3. Pioneer Industries (PI).

## 2.02 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.
- C. Frame Anchors: ASTM A 653/A 653M, Commercial Steel (CS), Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

## 2.03 HOLLOW METAL DOORS

- A. General: Provide 1-3/4 inch doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8 and ANSI/NAAMM HMMA 867.
- B. Exterior Doors (Energy Efficient): Face sheets fabricated of commercial quality hot-dipped zinc coated steel that complies with ASTM A924 A60. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model, ANSI/SDI A250.4 for physical performance level, and HMMA 867 for door construction.
  - 1. Design: Flush panel.
  - 2. Core Construction: Foamed in place polyurethane and steel stiffened laminated core with no stiffener face welds, in compliance with HMMA 867 "Laminated Core".
    - a. Provide 22 gauge steel stiffeners at 6 inches on-center internally welded at 5" on-center to integral core assembly, foamed in place polyurethane core chemically bonded to all interior surfaces. No stiffener face welding is permitted.
    - b. Thermal properties to rate at a fully operable minimum U-Factor 0.29 and R-Value 3.4, including insulated door, thermal-break frame and threshold.
    - c. Kerf Type Frames: Thermal properties to rate at a fully operable minimum U-Factor 0.36 and R-Value 2.7, including insulated door, kerf type frame, and threshold.
  - 3. Level/Model: Level 3 and Physical Performance Level A (Extra Heavy Duty), Minimum 16 gauge (0.053 inch - 1.3-mm) thick steel, Model 2.
  - 4. Vertical Edges: Vertical edges to be mechanically interlocked with hairline seam. Beveled Lock Edge, 1/8 inch in 2 inches (3 mm in 50 mm).
  - 5. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel to include a steel closure channel, screw attached, with the web of the channel flush with the face sheets of the door. Plastic or composite channel fillers are not acceptable.
  - 6. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9".
  - 7. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.
- C. Interior Doors: Face sheets fabricated of commercial quality cold rolled steel that complies with ASTM A 1008/A 1008M. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
  - 1. Design: Flush panel.
    - a. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.
  - 2. Level/Model: Level 2 and Physical Performance Level B (Heavy Duty), Minimum 18 gauge (0.042-inch - 1.0-mm) thick steel, Model 2.

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HOLLOW METAL FRAMES

3. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet.
  4. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.
  5. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.
- D. Manufacturers Basis of Design:
1. Curries Company (CU) - Polystyrene Core - 707 Series.
  2. Curries Company (CU) - Energy Efficient - 777 Trio-E Series.

## 2.04 HOLLOW METAL FRAMES

- A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.
- B. Thermal Break Frames: Subject to the same compliance standards and requirements as standard hollow metal frames. Tested for thermal performance in accordance with NFRC 102, and resistance to air infiltration in accordance with NFRC 400. Where indicated provide thermally broken frame profiles available for use in both masonry and drywall construction. Fabricate with 1/16" positive thermal break and integral vinyl weather-stripping.
- C. Exterior Frames: Fabricated of hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60.
1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.
  2. Frames: Minimum 14 gauge (0.067-inch -1.7-mm) thick steel sheet.
  3. Manufacturers Basis of Design:
    - a. Curries Company (CU) - Thermal Break TQ Series.
- D. Interior Frames: Fabricated from cold-rolled steel sheet that complies with ASTM A 1008/A 1008M.
1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.
  2. Frames: Minimum 16 gauge (0.053-inch -1.3-mm) thick steel sheet.
  3. Manufacturers Basis of Design:
    - a. Curries Company (CU) - M Series.
- E. Fire rated frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.
- F. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.

## 2.05 FRAME ANCHORS

- A. Jamb Anchors:
1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, formed from A60 metallic coated material, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
  2. Stud Wall Type: Designed to engage stud and not less than 0.042 inch thick.
- B. Floor Anchors: Floor anchors to be provided at each jamb, formed from A60 metallic coated material, not less than 0.042 inches thick.
- C. Mortar Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.06 LOUVERS only where indicated on door schedule

- A. Metal Louvers: Unless otherwise indicated provide louvers to meet the following requirements.
  - 1. Blade Type: Vision proof inverted V or inverted Y.
  - 2. Metal and Finish: Galvanized steel, 0.040 inch thick, factory primed for paint finish with baked enamel or powder coated finish. Match pre-finished door paint color where applicable.

2.07 LIGHT OPENINGS AND GLAZING

- A. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints at fabricator's shop. Fixed and removable stops to allow multiple glazed lites each to be removed independently. Coordinate frame rabbet widths between fixed and removable stops with the type of glazing and installation indicated.
- B. Moldings for Glazed Lites in Doors and Loose Stops for Glazed Lites in Frames: Minimum 20 gauge thick, fabricated from same material as door face sheet in which they are installed.
- C. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch (16 mm) high unless otherwise indicated. Provide fixed frame moldings and stops on outside of exterior and on secure side of interior doors and frames.
- D. Preformed Metal Frames for Light Openings: Manufacturer's standard frame formed of 0.048-inch-thick, cold rolled steel sheet; with baked enamel or powder coated finish; and approved for use in doors of fire protection rating indicated. Match pre-finished door paint color where applicable.

2.08 FABRICATION

- A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. When shipping limitations so dictate, frames for large openings are to be fabricated in sections for splicing or splining in the field by others.
- B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8.
- C. Hollow Metal Doors:
  - 1. Exterior Doors: Provide optional weep-hole openings in bottom of exterior doors to permit moisture to escape where specified.
  - 2. Glazed Lites: Factory cut openings in doors with applied trim or kits to fit. Factory install glazing where indicated.
  - 3. Astragals: Provide overlapping astragals as noted in door hardware sets in Division 08 Section "Door Hardware" on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted.
  - 4. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge strap for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
- D. Hollow Metal Frames:
  - 1. Shipping Limitations: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.



2. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
    - a. Welded frames are to be provided with two steel spreaders temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be used to size the frame opening.
  3. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
  4. High Frequency Hinge Reinforcement: Provide high frequency hinge reinforcements at door openings 48-inches and wider with mortise butt type hinges at top hinge locations.
  5. Continuous Hinge Reinforcement: Provide welded continuous 12-gauge straps for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
  6. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated for removable stops, provide security screws at exterior locations.
  7. Mortar Guards: Provide guard boxes at back of hardware mortises in frames at all hinges and strike preps regardless of grouting requirements.
  8. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
  9. Jamb Anchors: Provide number and spacing of anchors as follows:
    - a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
      - 1) Two anchors per jamb up to 60 inches high.
      - 2) Three anchors per jamb from 60 to 90 inches high.
      - 3) Four anchors per jamb from 90 to 120 inches high.
      - 4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
    - b. Stud Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
      - 1) Three anchors per jamb up to 60 inches high.
      - 2) Four anchors per jamb from 60 to 90 inches high.
      - 3) Five anchors per jamb from 90 to 96 inches high.
      - 4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
      - 5) Two anchors per head for frames above 42 inches wide and mounted in metal stud partitions.
  10. Door Silencers: Except on weatherstripped or gasketed doors, drill stops to receive door silencers. Silencers to be supplied by frame manufacturer regardless if specified in Division 08 Section "Door Hardware".
  11. Bituminous Coating: Where frames are fully grouted with an approved Portland Cement based grout or mortar, coat inside of frame throat with a water based bituminous or asphaltic emulsion coating to a minimum thickness of 3 mils DFT, tested in accordance with UL 10C and applied to the frame under a 3rd party independent follow-up service procedure.
- E. Hardware Preparation: Factory prepare hollow metal work to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware".
1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
  2. Reinforce doors and frames to receive non-template, mortised and surface mounted door hardware.

3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

## 2.09 STEEL FINISHES

- A. Prime Finishes: Doors and frames to be cleaned, and chemically treated to insure maximum finish paint adhesion. Surfaces of the frame exposed to view to receive a factory applied coat of rust inhibiting shop primer.
  1. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; and compatible with substrate and field-applied coatings.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. General Contractor to verify the accuracy of dimensions given to the steel frame manufacturer for existing openings (strike height, hinge spacing, hinge back set, etc.).
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.02 PREPARATION

- A. Remove welded in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Prior to installation, adjust and securely brace welded hollow metal frames for square, level, twist, and plumb condition.
- C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Frames."
- D. Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.

### 3.03 INSTALLATION

- A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
- B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11 and NFPA 80 at fire rated openings.
  1. Set frames accurately in position, plumbed, leveled, aligned, and braced securely until permanent anchors are set. After wall construction is complete and frames properly set and secured, remove temporary braces, leaving surfaces smooth and undamaged. Shim as necessary to comply with installation tolerances.
  2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.

3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar.
  4. Grout Requirements: Do not grout head of frames unless reinforcing has been installed in head of frame. Do not grout vertical or horizontal closed mullion members.
- C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
1. Non-Fire-Rated Standard Steel Doors:
    - a. Jamb and Head: 1/8 inch plus or minus 1/16 inch.
    - b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
    - c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
    - d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.
  2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
- D. Field Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.
- 3.04 ADJUSTING AND CLEANING
- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.
  - B. Remove grout and other bonding material from hollow metal work immediately after installation.
  - C. Prime-Coat and Painted Finish Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat, or painted finishes, and apply touchup of compatible air drying, rust-inhibitive primer, zinc rich primer or finish paint.

END OF SECTION 081113 08 1113

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SECTION 08 1416  
FLUSH WOOD DOORS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Applicable provisions of Bidding Requirements, Contract Requirements in Division 0 and all applicable Division 1 sections.

1.02 SECTION INCLUDES

- A. Flush wood doors; flush and flush glazed configuration; fire-rated and non-rated.

1.03 RELATED REQUIREMENTS

- A. Related Sections:
  - 1. Section 08 1213 - Hollow Metal Frames.
  - 2. Section 08 7100 - Door Hardware.
  - 3. Section 088100 - Glazing
  - 4. Section 099000 Paints and Coatings

1.04 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials Current Edition.
- B. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass 2018.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2022.
- D. ASTM E336 - Standard Test Method for Measurement of Airborne Sound Attenuation Between Rooms in Buildings 2020.
- E. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition 2014, with Errata (2016).
- F. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards 2021, with Errata.
- G. ICC (IBC) - International Building Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- H. NFPA 80 - Standard for Fire Doors and Other Opening Protectives 2022.
- I. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives 2022.
- J. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies 2022.
- K. UL 10B - Standard for Fire Tests of Door Assemblies Current Edition, Including All Revisions.
- L. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies Current Edition, Including All Revisions.

M. WDMA I.S. 1A - Interior Architectural Wood Flush Doors 2021, with Errata.

#### 1.05 SUBMITTALS

- A. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
- B. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.
  - 1. Provide information as required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).
- C. Samples: Submit two samples of door veneer, 12x12 inch in size illustrating wood grain, stain color, and sheen.
- D. Certificate: Submit labels and certificates required by quality assurance and quality control programs.
- E. Manufacturer's Installation Instructions: Indicate special installation instructions.

#### 1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section, with not less than three years of documented experience.
  - 1. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.
- B. Quality Certification:
  - 1. Provide labels or certificates indicating that the installed work complies with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade or grades specified.
  - 2. Provide designated labels on shop drawings as required by certification program.
  - 3. Provide designated labels on installed products as required by certification program.
  - 4. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.

#### 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Package, deliver and store doors in accordance with specified quality standard.
- B. Accept doors on site in manufacturer's packaging. Inspect for damage.
- C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one week. Break seal on site to permit ventilation.

#### 1.08 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Interior Doors: Provide manufacturer's warranty for the life of the installation.
- C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Wood Veneer Faced Doors:
  - 1. Eggers Industries: /#sle.
  - 2. Graham Wood Doors: [www.grahamdoors.com/#sle](http://www.grahamdoors.com/#sle).
  - 3. Haley Brothers: [www.haleybros.com/#sle](http://www.haleybros.com/#sle).
  - 4. Oregon Door; Architectural Series: [www.oregondoor.com/#sle](http://www.oregondoor.com/#sle).

### 2.02 DOORS AND PANELS

- A. Doors: Refer to drawings for locations and additional requirements.
  - 1. Quality Standard: Custom Grade, Heavy Duty performance, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
  - 2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.
- B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.
  - 1. Provide solid core doors at each location.
  - 2. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with UL 10C - Positive Pressure; Underwriters Laboratories Inc (UL) or Intertek/Warnock Hersey (WHI) labeled without any visible seals when door is open.
  - 3. Wood veneer facing with factory transparent finish as indicated on drawings.

### 2.03 DOOR AND PANEL CORES

- A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated.
- B. Fire-Rated Doors: Mineral core type, with fire resistant composite core (FD), plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.

### 2.04 DOOR FACINGS

- A. Veneer Facing for Transparent Finish: White oak, veneer grade in accordance with quality standard indicated, plain sliced (flat cut), with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face.
  - 1. Vertical Edges: Same species as face veneer.
  - 2. "Running Match" each pair of doors and doors in close proximity to each other.
- B. Facing Adhesive: Type I - waterproof.

### 2.05 DOOR CONSTRUCTION

- A. Fabricate doors in accordance with door quality standard specified.
- B. Cores Constructed with stiles and rails:
  - 1. Provide solid blocks at lock edge for hardware reinforcement.
  - 2. Provide solid blocking for other throughbolted hardware.

- C. Where supplementary protective edge trim is required, install trim after veneer facing has been applied full-width.
- D. Glazed Openings: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
- E. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
- F. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
- G. Provide edge clearances in accordance with the quality standard specified.

#### 2.06 FACTORY FINISHING - WOOD VENEER DOORS

- A. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:
  - 1. Transparent:
    - a. System - 11, Polyurethane, Catalyzed.
    - b. Stain: As selected by Architect from standard options.
    - c. Sheen: Satin.
- B. Finish work in accordance with WDMA I.S. 1A for grade specified and as follows:
  - 1. Transparent:
    - a. System - TR-2, Catalyzed Lacquer.
    - b. Sheen: Flat.
- C. Factory finish doors in accordance with sample to be provided.
- D. Seal door top edge with color sealer to match door facing.

#### 2.07 ACCESSORIES

- A. Hollow Metal Door Frames: As specified in Section 08 1113.
- B. Glazing: As specified in Section 088100.
- C. Glazing Stops: Wood, of same species as door facing, butted corners; prepared for countersink style screws.
- D. Astragals and Edges for Double Doors: Pairs of doors astragals, and door edge sealing and protection devices.
  - 1. UL listed products in compliance with requirements of authorities having jurisdiction.
- E. Door Hardware: As specified in Section 08 7100.

### PART 3 EXECUTION

#### 3.01 EXAMINATION

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



- C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

### 3.02 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions and specified quality standard.
  - 1. Install fire-rated doors in accordance with NFPA 80 requirements.
  - 2. Install smoke and draft control doors in accordance with NFPA 105 requirements.
- B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.
- C. Use machine tools to cut or drill for hardware.
- D. Coordinate installation of doors with installation of frames and hardware.
- E. Coordinate installation of glazing.

### 3.03 TOLERANCES

- A. Comply with specified quality standard for fit and clearance tolerances.
- B. Comply with specified quality standard for telegraphing, warp, and squareness.

### 3.04 ADJUSTING

- A. Adjust doors for smooth and balanced door movement.
- B. Adjust closers for full closure.

### 3.05 SCHEDULE

- A. Refer to Door and Frame Schedule, Drawing \_\_\_\_ "Door and Partition Schedules".

END OF SECTION 08 1416

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## SECTION 08 1433 STILE AND RAIL WOOD DOORS

### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

- A. Wood doors, stile and rail design; non-fire rated.
- B. Panels of wood and glass.
- C. Solid hardwood from quality heavy duty selection

#### 1.02 RELATED REQUIREMENTS

- A. Section 08 1113 - Hollow Metal Doors and Frames.
- B. Section 08 1213 - Hollow Metal Frames.
- C. Section 08 1416 - Flush Wood Doors: Attack-resistant door opening assemblies using stile and rail doors.
- D. Section 08 7100 - Door Hardware.
- E. Section 08 8000 - Glazing.
- F. Section 09 9123 - Interior Painting: Field finishing.
- G. Section 09 9300 - Staining and Transparent Finishing: Field finishing.

#### 1.03 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials Current Edition.
- B. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass 2018.
- C. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass 2019.
- D. ASTM E2112 - Standard Practice for Installation of Exterior Windows, Doors and Skylights 2019c.
- E. AWI (QCP) - Quality Certification Program Current Edition.
- F. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition 2014, with Errata (2016).
- G. AWMAC (GIS) - Guarantee and Inspection Services Program Current Edition.
- H. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards 2021, with Errata.
- I. ICC (IBC) - International Building Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- J. ITS (DIR) - Directory of Listed Products Current Edition.

- K. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives 2022.
- L. UL 1784 - Standard for Air Leakage Tests of Door Assemblies Current Edition, Including All Revisions.
- M. WDMA I.S. 6A - Interior Architectural Wood Stile and Rail Doors 2013.
- N. WI (CCP) - Certified Compliance Program (CCP) Current Edition.

#### 1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Indicate stile and rail 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, and cutouts for glazing.
- D. Samples: Submit two samples of door construction, 6 by 6 inches in size cut from top corner of door.
- E. Certificate: Submit labels and certificates required by quality assurance and quality control programs.
- F. Manufacturer's Installation Instructions: Indicate special installation instructions.
- G. Manufacturer's qualification statement.
- H. Installer's qualification statement.
- I. Warranty, executed in Owner's name.

#### 1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section, with not less than three years of documented experience.
  - 1. Accredited participant in specified certification program prior to commencement of fabrication and throughout duration of project.
- B. Quality Certification:
  - 1. Comply with AWI (QCP) woodwork association quality certification service/program in accordance with requirements for work specified in this section: [www.awiqcp.org/#sle](http://www.awiqcp.org/#sle).
  - 2. Provide labels or certificates indicating that installed work complies with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade or grades specified.
  - 3. Provide designated labels on shop drawings as required by certification program.
  - 4. Provide designated labels on installed products as required by certification program.
  - 5. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.

#### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Package, deliver, and store doors in accordance with quality standard specified.

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

#### 1.07 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Include coverage for warping beyond specified installation tolerances and defective materials.

### PART 2 PRODUCTS

#### 2.01 MANUFACTURERS

- A. Stile and Rail Wood Doors:
  1. Karona, Inc: [www.karonadoor.com/#sle](http://www.karonadoor.com/#sle).
  2. Masonite Architectural; Aspiro Authentic Stile & Rail Doors: [www.architectural.masonite.com/#sle](http://www.architectural.masonite.com/#sle).
  3. VT Industries, Inc: [www.vtindustries.com/#sle](http://www.vtindustries.com/#sle).

#### 2.02 DOORS

- A. Quality Standard: Custom Grade, Heavy Duty performance, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless otherwise indicated.
- B. Interior Doors: 1-3/8 inches thick unless otherwise indicated; solid lumber construction; mortise and tenon joints. Transparent finish as indicated on drawings.

#### 2.03 DOOR AND PANEL FACINGS

- A. Adhesive: Type I - Waterproof.

#### 2.04 DOOR CONSTRUCTION

- A. Factory machine doors for finish hardware in accordance with hardware requirements and dimensions. Do not machine for surface hardware.
- B. Glazed Openings: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
- C. Factory install glazing in doors in compliance with quality standards specified, using manufacturer's standard elastomeric glazing sealant.
- D. Smoke and Draft Control Doors (Indicated as "S" on Drawings): In addition to required fire rating, provide stile and rail door assemblies tested in accordance with UL 1784 with maximum air leakage of 3.0 cfm per sq ft of door opening at 0.10 inch water guage pressure at both ambient and elevated temperatures for 'S' label; if necessary, provide additional gasketing or edge sealing.
- E. Smoke and Draft Control Doors (Indicated as "S" on Drawings): In addition to required fire rating, provide stile and rail door assemblies in compliance with WDMA I.S. 6A requirements for

"S" label; if necessary, provide additional gasketing or edge sealing.

## 2.05 FINISHES

- A. Finish work in accordance with AWI/AWMA/CI (AWS) or AWMA/CI (NAAWS), Section 5 - Finishing for grade specified and as follows:
  - 1. Transparent:
    - a. System - 1, Lacquer, Nitrocellulose.
    - b. Stain: As selected by Architect.
- B. Factory finish doors in accordance with approved sample.

## 2.06 ACCESSORIES

- A. Hollow Metal Door Frames: See Section 08 1113.
- B. Glazed Openings:
  - 1. Heat-Strengthened and Fully Tempered Glass: ASTM C1048.
  - 2. Laminated Safety Glass: Comply with 16 CFR 1201 test requirements for Category II.
  - 3. Glazing: Sealed insulated glazing units with 1 inch overall thickness, and consisting of two 1/4 inch thick panes of glass.
- C. Panel or Glass Retention Molding: Wood of same species as door facing, flat bead stop, with butted corners; prepared for countersink style tamper proof screws.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Do not install doors in frame openings that are not plumb or are out of tolerance for size or alignment.

### 3.02 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions and specified quality standards.
  - 1. Install smoke and draft control doors in accordance with NFPA 105 requirements.
- B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.
- C. Machine cut for hardware.
- D. Coordinate installation of doors with installation of frames and hardware.

### 3.03 TOLERANCES

- A. Comply with specified quality standard for fit, clearance, and joinery tolerances.

3.04 ADJUSTING

- A. Adjust doors for smooth and balanced door movement.
- B. Adjust closers for full closure.

END OF SECTION 08 1433

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## SECTION 08 3100 ACCESS DOORS AND PANELS

### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

- A. Wall mounted hollow metal frame with key lock access units.
- B. Ceiling mounted frameless access units.

#### 1.02 RELATED REQUIREMENTS

- A. Section 08 7100 - Door Hardware: Mortise cylinder and core hardware.
- B. Section 09 9300 - Painting and Coatings: Field paint finish.

#### 1.03 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.

#### 1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.
- C. Shop Drawings: Indicate exact position of each access door and/or panel unit.
- D. Project Record Documents: Record actual locations of each access unit.

#### 1.05 QUALITY ASSURANCE

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

### PART 2 PRODUCTS

#### 2.01 ACCESS DOORS AND PANELS ASSEMBLIES

- A. Wall-Mounted Units with Return Air Grille:
  - 1. Location: As indicated on drawings.
  - 2. Panel Material: Aluminum extrusions with gypsum board inlay.
  - 3. Size: 12 by 12 inches.
- B. Ceiling-Mounted Units with Return Air Grille:
  - 1. Location: As indicated on drawings.
  - 2. Panel Material: Aluminum extrusion with gypsum board inlay.
  - 3. Provide Frameless type for use in GWB ceiling with intergal spakel edge per Basis of Design.
  - 4. Size - Other Ceilings: 36 by 36 inches or as otherwise shown on drawings.

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ACCESS DOORS AND PANELS

5. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.

## 2.02 WALL AND CEILING MOUNTED ACCESS UNITS

### A. Manufacturers:

1. Activar Construction Products Group, Inc. - JL Industries: [www.activarcpg.com/#sle](http://www.activarcpg.com/#sle).
  - a. Concealed-Frame Access Panel: Activar/JL Industries CT.
  - b. Basis of Design model: MODEL TMW™ FLUSH ACCESS PANEL WITH WALLBOARD BEAD with Torax head cam or as otherwise selected from manufacturers standard locking devices.
  - c. Or approved equal by the following manufacturers:
2. Babcock-Davis: [www.babcockdavis.com/#sle](http://www.babcockdavis.com/#sle).
3. Bauco Access Panel Solutions Inc: [www.accesspanelsolutions.com/#sle](http://www.accesspanelsolutions.com/#sle).
  - a. Concealed Hardware and Gypsum Board Inlay: Bauco Plus II - Access Panels.
  - b. Circular with Concealed Hardware and Gypsum Board Inlay: Bauco Rondo - Circular Access Panels for Drywall.
4. Cendrex, Inc: [www.cendrex.com/#sle](http://www.cendrex.com/#sle).
  - a. Concealed Flange and Latch Units: Cendrex CTR-MAG.

### B. Wall and Ceiling Mounted Units: Factory fabricated door and frame, fully assembled units with corner joints welded, filled and ground flush; square and without rack or warp; coordinate requirements with type of installation assembly being used for each unit.

1. Style: Frameless UNO on drawings.
2. Door Style: Single thickness with rolled or turned in edges.
3. For only indicated units: Primed and Factory Finish: Polyester powder coat; color as selected by Architect from manufacturer's standard colors.
4. Door/Panel Size: As indicated on the drawings.
5. Hardware:
  - a. Hinges for Non-Fire-Rated Units: Concealed, constant force closure spring type.
  - b. Latch/Lock: Cylinder lock-operated cam latch, two keys for each unit.
    - 1) Mortise cylinder and core as specified in Section 08 7100.

## 2.03 WALL AND CEILING MOUNTED ACCESS UNITS WITH RETURN AIR GRILLES

### A. Gypsum Board Inlay Access Panels: Provide rectangular and square access panel with recessed and gasketed aluminum perimeter frame that acts as finishing edge and having concealed mechanical touch-latch with safety cable and free-pivoting hinge.

1. Rectangular Panel Frame Size: 24 by 36 inches set within 1/2 inch thick gypsum board.
2. Square Panel Frame Size: 24 by 24 inches set within 1/2 inch thick gypsum board.
3. Panel Frame: 1 inch margin with concealed countersunk screw mounting.

### B. Air Return Grille: Linear bar grille fitted with flush and concealed perimeter frame.

1. Grille: Fixed grilles with 1/4 inch thick by 5/8 inch deep bars at 1/2 inch on center providing 48 percent free space opening.
2. Grille Size: 12 by 12 inches set within 1/2 inch thick gypsum board.
3. Fabrication: Aluminum with factory powder coated finish.
4. Grille Frame: 1 inch margin with concealed countersunk screw mounting.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that rough openings are correctly sized and located.  
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- B. Begin installation only after substrates have been properly prepared, and if the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to proceeding with this work.
- B. Prepare surfaces using methods recommended by manufacturer for applicable substrates in accordance with project conditions.

3.03 INSTALLATION

- A. Install units in accordance with manufacturer's instructions.
- B. Install frames plumb and level in openings, and secure units rigidly in place.
- C. Position units to provide convenient access to concealed equipment when necessary.

END OF SECTION 08 3100

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SECTION 08 4113  
ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 GENERAL

1.01 Related Documents

- A. Applicable provisions of Bidding Requirements, Contract Requirements in Division 0 and all applicable Division 01 sections.
- B. Refer to Alternates and performance requirements.

1.02 Summary

- A. Section Includes: Architectural Dark Bronze Thermally Broken Aluminum Framed Insulated Safety Glass Main Entry Replacement Doors as indicated on drawings for Library.
- B. Related Sections:
  - 1. 079200 "Joint Sealants"
  - 2. 087100 "Door Hardware"
  - 3. 088100 "Glazing"

1.03 Definitions

- A. Definitions: For fenestration industry standard terminology and definitions refer to American Architectural Manufacturers Association (AAMA) - AAMA Glossary (AAMA AG).

1.04 Performance Requirements

- A. Storefront System Performance Requirements:
  - 1. Wind loads: Provide storefront system; include anchorage, capable of withstanding wind load design pressures. The design pressures are based on the latest Building Code.
  - 2. Air Infiltration: The test specimen shall be tested in accordance with ASTM E 283. Air infiltration rate shall not exceed 0.06 cfm/ft<sup>2</sup> (0.3 l/s · m<sup>2</sup>) at a static air pressure differential of 6.24 psf (300 Pa).
  - 3. Water Resistance: The test specimen shall be tested in accordance with ASTM E 331. There shall be no leakage at a minimum static air pressure differential of 8 psf (383 Pa) as defined in AAMA 501.
  - 4. Uniform Load: A static air design load of 20 psf (958 Pa) shall be applied in the positive and negative direction in accordance with ASTM E 330. There shall be no deflection in excess of L/175 of the span of any framing member. At a structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2% of their clear spans shall occur.
  - 5. Delegated Design: Design glazed aluminum framed system, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
  - 6. Thermally Broken and compliant code and able to pass comcheck.
- B. Environmental Product Declarations (EPD): Shall have a Type III Product-Specific EPD created from a Product Category Rule.
- C. Recycled Content: Provide documentation indicating postconsumer recycled content plus one-half preconsumer recycled content.

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ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

- D. VOC Emissions for Sealants: Provide certificate of compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario.
- E. VOC Content for Sealants: Provide documentation of compliant VOC content for SCAQMD Rule 1168.

#### 1.05 Submittals

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, hardware, finishes, and installation instructions for each type of aluminum-framed storefront system indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, hardware, and attachments to other work, operational clearances and installation details.
- C. Samples for Initial Selection: For units with factory-applied color finishes including samples of hardware and accessories involving color selection.
- D. Samples for Verification: For aluminum-framed storefront system and components required.
- E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency for each type of aluminum-framed storefront.
- F. Fabrication Sample: Of each vertical-to-horizontal intersection of aluminum-framed systems, made from 12" (304.8 mm) lengths of full-size components and showing details of the following:
  - 1. Joinery, including concealed welds.
  - 2. Anchorage.
  - 3. Expansion provisions.
  - 4. Glazing.
  - 5. Flashing and drainage.
- G. Other Action Submittals:
  - 1. Entrance Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

#### 1.06 Quality Assurance

- A. Installer Qualifications: An installer which has had successful experience with installation of the same or similar units required for the project and other projects of similar size and scope.
- B. Manufacturer Qualifications: A manufacturer capable of providing aluminum-framed storefront system that meet or exceed performance requirements indicated and of documenting this performance by inclusion of test reports, and calculations.
- C. Source Limitations: Obtain aluminum-framed storefront system through one source from a single manufacturer.
- D. Product Options: Drawings indicate size, profiles, and dimensional requirements of aluminum-framed storefront system and are based on the specific system indicated. Refer to Division 01 Section "Product Requirements." Do not modify size and dimensional requirements.
  - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory

data to Architect for review.

- E. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination".

#### 1.07 Project Conditions

- A. Field Measurements: Verify actual dimensions of aluminum-framed storefront openings by field measurements before fabrication and indicate field measurements on Shop Drawings.

#### 1.08 Warranty

- A. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty.
  - 1. Warranty Period: Two (2) years from Date of Substantial Completion of the project provided however that the Limited Warranty shall begin in no event later than six months from date of shipment by manufacturer.

### PART 2 PRODUCTS

#### 2.01 Manufacturers

- A. Basis-of-Design Product:
  - 1. Kawneer Company Inc.
  - 2. Trifab™ VG 451T Framing System (Thermally broken, 2" Sightline)
  - 3. System Dimensions: 2" x 4-1/2" (50.8 mm x 114.3 mm) and as indicated on drawings
  - 4. Glass: Front Plane
- B. Subject to compliance with requirements, provide a comparable product by the following:
  - 1. EFCO Corporation, [www.efco.com](http://www.efco.com).
  - 2. Oldcastle Building Envelope, [www.obe.com](http://www.obe.com).
  - 3. Or Approved Equal.

#### 2.02 Materials

- A. Aluminum Extrusions: Alloy and temper recommended by aluminum storefront manufacturer for strength, corrosion resistance, and application of required finish and not less than 0.070" (1.8 mm) wall thickness at any location for the main frame and complying with ASTM B 221: 6063-T6 alloy and temper.
  - 1. Recycled Content: Shall have a minimum of 50% mixed pre- and post-consumer recycled content.
    - a. Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
    - b. Indicate relative dollar value of recycled content product to total dollar value of product included in project.
    - c. Indicate location recovery of recycled content.
    - d. Indicate location of manufacturing facility.
- B. Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with aluminum framing members, trim hardware, anchors, and other components.
- C. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.

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ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

- D. Reinforcing Members: Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
- E. Sealant: For sealants required within fabricated storefront system, provide permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.
- F. Tolerances: Reference to tolerances for wall thickness and other cross-sectional dimensions of storefront members are nominal and in compliance with AA Aluminum Standards and Data.
- G. Red List Free: All parts and materials comply with the Living Building Challenge/DECLARE Red List and the Cradle-to-Cradle (C2C) Banned List.
  - 1. PVC free
  - 2. Neoprene free

#### 2.03 Storefront Framing System

- A. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- B. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials. Where exposes shall be stainless steel.
- C. Perimeter Anchors: When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.
- D. Packing, Shipping, Handling and Unloading: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- E. Storage and Protection: Store materials protected from exposure to harmful weather conditions. Handle storefront material and components to avoid damage. Protect storefront material against damage from elements, construction activities, and other hazards before, during and after storefront installation.

#### 2.04 Glazing Systems

- A. Glazing: As specified in Section 088100 "Glazing".
- B. Glazing Gaskets: Manufacturer's standard compression types; replaceable, extruded EPDM rubber.
- C. Spacers and Setting Blocks: Manufacturer's standard elastomeric type.
- D. Bond-Breaker Tape: Manufacturer's standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.
- E. Glazing Sealants: For structural-sealant-glazed systems, as recommended by manufacturer for joint type, and as follows:
  - 1. Structural Sealant: ASTM C 1184, single-component neutral-curing silicone formulation that is compatible with system components with which it comes in contact, specifically formulated and tested for use as structural sealant and approved by a structural-sealant manufacturer for use in aluminum-framed systems indicated.
    - a. Color: Black



2. Weatherseal Sealant: ASTM C 920 for Type S, Grade NS, Class 25, Uses NT, G, A, and O; single-component neutral-curing formulation that is compatible with structural sealant and other system components with which it comes in contact; recommended by structural-sealant, weatherseal-sealant, and aluminum-framed-system manufacturers for this use.
  - a. Color: Matching structural sealant.

## 2.05 Entrance Door Systems

- A. Entrance Doors: As specified in Section 084113 "Aluminum-Framed Entrances and Storefronts".
- B. Entrance Door Hardware: As specified in Section 087100 "Door Hardware".

## 2.06 Accessory Materials

- A. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Section 079200 "Joint Sealants".

## 2.07 Fabrication

- A. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:
  1. Profiles that are sharp, straight, and free of defects or deformations.
  2. Accurately fit joints; make joints flush, hairline and weatherproof.
  3. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.
  4. Physical and thermal isolation of glazing from framing members.
  5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
  6. Provisions for field replacement of glazing.
  7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- B. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.
- C. Structural-Sealant-Glazed Framing Members: Include accommodations for using temporary support device to retain glazing in place while structural sealant cures.
- D. Storefront Framing: Fabricate components for assembly using manufacturer's standard installation instructions.
- E. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

## 2.08 Aluminum Finishes

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. Factory Finishing:
  1. Kawneer Permanodic™ AA-M10C21A44 / AA-M45C22A44, AAMA 611, Architectural Class I Color Anodic Coating, Color: #40 Dark Bronze.

## PART 3 EXECUTION

### 3.01 Examination

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work. Verify rough opening dimensions, levelness of sill plate and operational clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weather tight aluminum- framed storefront system installation.
  - 1. Masonry Surfaces: Visibly dry and free of excess mortar, sand, and other construction debris.
  - 2. Wood Frame Walls: Dry, clean, sound, well nailed, free of voids, and without offsets at joints. Ensure that nail heads are driven flush with surfaces in opening and within 3 inches (76 mm) of opening.
  - 3. Metal Surfaces: Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.
  - 4. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.02 Installation

- A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing aluminum-framed storefront system, accessories, and other components.
- B. Install aluminum-framed storefront system level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.
- C. Set sill members in bed of sealant or with gaskets, as indicated, for weather tight construction.
- D. Install aluminum-framed storefront system and components to drain condensation, water penetrating joints, and moisture migrating within aluminum-framed storefront system to the exterior.
- E. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

### 3.03 Field Quality Control

- A. Field Tests: Architect shall select storefront units to be tested as soon as a representative portion of the project has been installed, glazed, perimeter caulked and cured. Conduct tests for air infiltration and water penetration with manufacturer's representative present. Tests not meeting specified performance requirements and units having deficiencies shall be corrected as part of the contract amount.
  - 1. Testing: Testing shall be performed by a qualified independent testing agency. Refer to Testing Section for payment of testing and testing requirements. Testing Standard per AAMA 503, including reference to ASTM E 783 for Air Infiltration Test and ASTM E 1105 Water Infiltration Test.
    - a. Air Infiltration Tests: Conduct tests in accordance with ASTM E 783. Allowable air infiltration shall not exceed 1.5 times the amount indicated in the performance requirements or 0.09 cfm/ft<sup>2</sup>, whichever is greater.
    - b. Water Infiltration Tests: Conduct tests in accordance with ASTM E 1105. No uncontrolled water leakage is permitted when tested at a static test pressure of

two-thirds the specified water penetration pressure but not less than 6.24 psf (300 Pa).

- B. Manufacturer's Field Services: Upon Owner's written request, provide periodic site visit by manufacturer's field service representative.

3.04 Adjusting, Cleaning, And Protection

- A. Clean aluminum surfaces immediately after installing aluminum-framed storefronts. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
- B. Clean glass immediately after installation. Comply with glass manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels, and clean surfaces.
- C. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

END OF SECTION 084113 08 4113

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## SECTION 08 5113 ALUMINUM WINDOWS

### PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS

- A. Applicable provisions of Bidding Requirements, Contract Requirements in Division 0 and all applicable Division 01 sections.

#### 1.02 SUMMARY

- A. Section Includes: Architectural Aluminum Windows including perimeter trims, stools, accessories, shims and anchors, and perimeter sealing of window units.
  - 1. Types of aluminum windows include:
    - a. Thermal
    - b. Fix and Operable as indicated on drawings
- B. Related Sections:
  - 1. Division 5 for Security Screens
  - 2. 079200 "Joint Sealants" for joint sealants installed as part of the aluminum sliding door system
  - 3. 084113 "Aluminum-Framed Entrances and Windows"
  - 4. 088100 "Glazing"

#### 1.03 DEFINITIONS

- A. Performance class designations according to AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS):
  - 1. AW: Architectural Window
- B. Performance grade number according to AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS):
  - 1. Design pressure number in pounds force per square foot used to determine the structural test pressure and water test pressure.
- C. Structural Test Pressure: For uniform load structural test, is equivalent to 150 percent of the design pressure.
- D. Definitions: For fenestration industry standard terminology and definitions refer to American Architectural Manufacturers Association (AAMA) - AAMA Glossary (AAMA AG).
- E. Minimum Test Size: Smallest gateway test size permitted for performance class. Products must be tested at minimum test size or at a size larger than minimum test size to comply with requirements for performance class.

#### 1.04 PERFORMANCE REQUIREMENTS

- A. General: Provide aluminum windows capable of complying with performance requirements indicated, based on testing manufacturer's windows that are representative of those specified, and that are of minimum test size indicated below:
  - 1. Size required by AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS) for minimum gateway performance.

- B. Structural Performance: Provide aluminum windows capable of withstanding the effects of the following loads, based on testing units representative of those indicated for the Project that pass AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS), Uniform Load Structural Test:
  - 1. Design Wind Loads: Door shall be designed to withstand wind loads as noted on structural drawings.
  - 2. Deflection: Design glass framing system to limit lateral deflections of glass edges to less than 1/175 of glass-edge length or 3/4 inch (19 mm), whichever is less, at design pressure based on testing performed according to AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS), Uniform Load Deflection Test or structural computations.
- C. Thermal Movements: Provide aluminum windows, including anchorage, that allow for thermal movements resulting from the following maximum change allowed in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
- D. Recycled Content: Provide documentation indicating post-consumer recycled content plus one-half preconsumer recycled content.
- E. VOC Emissions for Sealants: Provide certificate of compliance with California Department of Public Health (CDPH) Standard Method v1.1 – 2010, using the applicable exposure scenario.
- F. VOC Content for Sealants: Provide documentation of compliant VOC content for SCAQMD Rule 1168.

#### 1.05 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, fabrication methods, dimensions of individual components and profiles, hardware, finishes, and operating instructions for each type of aluminum window indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, hardware, attachments to other work, operational clearances and installation details.
- C. Samples for Initial Selection: For units with factory-applied color finishes including samples of hardware and accessories involving color selection.
- D. Samples for Verification: For aluminum windows and components required.
- E. Product Schedule: For aluminum windows. Use same designations indicated on Drawings.
- F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency for each type, class, grade, and size of aluminum window. Test results based on use of downsized test units will not be accepted.
- G. Maintenance Data: For operable sash, operating hardware and finishes to be include in maintenance manuals.

#### 1.06 QUALITY ASSURANCE

- A. Installer Qualifications: An installer which has had successful experiences with installation of the same or similar units required for this project and other projects of similar size and scope.
- B. Manufacturer Qualifications: A manufacturer capable of fabricating aluminum windows that meet or exceed performance requirements indicated and of documenting this performance by inclusion of test reports, and calculations.

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- C. Source Limitations: Obtain aluminum windows through one source from a single manufacturer.
- D. Product Options: Drawings indicate size, profiles, and dimensional requirements of aluminum windows and are based on the specific system indicated. Refer to Division 01 Section "Product Requirements." Do not modify size and dimensional requirements.
  - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- E. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

#### 1.07 PROJECT CONDITIONS

- A. Field Measurements: Verify aluminum window openings by field measurements before fabrication and indicate measurements on Shop Drawings.

#### 1.08 WARRANTY

- A. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty.
  - 1. Warranty Period: Two (2) years from Date of Substantial Completion of the project provided however that the Limited Warranty shall begin in no event later than six months from date of shipment by manufacturer.

### PART 2 PRODUCTS

#### 2.01 MANUFACTURERS

- A. Basis-of-Design Product:
  - 1. Winco Window Co., 6200 Maple Ave., St. Louis, MO 63130-3305. ASD. Toll Free: 800-525-8089. Tel: 314-725-8088. Fax: 314-725-1419. Web: [www.wincowindow.com](http://www.wincowindow.com).
  - 2. Winco Windows Products used:
    - a. Winco Heavy Commercial Thermally Improved Windows as indicated on drawings and the following:
    - b. 1450S Series 4" Thermal Fixed (Profile: Offset Double Hung)
    - c. 1550 PI Thermal Double Leaf (Butterfly) Inswing Casement (Fixed)
    - d. WINCO: Windows, Receptors, Vertical Mullions, Sill Extenders, Snap Trim and Sculptured Snap Trim with profiles as indicated on drawings as manufactured by Winco Windows.
  - 3. Performance requirements: Provide complete system with all components and configurations indicated on drawings which are in accordance with historic preservation intent as approved by the Philadelphia Historical Commission; these may include custom trim items.
- B. Subject to compliance with requirements, provide a complete system of a comparable product by the following and only if basis of design products are not readily available:
  - 1. Graham Windows, Graham Architectural Products; [grahamwindows.com](http://grahamwindows.com)
- C. Substitutions: Refer to Substitutions Section for procedures and submission requirements.
  - 1. Pre-Contract (Bidding Period) Substitutions: Submit written requests ten (10) days prior to bid date.
  - 2. Post-Contract (Construction Period) Substitutions: Submit written request in order to avoid window installation and construction delays.

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ALUMINUM WINDOWS

3. Product Literature and Drawings: Submit product literature and drawings modified to suit specific project requirements and job conditions.
  4. Certificates: Submit certificate(s) certifying substitute manufacturer (1) attesting to adherence to specification requirements for window system performance criteria, and (2) has been engaged in the design, manufacturer and fabrication of aluminum windows for a period of not less than ten (10) years. (Company Name)
  5. Test Reports: Submit test reports verifying compliance with each test requirement required by the project.
  6. Samples: Provide samples of typical product sections and finish samples in manufacturer's standard sizes.
- D. Substitution Acceptance: Acceptance will be in written form, either as an addendum or modification, and documented by a formal change order signed by the Owner and Contractor.

## 2.02 MATERIALS

- A. Aluminum Extrusions: Alloy and temper recommended by aluminum window manufacturer for strength, corrosion resistance, and application of required finish and not less than 0.070" wall thickness at any location for the main frame and sash members.
  1. Recycled Content: Provide documentation indicating post-consumer recycled content plus one-half pre-consumer recycled content.
- B. Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with aluminum window members, trim, hardware, anchors, and other components.
- C. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated.
- D. Reinforcing Members: Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated.
- E. Sliding-Type Weather Stripping: Provide woven-pile weather stripping of wool, polypropylene, or nylon pile and resin-impregnated backing fabric. Comply with AAMA 701/702.
  1. Weather Seals: Provide weather stripping with integral barrier fin or fins of semi-rigid, polypropylene sheet or polypropylene-coated material. Comply with AAMA 701/702.
- F. Sealant: For sealants required within fabricated windows, provide window manufacturer's standard, permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.
  1. VOC Emissions for Sealants: Provide certificate of compliance with California Department of Public Health (CDPH) Standard Method v1.1 – 2010, using the applicable exposure scenario.

## 2.03 ALUMINUM CLAD OVER EXISTING AND NEW WOOD FRAME WINDOW

- A. Acceptable Product:
  1. Winco 1450S Series: 4 inch Heavy Commercial Thermally Improved Window.
- B. Performance: AAMA/WDMA/CSA 101/I.S.2/A440.
  1. Architectural Window: AW-100.
  2. Heavy Commercial: HC-100.
  3. Water Resistance, ASTM E 331: 12 psf (575 Pa).



4. Water Resistance, ASTM E 547: 12 psf (575 Pa) for AW rated windows.
5. Air Infiltration, ASTM E 283 at static air pressure of 6.24 psf: 0.03 cfm/sf.
6. Uniform Load Structural Test, ASTM E 330: 120 psf (5748 Pa).
7. Forced Entry Resistance, ASTM F 588: Grade 10.
8. Condensation Resistance Factor (CRF), AAMA 1503.1: Frame: 68.
9. Thermal Performance ("U" Value), AAMA 1503.1: 0.45 BTU/Hr-F°-Ft².
10. Blast Resistant: Provide a complete blast resistant window assembly meeting UFC 4-010-01.
11. Provide impact resistant window assembly meeting either FBC 2007 – HVHZ Protocols; or ASTM E1886 and ASTM E1996 (Level D or E) Protocols

C. Frame: Thermally broken.

1. Wall Thickness: 0.125 inches (3.2 mm).
2. Depth: 4 inches (102 mm).
3. Corners: Closely fit and mechanically fastened with screws. Must be sealed using AAMA approved sealants in a multi-step process to provide sealant redundancy.
4. Bevel: Integral bevel on glazing leg or glazing bead

D. Ventilator and Access Sash: Thermally broken.

1. Wall Thickness: 0.125 inches (3.2 mm).
2. Ventilator Depth: 2 inches (51 mm).
3. All vent extrusions shall be tubular on all 4 sides.
4. Corners: Mitered and mechanically fastened with screws. Joinery is sealed with small joint sealant.
5. Each vent shall have two rows of Santoprene® weather stripping installed in a specifically designed weather strip pocket for the extrusion.
6. Bevel: Integral bevel on glazing leg or glazing bead

E. Weather Strip

1. All weather strips shall be double Santoprene® thermoplastic rubber or equal.

F. Thermal Barrier

1. Poured-in-place structural thermal barrier shall transfer during bending and provide composite action between frame components.
2. Thermal barrier pocket on aluminum extrusions shall be Azo-Braded to create a mechanical lock to improve the adhesion properties between the polyurethane polymer and the surface of the thermal barrier pocket.
3. Window manufacturer must provide a warranty from the manufacturer of the polyurethane thermal barrier that warrants against product failure as a result of thermal shrinkage beyond 1/8 inch (3.2 mm) from each end and fracturing of the polyurethane for a period not to exceed ten years from the date of window manufacture.
4. Thermal barriers made of crimped in place polyamide (insulbar®) strips are not acceptable unless all strips are covered and tooled with Dow 795 silicone caulking to climate water migration.

## 2.04 WINDOW

A. Window Type: Fixed with operable casement or as otherwise indicated on drawings and in Window Schedule.

B. Performance Requirements: Provide aluminum windows of performance indicated that comply with AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS)

1. Performance Class and Grade: XO/OX: AW-PG40-HS

- C. Condensation-Resistance Factor (CRF): Provide aluminum windows tested for thermal performance according to AAMA 1503, with a CRF not less than Single Slide: 76 (frame) and 77 (glass) or Double Slide: 69 (frame) and 77 (glass).
  - D. Temperature Index (I): Provide aluminum windows tested for thermal performance according to CSA-A440 with a Temperature Index not less than Single Slide: 57 (frame) and 73 (glass) or Double Slide: 36 (frame) and 74 (glass).
  - E. Energy Efficiency:
    - 1. Thermal Transmittance: Provide aluminum windows tested for thermal performance according to AAMA 1503.
      - a. Provide aluminum windows tested for thermal performance according to AAMA 1503, with a thermal transmittance (U-factor) no more than Single Slide: 0.25 BTU/hr/sf/°F or Double Slide: 0.28 BTU/hr/sf/°F.
      - b. Provide aluminum windows simulated for thermal performance according to AAMA 507 and NFRC 100 with a thermal transmittance (U-factor) range of; Single Slide: 0.23 to 0.38 BTU/hr/sf/°F or Double Slide: 0.25 to 0.39 BTU/hr/sf/°F (Based on center of glass U-factor range 0.10 to 0.32 for triple glazing).
    - 2. Solar Heat-Gain Coefficient (SHGC): Provide aluminum windows with a whole-window SHGC as determined according to NFRC 200 and AAMA 507 procedures.
  - F. Air Infiltration: Maximum rate not more than indicated when tested according to AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS), Air Infiltration Test.
    - 1. Maximum Rate: 0.3 cfm/sq. ft. (0.5 L/s•m<sup>2</sup>) of area at an inward test pressure of 6.24 lbf/sq. ft. (300 Pa) in accordance with ASTM E283.
  - G. Water Resistance: No water leakage as defined in AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS) referenced test methods at a water test pressure equaling that indicated, when tested according to ASTM E547 and ASTM E331.
    - 1. Test Pressure: XO/OX and XX; 20 percent of positive design pressure, but not more than 10 lbf/sq. ft. (478 Pa).
  - H. Forced-Entry Resistance: Comply with Performance Grade 10 requirements when tested according to ASTM F 588.
  - I. Life-Cycle Testing: Test according to AAMA 910 and comply with AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS).
  - J. Operating Force and Auxiliary (Durability) Tests: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS) for operating window types indicated.
  - K. Sound Transmission Class (STC) and Outdoor-Indoor Transmission Class (OITC): When tested to AAMA Specification 1801 and in accordance with ASTM E1425 and ASTM E90, the STC and OITC Rating shall not be less than:
    - 1. XO UNIT = 32 (STC) and 26 (OITC)
  - L. Environmental Product Declarations (EPD): Provide a Type III Product-Specific EPD created from a Product Category Rule specific to North America.
- 2.05 TRIM AND PANS
- A. Provide trim, pans and all other items as indicated on Drawings.
  - B. Sub Frame and Closure Plate.
  - C. Sill Starter.

- D. Winco Sills: as indicated on drawings inches (as indicated on drawings mm).
- E. Sub-Sill: as indicated on drawings Series.
- F. Sill Extension: as indicated on drawings inches (as indicated on drawings mm).
- G. PVC Comp. Channel (Frame Filler): For as indicated on drawings inch (as indicated on drawings mm) frame depth.
- H. Strap Anchor.
- I. Snap Cover: Part # as indicated on drawings.
- J. Base Clip: Part # as indicated on drawings.
- K. Replacement Pan Systems:
  - 1. Pan Head, Jamb and Sill: Part # as indicated on drawings.
  - 2. Pan Head and Jamb: For use with Part # as indicated on drawings.
  - 3. Pan Extender: For use with Part # as indicated on drawings.
  - 4. Pan Sill: For use with Part # as indicated on drawings.
  - 5. Pan Sill: Part #as indicated on drawings.
  - 6. Pan Jamb: Part # as indicated on drawings.
  - 7. Pan Head: Part # as indicated on drawings.
  - 8. Multi-Purpose Pan: Part # as indicated on drawings.

## 2.06 SCREENS

- A. Frame: Extruded aluminum, 6063-T6 alloy and temper.
  - 1. Screen mounting holes shall be pre-drilled at the factory
- B. Screen Fabric: 0.011 inch (0.2194 mm) diameter 5154 alloy wire woven in 18 x 16 mesh.
  - 1. Color: Charcoal anodized.
- C. Screen Fabric: 0.009 inch (0.2286 mm) diameter stainless steel wire woven in 18 x 16 mesh.

## 2.07 BLINDS

- A. Head Rail: 1.085 inch wide by 0.875 inch high by 0.050 inch thick (27 mm by 22 mm by 1.3 mm).
- B. Bottom Rail: 1 inch wide by 0.355 inch high by 0.050inch thick (25 mm by 9 mm by 1.3 mm).
- C. Rail Material: 6063-T5 extruded aluminum alloy and temper with a baked on polyester powder coat finish conforming to AAMA 603.8-1985.
- D. Ladder Cord Locations: Shall not exceed 6 inches (152 mm) from end of the slot or 24 inches (610 mm) apart.
- E. Tilt Control: Tilt control knob shall have slip feature to minimize damage due to over tilting of blind.
- F. Tilt Control: Provide angled tilt control knobs.
- G. Knobs: Provide removable key operated knobs.
- H. Knobs: Provide Low Profile knobs.

- I. Knobs: Provide Thumb turn knobs.

## 2.08 MULLIONS AND GRIDS

- A. Mullion:
  - 1. Non-Thermal Mullion: Part #as indicated on drawings.
  - 2. Thermal Mullion: Part # as indicated on drawings.
  - 3. Provide mullions as indicated on Drawings.
- B. Window Depth: as indicated on drawings inches (as indicated on drawings mm).
- C. Winco Window Series: types as indicated on drawings and glazing per Glazing Section 088100.
  - 1. Note: special translucent glazing for one unit as indicated on drawings.
- D. Stack:
  - 1. Vertical.
  - 2. Horizontal.
- E. Non-Removable Grid Frames:
  - 1. Non-Sloped: as indicated on drawings.
  - 2. Sloped: as indicated on drawings.
  - 3. Sculptured: as indicated on drawings.
  - 4. Hurricane Glazed: as indicated on drawings.
  - 5. Integral Bevel.

## 2.09 FINISH

- A. Anodic Finish: All exposed areas of aluminum windows and components shall receive a two-step finish: clear anodize components, then color coat with electrostatically deposited finish:
  - 1. Color: To be selected by the Architect from the manufacturer's standard colors.
  - 2. Color: As noted in the Window Schedule.
  - 3. Color: A44, Class I color anodized at 0.7 mils or greater in accordance with AAMA 611-98 (WINCO Finish 111 Light Bronze, 112 Medium Bronze or 113 Dark Bronze, 115 Black).
- B. Paint Finish: Finish all exposed areas of aluminum windows and components with the following:
  - 1. 70 percent Kynar in accordance with AA-M12-C42-R1X, AAMA 2605-98
  - 2. 50 percent Kynar in accordance with AA-M12-C42-R1X, and AAMA 2604-98.
  - 3. Color: To be selected by the Architect from the manufacturer's standard colors.
  - 4. Color: As noted in the Window Schedule.
  - 5. Color: As indicated on drawings.

## 2.10 GLAZING

- A. Glass and Glazing Materials: Refer to Division 08 Section "Glazing" for glass units and glazing requirements applicable to glazed aluminum window units.
- B. Glazing System: Glazing method shall be a wet/dry type in accordance with manufacturer's standards. Exterior glazing shall be silicone back bedding sealant. Interior glazing shall be snap-in type glazing beads with an interior gasket in accordance with AAMA 702 or ASTM C864.
- C. Glazing: All units shall be factory glazed with butyl tape, silicone cap bead on the exterior, with glazing vinyl and extruded snap-in aluminum glazing bead on the interior.

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ALUMINUM WINDOWS

## 2.11 HARDWARE

- A. General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, or other corrosion-resistant material compatible with aluminum; designed to smoothly operate, tightly close, and securely lock aluminum windows, and sized to accommodate sash weight and dimensions.
- B. Horizontal Sliding Windows: Provide the following operating hardware:
  - 1. Handle: Continuous, integral pulls.
  - 2. Sash Locks.
  - 3. Composite adjustable tandem roller.
  - 4. Stainless Steel roller track.
  - 5. Standard auto lock.
  - 6. Limit device.
  - 7. Optional Sash Lock: Spring-loaded, snap-type lock on bottom rail of lower sash.
  - 8. Limit Device: Sash stop limit device; for bottom sash located at jamb; two per sash.

## 2.12 INSECT SCREENS

- A. General: Design windows and hardware to accommodate screens in a tight-fitting, removable arrangement, with a minimum of exposed fasteners and latches. Fabricate insect screens to fully integrate with window frame. Locate screens on outside of window and provide for each operable exterior sash.
  - 1. Comply with SMA 1004, "Specifications for Aluminum Tubular Frame Screens for Windows," for minimum standards of appearance, fabrication, attachment of screen fabric, hardware, and accessories unless more stringent requirements are indicated.
- B. Aluminum Insect Screen Frames: Manufacturer's standard aluminum alloy complying with SMA 1004. Fabricate frames with mitered or coped joints or corner extrusions, concealed fasteners and removable PVC spline.
  - 1. Extruded-Aluminum or Aluminum Tubular Framing Sections and Cross Braces: Not less than 0.050-inch (1.3-mm) wall thickness.
  - 2. Finish: Manufacturer's standard.

## 2.13 FABRICATION

- A. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:
  - 1. Profiles that are sharp, straight, and free of defects or deformations.
  - 2. Accurately fit joints; make joints flush, hairline and weatherproof.
  - 3. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.
  - 4. Physical and thermal isolation of glazing from framing members.
  - 5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
  - 6. Provisions for field replacement of glazing.
  - 7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- B. Fabricate aluminum windows in sizes indicated to be confirm by field measurement. Include a complete system for assembling components and anchoring windows.
- C. Fabricate aluminum windows that are re-glazable without dismantling sash or framing.

- D. Thermally Improved Construction: Fabricate aluminum windows with an integral, concealed, low-conductance thermal barrier; located between exterior materials and window members exposed on interior side; in a manner that eliminates direct metal-to-metal contact. Thermal barriers shall be designed in accordance with AAMA TIR A8.
  - 1. Frame thermal barrier shall be polyamide with a minimum of 1" (25.4 mm) separation, installed continuously and mechanically bonded to the aluminum.
  - 2. Sash thermal barrier shall be polyamide with a minimum of 1/2" (12.7 mm) separation, installed continuously and mechanically bonded to the aluminum.
- E. Weather Stripping: Provide full-perimeter weather stripping for each operable sash.
- F. Weep Holes: Provide weep holes and internal passages in window frames to conduct infiltrating water to exterior.
- G. Provide water-shed members as required above lines of natural water penetration.
- H. Mullions: Provide mullions and cover plates as shown, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections, as indicated. Provide mullions and cover plates capable of withstanding design loads of window units.
- I. Sub frames: Provide sub frames with anchors for window units as shown, of profile and dimensions indicated but not less than 0.093-inch (2.4-mm) thick extruded aluminum. Miter or cope corners, and join with concealed mechanical joint fasteners. Finish to match window units. Provide sub frames capable of withstanding design loads of window units.
- J. Factory-Glazed Fabrication: Glaze aluminum windows in the factory where practical and possible for applications indicated. Comply with requirements in Division 08 Section "Glazing" and with AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS).
- K. Glazing Stops: Provide snap-on glazing stops coordinated with Division 08 Section "Glazing" and glazing system indicated. Provide glazing stops to match sash.

## 2.14 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. Factory Finishing:
  - 1. Kawneer Permanodic™ AA-M10C21A44 / AA-M45C22A44, AAMA 611, Architectural Class I Color Anodic Coating, Color: #40 Dark Bronze.
  - 2. Kawneer Permanodic™ AA-M10C21A41 / AA-M45C22A41, AAMA 611, Architectural Class I Clear Anodic Coating (Color #14 Clear) (Optional).

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work. Verify rough opening dimensions, levelness of sill plate and operational clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weather tight window installation.

1. Masonry Surfaces: Visibly dry and free of excess mortar, sand, and other construction debris.
2. Metal Surfaces: Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.02 INSTALLATION

- A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing windows, hardware, accessories, and other components.
- B. Install aluminum framed storefront system level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.
- C. Set sill members in bed of sealant or with gaskets, as indicated, for weather tight construction.
- D. Install aluminum framed storefront system and components to drain condensation, water penetrating joints, and moisture migrating within sliding door to the exterior.
- E. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

### 3.03 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.
  1. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.
- B. Testing Services: Testing and inspecting of installed windows shall take place as follows:
  1. Testing Methodology: Testing Standard shall be per AAMA 502 including reference to ASTM E 783 for Air Infiltration Test and ASTM E 1105 for Water Penetration Test.
    - a. Air Infiltration Test: Conduct test in accordance with ASTM E 783 at a minimum uniform static test pressure of 1.57 psf (75 Pa) for CW or 6.24 psf (300 Pa) for AW. The maximum allowable rates of air leakage for field testing shall not exceed 1.5 times the project specifications.
    - b. Water Infiltration Test: Water penetration resistance tests shall be conducted in accordance with ASTM E 1105 at a static test pressure equal to 2/3 the specified water test pressure.
  2. Testing Extent: Architect shall select window units to be tested as soon as a representative portion of the project has been installed, glazed, perimeter caulked and cured. Conduct tests for air infiltration and water penetration with manufacturer's representative present.
  3. Test Reports: Shall be prepared according to AAMA 502.

### 3.04 ADJUSTING, CLEANING, AND PROTECTION

- A. Adjust operating sashes, screens, hardware, and accessories for a tight fit at contact points and weather stripping for smooth operation and weather tight closure. Lubricate hardware and moving parts.
- B. Clean aluminum surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.



- C. Clean glass immediately after installing windows. Comply with manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels, and clean surfaces.
- D. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.
- E. Protect window surfaces from contact with contaminating substances resulting from construction operations. In addition, monitor window surfaces adjacent to and below exterior concrete and masonry surfaces during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written recommendations.

3.05 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain window operating system. Refer to Section 017823 "Operating and Maintenance Manuals."

END OF SECTION 085113 08 5113



## SECTION 08 7100 DOOR HARDWARE

### PART 1 GENERAL

#### 1.01 RELATED DOCUMENTS

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

#### 1.02 SUMMARY

- A. This Section includes commercial door hardware for the following:
  - 1. Swinging doors.
- B. Door hardware includes, but is not necessarily limited to, the following:
  - 1. Mechanical door hardware.
  - 2. Electromechanical door hardware.
  - 3. Cylinders specified for doors in other sections.
- C. Related Sections:
  - 1. Division 08 Section "Hollow Metal Doors and Frames".
  - 2. Division 08 Section "Flush Wood Doors".
  - 3. Division 08 Section "Aluminum-Framed Entrances and Storefronts".
- D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
  - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
  - 2. ICC/IBC - International Building Code.
  - 3. NFPA 70 - National Electrical Code.
  - 4. NFPA 80 - Fire Doors and Windows.
  - 5. NFPA 101 - Life Safety Code.
  - 6. NFPA 105 - Installation of Smoke Door Assemblies.
  - 7. State Building Codes, Local Amendments.
- E. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:
  - 1. ANSI/BHMA Certified Product Standards - A156 Series.
  - 2. UL10C - Positive Pressure Fire Tests of Door Assemblies.
  - 3. ANSI/UL 294 - Access Control System Units.
  - 4. UL 305 - Panic Hardware.
  - 5. ANSI/UL 437- Key Locks.

#### 1.03 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness,

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DOOR HARDWARE

hand, function, and finish of door hardware.

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
  2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
  3. Content: Include the following information:
    - a. Type, style, function, size, label, hand, and finish of each door hardware item.
    - b. Manufacturer of each item.
    - c. Fastenings and other pertinent information.
    - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
    - e. Explanation of abbreviations, symbols, and codes contained in schedule.
    - f. Mounting locations for door hardware.
    - g. Door and frame sizes and materials.
    - h. Warranty information for each product.
  4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Shop Drawings: Details of electrified access control hardware indicating the following:
1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:
    - a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
    - b. Complete (risers, point-to-point) access control system block wiring diagrams.
    - c. Wiring instructions for each electronic component scheduled herein.
  2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.
- D. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.
- E. Informational Submittals:
1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.
- F. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

#### 1.04 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
- B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).
- C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.
- E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.
  - 1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
  - 2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.
- F. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.
- G. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
  - 1. Function of building, purpose of each area and degree of security required.
  - 2. Plans for existing and future key system expansion.
  - 3. Requirements for key control storage and software.
  - 4. Installation of permanent keys, cylinder cores and software.
  - 5. Address and requirements for delivery of keys.
- H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
  - 1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
  - 2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
  - 3. Review sequence of operation narratives for each unique access controlled opening.
  - 4. Review and finalize construction schedule and verify availability of materials.

5. Review the required inspecting, testing, commissioning, and demonstration procedures

- I. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

#### 1.05 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

#### 1.06 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

#### 1.07 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
  1. Structural failures including excessive deflection, cracking, or breakage.
  2. Faulty operation of the hardware.
  3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
  4. Electrical component defects and failures within the systems operation.
- C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.
- D. Special Warranty Periods:
  1. Ten years for mortise locks and latches.
  2. Five years for exit hardware.
  3. Twenty five years for manual overhead door closer bodies.
  4. Two years for electromechanical door hardware, unless noted otherwise.

## 1.08 MAINTENANCE SERVICE

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

## PART 2 PRODUCTS

### 2.01 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.
- B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
  - 1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.
- C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

### 2.02 HANGING DEVICES

- A. Hinges: ANSI/BHMA A156.1 butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.
  - 1. Quantity: Provide the following hinge quantity:
    - a. Two Hinges: For doors with heights up to 60 inches.
    - b. Three Hinges: For doors with heights 61 to 90 inches.
    - c. Four Hinges: For doors with heights 91 to 120 inches.
    - d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
  - 2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
    - a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
    - b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.
  - 3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
    - a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
    - b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
  - 4. Hinge Options: Comply with the following:
    - a. Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.
  - 5. Manufacturers:
    - a. Hager Companies (HA) - BB Series, 5 knuckle.
    - b. Ives (IV) - 5BB Series, 5 knuckle.

- c. McKinney (MK) - TA/T4A Series, 5 knuckle.
- B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 continuous geared hinge. with minimum 0.120-inch thick extruded 6063-T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.
- 1. Manufacturers:
    - a. Hager Companies (HA).
    - b. Ives (IV).
    - c. Pemko (PE).

## 2.03 DOOR OPERATING TRIM

- A. Door Push Plates and Pulls: ANSI/BHMA A156.6 door pushes and pull units of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.
- 1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
  - 2. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.
  - 3. Manufacturers:
    - a. Ives (IV).
    - b. Rockwood (RO).
    - c. Trimco (TC).

## 2.04 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.
- 1. Manufacturers:
    - a. Dormakaba Best (BE).
    - b. No Substitution.
- B. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:
- 1. Threaded mortise cylinders with rings and cams to suit hardware application.
  - 2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
  - 3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
  - 4. Tubular deadlocks and other auxiliary locks.
  - 5. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
  - 6. Keyway: Manufacturer's Standard.
- C. Interchangeable Cores: Provide small format interchangeable cores as specified, core insert, removable by use of a special key; usable with other manufacturers' cylinders.
- D. Keying System: Each type of lock and cylinders to be factory keyed.
- 1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.
  - 2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
  - 3. Existing System: Field verify and key cylinders to match Owner's existing system.
- E. Key Quantity: Provide the following minimum number of keys:

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DOOR HARDWARE



1. Change Keys per Cylinder: Two (2)
2. Master Keys (per Master Key Level/Group): Five (5).
3. Construction Keys (where required): Ten (10).

F. Construction Keying: Provide temporary keyed construction cores.

G. Key Registration List (Bitting List):

1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
2. Provide transcript list in writing or electronic file as directed by the Owner.

## 2.05 MECHANICAL LOCKS AND LATCHING DEVICES

A. Mortise Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 Certified Products Directory (CPD) listed. Locksets are to be manufactured with a corrosion resistant steel case and be field-reversible for handing without disassembly of the lock body.

1. Where specified, provide status indicators with highly reflective color and wording for "locked/unlocked" or "vacant/occupied" with custom wording options if required. Indicator to be located above the cylinder with the inside thumb-turn not blocking the visibility of the indicator status. Indicator window size to be a minimum of 2.1" x 0.6" with a curved design allowing a 180 degree viewing angle with protective covering to prevent tampering.
2. Manufacturers:
  - a. Corbin Russwin Hardware (RU) - ML2000 Series.
  - b. Sargent Manufacturing (SA) - 8200 Series.
  - c. Schlage (SC) - L9000 Series.

## 2.06 AUXILIARY LOCKS

A. Mortise Deadlocks, Small Case: ANSI/BHMA A156.36, Grade 1, small case mortise type deadlocks constructed of heavy gauge wrought corrosion resistant steel. Steel or stainless steel bolts with a 1" throw and hardened steel roller pins. Deadlocks to be products of the same source manufacturer and keyway as other specified locksets.

1. Manufacturers:
  - a. Corbin Russwin Hardware (RU) - DL4000 Series.
  - b. Sargent Manufacturing (SA) - 4870 Series.
  - c. Schlage (SC) - L460 Series.

## 2.07 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.

B. Standards: Comply with the following:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.

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2. Strikes for Bored Locks and Latches: BHMA A156.2.
3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
4. Dustproof Strikes: BHMA A156.16.

## 2.08 ELECTRIC STRIKES

- A. Standard Electric Strikes: Electric strikes conforming to ANSI/BHMA A156.31, Grade 1, for use on non-rated or fire rated openings. Strikes shall be of stainless steel construction tested to a minimum of 1500 pounds of static strength and 70 foot-pounds of dynamic strength with a minimum endurance of 1 million operating cycles. Provide strikes with 12 or 24 VDC capability, fail-secure unless otherwise specified. Where specified provide latchbolt and latchbolt strike monitoring indicating both the position of the latchbolt and locked condition of the strike.
  1. Manufacturers:
    - a. HES (HS) - 1006 Series.
    - b. Von Duprin (VD) - 6200/6400 Series.
- B. Provide electric strikes with in-line power controller and surge suppressor by the same manufacturer as the strike with the combined products having a five year warranty.

## 2.09 CONVENTIONAL EXIT DEVICES

- A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:
  1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
  2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
  3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
  4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
  5. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
    - a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
    - b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
  6. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
  7. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
  8. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
  9. Rail Sizing: Provide exit device rails factory sized for proper door width application.
  10. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.
- B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices furnished in the functions



specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.

1. Manufacturers:
  - a. Corbin Russwin Hardware (RU) - ED4000 / ED5000 Series.
  - b. Sargent Manufacturing (SA) - 80 Series.
  - c. Von Duprin (VD) - 35A/98 XP Series.

## 2.10 DOOR CLOSERS

- A. All door closers specified herein shall meet or exceed the following criteria:
  1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.
  2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
  3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.
  4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
  5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
  6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.
- B. Door Closers, Surface Mounted (Large Body Cast Iron): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control.
  1. Manufacturers:
    - a. Corbin Russwin Hardware (RU) - DC8000 Series.
    - b. Norton Rixson (NO) - 9500 Series.
    - c. Sargent Manufacturing (SA) - 281 Series.

## 2.11 ARCHITECTURAL TRIM

- A. Door Protective Trim
  1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
  2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
  3. Where plates are applied to fire rated doors with the top of the plate more than 16" above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer's catalog and template book for specific requirements for size and applications.
  4. Protection Plates: ANSI/BHMA A156.6 protection plates (kick, armor, or mop), fabricated from the following:
    - a. Stainless Steel: 300 grade, .050-inch thick.

5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
6. Manufacturers:
  - a. Hiawatha, Inc. (HI).
  - b. Rockwood (RO).
  - c. Trimco (TC).

## 2.12 DOOR STOPS AND HOLDERS

- A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
- B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
  1. Manufacturers:
    - a. Hiawatha, Inc. (HI).
    - b. Rockwood (RO).
    - c. Trimco (TC).
- C. Overhead Door Stops and Holders: ANSI/BHMA A156.8, Grade 1 Certified Products Directory (CPD) listed overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.
  1. Manufacturers:
    - a. Norton Rixson (RF).
    - b. Rockwood (RO).
    - c. Sargent Manufacturing (SA).

## 2.13 ARCHITECTURAL SEALS

- A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.
- B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
  1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.
- C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
  1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.
- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.

- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- F. Manufacturers:
  - 1. National Guard Products (NG).
  - 2. Pemko (PE).
  - 3. Reese Enterprises, Inc. (RE).

## 2.14 ELECTRONIC ACCESSORIES

- A. Request-to-Exit Motion Sensor: Request-to-Exit Sensors motion detectors specifically designed for detecting exiting through a door from the secure area to a non-secure area. Include built-in timers (up to 60 second adjustable timing), door monitor with sounder alert, internal vertical pointability coverage, 12VDC or 24VDC power and selectable relay trigger with fail safe/fail secure modes.
  - 1. Manufacturers:
    - a. Alarm Controls (AK) - SREX Series.
    - b. Securitron (SU) - XMS Series.
- B. Door Position Switches: Door position magnetic reed contact switches specifically designed for use in commercial door applications. On recessed models the contact and magnetic housing snap-lock into a 1" diameter hole. Surface mounted models include wide gap distance design complete with armored flex cabling. Provide SPDT, N/O switches with optional Rare Earth Magnet installation on steel doors with flush top channels.
  - 1. Manufacturers:
    - a. Securitron (SU) - DPS Series.
- C. Switching Power Supplies: Provide power supplies with either single or dual voltage configurations at 12 or 24VDC. Power supplies shall have battery backup function with an integrated battery charging circuit and shall provide capability for power distribution, direct lock control and Fire Alarm Interface (FAI) through add on modules. Power supplies shall be expandable up to 16 individually protected outputs. Output modules shall provide individually protected, continuous outputs and/or individually protected, relay controlled outputs.
  - 1. Provide the least number of units, at the appropriate amperage level, sufficient to exceed the required total draw for the specified electrified hardware and access control equipment.
  - 2. Manufacturers:
    - a. Securitron (SU) - AQD Series.
- D. Intelligent Switching Power Supplies: Provide power supplies with single, dual or multi-voltage configurations at 12 and/or 24VDC. Power Supply shall have battery backup function with an integrated battery charging circuit. The power supply shall have a standard, integrated Fire Alarm Interface (FAI). The power supply shall provide capability for secondary voltage, power distribution, direct lock control and network monitoring through add on modules. The power supply shall be expandable up to 16 individually protected outputs. Output modules shall provide individually protected, continuous outputs and/or individually protected, relay controlled outputs. Network modules shall provide remote monitoring functions such as status reporting, fault reporting and information logging.
  - 1. Provide the least number of units, at the appropriate amperage level, sufficient to exceed the required total draw for the specified electrified hardware and access control equipment.
  - 2. Manufacturers:
    - a. Securitron (SU) - AQL Series.

## 2.15 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

## 2.16 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

### 3.02 PREPARATION

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.
- B. Wood Doors: Comply with ANSI/DHI A115-W series.

### 3.03 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
  - 1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
  - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
  - 2. DHI TDH-007-20: Installation Guide for Doors and Hardware.
  - 3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."

- 4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
- C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
- E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

#### 3.04 FIELD QUALITY CONTROL

- A. Field Inspection (Punch Report): Reference Division 01 Sections "Closeout Procedures". Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.
  - 1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

#### 3.05 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.

#### 3.06 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

#### 3.07 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.08 DOOR HARDWARE SETS

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should 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 and functionality.
1. Quantities listed are for each pair of doors, or for each single door.
  2. The supplier is responsible for handing and sizing all products.
  3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.
  4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.

B. Manufacturer's Abbreviations:

	1. MK - MCKINNEY			
	2. PE - PEMKO			
	3. RU - CORBIN RUSSWIN			
	4. SH - SCHLAGE ELECTRONIC SECURITY			
	5. BE - BEST ACCESS & DOOR CLOSERS			
	6. HS - HES			
	7. RO - ROCKWOOD			
	8. RF - RIXSON			
	9. SU - SECURITRON			

HARDWARE SETS

SET: 1.0

DOORS: 101A

2	CONTINUOUS HINGE	10BEFM_SLF- HD1 X LENGTH REQUIRED		PE	
1	CONCEALED VERT ROD EXIT, CLASSROOM	ED5800 128955ET	613E	RU	
1	CONCEALED VERT ROD EXIT, EXIT ONLY	ED5800 EO	613E	RU	
1	CORE	AS REQUIRED TO MATCH FACILITY STANDARD (BEST 5C7DD SYSTEM)	613	BE	
2	CONC OVERHEAD STOP	6-336	613E	RF	
2	SURFACE CLOSER	DC8210 A3 / DC8200	613E	RU	

1	THRESHOLD	273X224-10BE-FGT X LENGTH REQUIRED X MSES25SS		PE	
1	GASKETING	PROVIDED BY DOOR/FRAME SUPPLIER			
2	SWEEP	3452-10BE-NB X LENGTH REQUIRED		PE	
2	POSITION SWITCH	DPS-M-BK		SU	⚡
<p>NOTES:  VERIFY AND COORDINATE SCHEDULED HARDWARE WITH EXISTING CONDITIONS PRIOR TO ORDERING. PREPARE EXISTING FRAME AND PROVIDE ALL FILLER PLATES AND ACCESSORIES REQUIRED FOR PROPER INSTALLATION AND FUNCTION OF NEW HARDWARE.</p> <p>SYSTEM OPERATIONAL NARRATIVE  DOOR POSITION SWITCHES MONITOR THE DOORS OPEN/CLOSED STATUS.</p>					
SET: 2.0					
DOORS: 004C					
3	HINGE, FULL MORTISE, HVY WT	T4A3386 [NRP]	US10BE	MK	
1	STOREROOM LOCK	ML2057 128T CT7D	613E	RU	
1	CORE	AS REQUIRED TO MATCH FACILITY STANDARD (BEST 5C7DD SYSTEM)	613	BE	
1	ELECTRIC STRIKE	1600-CS	613E	HS	⚡
1	SMART PAC BRIDGE RECTIFIER	2005M3		HS	⚡
1	DOOR OPERATOR, ACTUATORS, & ACCESSORIES	PROVIDED BY DOOR OPERATOR SUPPLIER			
1	KICK PLATE	K1050 12" CSK BEV	US10BE	RO	
1	THRESHOLD	273X224-10BE-FGT X LENGTH REQUIRED X MSES25SS		PE	
1	GASKETING	S773BL (HEAD & JAMBS)		PE	
1	SWEEP	3452-10BE-NB X		PE	

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DOOR HARDWARE

		LENGTH REQUIRED			
1	POSITION SWITCH	DPS-M-BK		SU	⚡
1	MOTION SENSOR	XMS		SU	⚡
1	REMOTE PUSH BUTTON	PROVIDED BY SECURITY SUPPLIER			
1	POWER SUPPLY	AQL4-R8E1		SU	⚡
1	WIRING DIAGRAM	ELEVATION AND POINT TO POINT AS SPECIFIED			

NOTES:

SYSTEM OPERATIONAL NARRATIVE

DOOR NORMALLY CLOSED AND SECURE.

ELECTRIC STRIKE OPENS AND DOOR OPERATOR IS SET IN MOTION VIA REMOTE PUSH  
BUTTON ONCE VETTED VIA INTERCOM CALL STATION.

ENTRY ALSO POSSIBLE VIA KEY OVERRIDE.

FREE EGRESS AT ALL TIMES.

MOTION SENSING REQUEST TO EXIT SWITCH TEMPORARILY SHUNTS THE DOOR POSITION  
SWITCH ALLOWING EGRESS WITHOUT INDICATING ALARM AT MONITORING STATION.

DOOR POSITION SWITCH MONITORS DOOR OPEN/CLOSED STATUS.

ELECTRIC STRIKE REMAINS CLOSED DURING POWER LOSS. (FAIL SECURE)

SET: 3.0

DOORS: ST1-2

6	HINGE, FULL MORTISE, HVY WT	T4A3386 [NRP]	US10BE	MK	
1	CONCEALED VERT ROD EXIT, EXIT ONLY	ED5800 EO	613E	RU	
1	CONCEALED VERT ROD EXIT, STOREROOM	ED5800 128959ET CT7SD	613E	RU	
1	CORE	AS REQUIRED TO MATCH FACILITY STANDARD (BEST 5C7DD SYSTEM)	613	BE	
2	SURFACE CLOSER	DC8210 A11	613E	RU	
2	KICK PLATE	K1050 12" CSK BEV	US10BE	RO	
1	THRESHOLD	273X224AFGT X LENGTH REQUIRED X MSES25SS		PE	
1	GASKETING	S773BL (HEAD		PE	

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DOOR HARDWARE



		& JAMBS)			
1	RAIN GUARD	346-10BE		PE	
2	SWEEP	3452-10BE-NB X LENGTH REQUIRED		PE	
1	ASTRAGAL	29324-10BE-NB X DOOR HEIGHT		PE	

NOTES:  
SYSTEM OPERATIONAL NARRATIVE  
DOOR POSITION SWITCHES MONITOR THE DOORS OPEN/CLOSED STATUS.

SET: 4.0  
DOORS: 004B

3	HINGE, FULL MORTISE, HVY WT	T4A3386 [NRP]	US10BE	MK	
1	RIM EXIT DEVICE, CLASSROOM	ED5200 128955ET CT7SD	613E	RU	
1	CORE	AS REQUIRED TO MATCH FACILITY STANDARD (BEST 5C7DD SYSTEM)	613	BE	
1	SURFACE CLOSER	DC8210 A11	613E	RU	
1	KICK PLATE	K1050 12" CSK BEV	US10BE	RO	
1	THRESHOLD	273X224AFGT X LENGTH REQUIRED X MSES25SS		PE	
1	GASKETING	S773BL (HEAD & JAMBS)		PE	
1	RAIN GUARD	346-10BE		PE	
1	SWEEP	3452-10BE-NB X LENGTH REQUIRED		PE	

NOTES:  
SYSTEM OPERATIONAL NARRATIVE  
DOOR POSITION SWITCH MONITORS DOORS OPEN/CLOSED STATUS.

SET: 5.0  
DOORS: 001A, 001B

6	HINGE	T4A3786 [NRP]	US10BE	MK	
1	SURFACE VERT ROD EXIT, STOREROOM	ED5470 128959ET M55 CT7D	613E	RU	
1	SURFACE VERT ROD EXIT, EXIT ONLY	ED5470 EO M55	613E	RU	
2	CORE	AS REQUIRED TO MATCH FACILITY STANDARD (BEST 5C7DD SYSTEM)	613	BE	
2	SURFACE CLOSER	DC8210 A11	613E	RU	
2	KICK PLATE	K1050 12" CSK BEV	US10BE	RO	
2	SILENCER	608		RO	

NOTES:

VERIFY AND COORDINATE SCHEDULED HARDWARE WITH EXISTING CONDITIONS PRIOR TO ORDERING. PREPARE EXISTING DOOR AND FRAME AND PROVIDE ALL FILLER/MOUNTING PLATES AND ACCESSORIES REQUIRED FOR PROPER INSTALLATION AND FUNCTION OF NEW HARDWARE.

SET: 6.0

DOORS: ST1-1

6	HINGE	T4A3786 [NRP]	US10BE	MK	
1	SURFACE VERT ROD EXIT, CLASSROOM	ED5470 128955ET M55 CT7SD	613E	RU	
1	SURFACE VERT ROD EXIT, EXIT ONLY	ED5470 EO M55	613E	RU	
1	CORE	AS REQUIRED TO MATCH FACILITY STANDARD (BEST 5C7DD SYSTEM)	613	BE	
1	SURFACE CLOSER	DC8210 A3 / DC8200	613E	RU	
1	SURFACE CLOSER	DC8210 A11	613E	RU	
2	KICK PLATE	K1050 12" CSK BEV	US10BE	RO	
1	WALL STOP	403 (OR) 441CU	US10BE	RO	
2	SILENCER	608		RO	

NOTES:

VERIFY AND COORDINATE SCHEDULED HARDWARE WITH EXISTING CONDITIONS PRIOR TO ORDERING. PREPARE EXISTING DOOR AND FRAME AND PROVIDE ALL FILLER/MOUNTING

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DOOR HARDWARE

PLATES AND ACCESSORIES REQUIRED FOR PROPER INSTALLATION AND FUNCTION OF NEW HARDWARE.

SET: 7.0

DOORS: 004A

3	HINGE	T4A3786 [NRP]	US10BE	MK	
1	RIM EXIT DEVICE, CLASSROOM	ED5200 128955ET CT7SD	613E	RU	
1	CORE	AS REQUIRED TO MATCH FACILITY STANDARD (BEST 5C7DD SYSTEM)	613	BE	
1	SURFACE CLOSER	DC8210 A11	613E	RU	
1	KICK PLATE	K1050 12" CSK BEV	US10BE	RO	
3	SILENCER	608		RO	

SET: 8.0

DOORS: 101B

8	HINGE	T4A3786 [NRP]	US10BE	MK	
2	DUMMY BAR, EXIT ONLY	ED5000DB EO	613E	RU	
1	DUNNY TRIM	128ET DUNNY LEVER TRIM	613E	RU	
2	SURFACE CLOSER	DC8210 A11	613E	RU	
2	KICK PLATE	K1050 12" CSK BEV	US10BE	RO	
2	SILENCER	608		RO	

NOTES:

VERIFY AND COORDINATE SCHEDULED HARDWARE WITH EXISTING CONDITIONS PRIOR TO ORDERING. PREPARE EXISTING DOOR AND FRAME AND PROVIDE ALL FILLER/MOUNTING PLATES AND ACCESSORIES REQUIRED FOR PROPER INSTALLATION AND FUNCTION OF NEW HARDWARE.

SET: 9.0

DOORS: 005-1A

3	HINGE, FULL MORTISE	TA2714 [NRP]	US10BE	MK	
1	STOREROOM LOCK	ML2057 128T CT7D	613E	RU	
1	CORE	AS REQUIRED TO MATCH	613	BE	

		FACILITY STANDARD (BEST 5C7DD SYSTEM)			
1	WALL STOP	403 (OR) 441CU	US10BE	RO	
1	SILENCER	608		RO	

NOTES:

VERIFY AND COORDINATE SCHEDULED HARDWARE WITH EXISTING CONDITIONS PRIOR TO ORDERING. PREPARE EXISTING FRAME AND PROVIDE ALL FILLER PLATES AND ACCESSORIES REQUIRED FOR PROPER INSTALLATION AND FUNCTION OF NEW HARDWARE.

SET: 10.0

DOORS: 003

3	HINGE, FULL MORTISE	TA2714 [NRP]	US10BE	MK	
1	STOREROOM LOCK	ML2057 128T CT7D	613E	RU	
1	CORE	AS REQUIRED TO MATCH FACILITY STANDARD (BEST 5C7DD SYSTEM)	613	BE	
1	SURF OVERHEAD STOP	10-336	613E	RF	
3	SILENCER	608		RO	

NOTES:

VERIFY AND COORDINATE SCHEDULED HARDWARE WITH EXISTING CONDITIONS PRIOR TO ORDERING. PREPARE EXISTING FRAME AND PROVIDE ALL FILLER PLATES AND ACCESSORIES REQUIRED FOR PROPER INSTALLATION AND FUNCTION OF NEW HARDWARE.

SET: 11.0

DOORS: 005-2A

3	HINGE, FULL MORTISE	TA2714 [NRP]	US10BE	MK	
1	STOREROOM LOCK	ML2057 128T CT7D	613E	RU	
1	CORE	AS REQUIRED TO MATCH FACILITY STANDARD (BEST 5C7DD SYSTEM)	613	BE	
1	SURFACE CLOSER	DC8210 A3 / DC8200	613E	RU	
1	KICK PLATE	K1050 12" CSK	US10BE	RO	

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		BEV			
1	WALL STOP	403 (OR) 441CU	US10BE	RO	
3	SILENCER	608		RO	
SET: 12.0					
DOORS: 005-2B					
3	HINGE, FULL MORTISE	TA2714 [NRP]	US10BE	MK	
1	STOREROOM LOCK	ML2057 128T CT7D	613E	RU	
1	CORE	AS REQUIRED TO MATCH FACILITY STANDARD (BEST 5C7DD SYSTEM)	613	BE	
1	SURFACE CLOSER	DC8210 A4	613E	RU	
1	KICK PLATE	K1050 12" CSK BEV	US10BE	RO	
3	SILENCER	608		RO	
SET: 13.0					
DOORS: 108					
3	HINGE, FULL MORTISE	TA2714 [NRP]	US10BE	MK	
1	STOREROOM LOCK	ML2057 128T CT7D	613E	RU	
1	CORE	AS REQUIRED TO MATCH FACILITY STANDARD (BEST 5C7DD SYSTEM)	613	BE	
NOTES:					
VERIFY AND COORDINATE SCHEDULED HARDWARE WITH EXISTING CONDITIONS PRIOR TO ORDERING. PREPARE EXISTING DOOR AND FRAME AND PROVIDE ALL FILLER/MOUNTING PLATES AND ACCESSORIES REQUIRED FOR PROPER INSTALLATION AND FUNCTION OF NEW HARDWARE.					
SET: 14.0					
DOORS: 103					
3	HINGE, FULL MORTISE	TA2714 [NRP]	US10BE	MK	
1	ACCESS CONTROL CYL LOCK	AD-400 PUSH BUTTON SERIES	613	SH	⚡

		(MATCH FACILITY STANDARD)			
1	CORE	AS REQUIRED TO MATCH FACILITY STANDARD (BEST 5C7DD SYSTEM)	613	BE	
1	WALL STOP	403 (OR) 441CU	US10BE	RO	
1	GASKETING	S88BL (HEAD & JAMBS)		PE	
SET: 15.0					
DOORS: 016A, 104					
3	HINGE, FULL MORTISE	TA2714 [NRP]	US10BE	MK	
1	PRIVACY LOCK	ML2060 128T V21	613E	RU	
1	SURFACE CLOSER	DC8210 A3 / DC8200	613E	RU	
1	KICK PLATE	K1050 12" CSK BEV	US10BE	RO	
1	WALL STOP	403 (OR) 441CU	US10BE	RO	
1	GASKETING	S88BL (HEAD & JAMBS)		PE	
1	COAT HOOK	RM801	US10BE	RO	
SET: 16.0					
DOORS: 013					
1	DEADBOLT	DL4122 CT7D	613E	RU	
2	CORE	AS REQUIRED TO MATCH FACILITY STANDARD (BEST 5C7DD SYSTEM)	613	BE	
1	PUSH PLATE	70C-RKW	US10BE	RO	
1	PULL PLATE	BF 110X70C	US10BE	RO	
1	SURFACE CLOSER	DC8210 A3 / DC8200	613E	RU	
NOTES:					
BALANCE OF EXISTING HARDWARE TO REMAIN.					
VERIFY AND COORDINATE SCHEDULED HARDWARE WITH EXISTING CONDITIONS PRIOR TO					

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ORDERING. PREPARE EXISTING DOOR AND FRAME AND PROVIDE ALL FILLER/MOUNTING PLATES AND ACCESSORIES REQUIRED FOR PROPER INSTALLATION AND FUNCTION OF NEW HARDWARE.

SET: 17.0

DOORS: 002, 010, 012

1	STOREROOM LOCK	ML2057 128T CT7D	613E	RU	
1	CORE	AS REQUIRED TO MATCH FACILITY STANDARD (BEST 5C7DD SYSTEM)	613	BE	

NOTES:

BALANCE OF EXISTING HARDWARE TO REMAIN.

VERIFY AND COORDINATE SCHEDULED HARDWARE WITH EXISTING CONDITIONS PRIOR TO ORDERING. PREPARE EXISTING DOOR AND FRAME AND PROVIDE ALL FILLER/MOUNTING PLATES AND ACCESSORIES REQUIRED FOR PROPER INSTALLATION AND FUNCTION OF NEW HARDWARE.

SET: 18.0

DOORS: 011, 015

1	STOREROOM LOCK	ML2057 128T CT7SD	613E	RU	
1	CORE	AS REQUIRED TO MATCH FACILITY STANDARD (BEST 5C7DD SYSTEM)	613	BE	

NOTES:

BALANCE OF EXISTING HARDWARE TO REMAIN.

VERIFY AND COORDINATE SCHEDULED HARDWARE WITH EXISTING CONDITIONS PRIOR TO ORDERING. PREPARE EXISTING DOOR AND FRAME AND PROVIDE ALL FILLER/MOUNTING PLATES AND ACCESSORIES REQUIRED FOR PROPER INSTALLATION AND FUNCTION OF NEW HARDWARE.

SET: 19.0

DOORS: 006, 08A

1	ACCESS CONTROL CYL LOCK	AD-400 PUSH BUTTON SERIES (MATCH FACILITY STANDARD)	613	SH	⚡
1	CORE	AS REQUIRED TO MATCH FACILITY STANDARD (BEST 5C7DD SYSTEM)	613	BE	
<p>NOTES: BALANCE OF EXISTING HARDWARE TO REMAIN.</p> <p>VERIFY AND COORDINATE SCHEDULED HARDWARE WITH EXISTING CONDITIONS PRIOR TO ORDERING. PREPARE EXISTING DOOR AND FRAME AND PROVIDE ALL FILLER/MOUNTING PLATES AND ACCESSORIES REQUIRED FOR PROPER INSTALLATION AND FUNCTION OF NEW HARDWARE.</p>					
SET: 20.0					
DOORS: 007					
1	PRIVACY LOCK	ML2060 128T V21	613E	RU	
<p>NOTES: BALANCE OF EXISTING HARDWARE TO REMAIN.</p> <p>VERIFY AND COORDINATE SCHEDULED HARDWARE WITH EXISTING CONDITIONS PRIOR TO ORDERING. PREPARE EXISTING DOOR AND FRAME AND PROVIDE ALL FILLER/MOUNTING PLATES AND ACCESSORIES REQUIRED FOR PROPER INSTALLATION AND FUNCTION OF NEW HARDWARE.</p>					
SET: 21.0					
DOORS: 08B, 201, 202					
1		EXISTING HARDWARE TO REMAIN			

END OF SECTION 08 7100



## SECTION 08 7100 DOOR HARDWARE

### PART 1 GENERAL

#### 1.01 RELATED DOCUMENTS

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

#### 1.02 SUMMARY

- A. This Section includes commercial door hardware for the following:
  - 1. Swinging doors.
- B. Door hardware includes, but is not necessarily limited to, the following:
  - 1. Mechanical door hardware.
  - 2. Electromechanical door hardware.
  - 3. Cylinders specified for doors in other sections.
- C. Related Sections:
  - 1. Division 08 Section "Hollow Metal Doors and Frames".
  - 2. Division 08 Section "Flush Wood Doors".
  - 3. Division 08 Section "Aluminum-Framed Entrances and Storefronts".
- D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
  - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
  - 2. ICC/IBC - International Building Code.
  - 3. NFPA 70 - National Electrical Code.
  - 4. NFPA 80 - Fire Doors and Windows.
  - 5. NFPA 101 - Life Safety Code.
  - 6. NFPA 105 - Installation of Smoke Door Assemblies.
  - 7. State Building Codes, Local Amendments.
- E. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:
  - 1. ANSI/BHMA Certified Product Standards - A156 Series.
  - 2. UL10C - Positive Pressure Fire Tests of Door Assemblies.
  - 3. ANSI/UL 294 - Access Control System Units.
  - 4. UL 305 - Panic Hardware.
  - 5. ANSI/UL 437- Key Locks.

#### 1.03 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness,

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hand, function, and finish of door hardware.

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
  2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
  3. Content: Include the following information:
    - a. Type, style, function, size, label, hand, and finish of each door hardware item.
    - b. Manufacturer of each item.
    - c. Fastenings and other pertinent information.
    - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
    - e. Explanation of abbreviations, symbols, and codes contained in schedule.
    - f. Mounting locations for door hardware.
    - g. Door and frame sizes and materials.
    - h. Warranty information for each product.
  4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Shop Drawings: Details of electrified access control hardware indicating the following:
1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:
    - a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
    - b. Complete (risers, point-to-point) access control system block wiring diagrams.
    - c. Wiring instructions for each electronic component scheduled herein.
  2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.
- D. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.
- E. Informational Submittals:
1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.
- F. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

#### 1.04 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
- B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).
- C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.
- E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.
  - 1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
  - 2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.
- F. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.
- G. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
  - 1. Function of building, purpose of each area and degree of security required.
  - 2. Plans for existing and future key system expansion.
  - 3. Requirements for key control storage and software.
  - 4. Installation of permanent keys, cylinder cores and software.
  - 5. Address and requirements for delivery of keys.
- H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
  - 1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
  - 2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
  - 3. Review sequence of operation narratives for each unique access controlled opening.
  - 4. Review and finalize construction schedule and verify availability of materials.

5. Review the required inspecting, testing, commissioning, and demonstration procedures

- I. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.06 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.07 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
  - 1. Structural failures including excessive deflection, cracking, or breakage.
  - 2. Faulty operation of the hardware.
  - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
  - 4. Electrical component defects and failures within the systems operation.
- C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.
- D. Special Warranty Periods:
  - 1. Ten years for mortise locks and latches.
  - 2. Five years for exit hardware.
  - 3. Twenty five years for manual overhead door closer bodies.
  - 4. Two years for electromechanical door hardware, unless noted otherwise.

## 1.08 MAINTENANCE SERVICE

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

## PART 2 PRODUCTS

### 2.01 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.
- B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
  - 1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.
- C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

### 2.02 HANGING DEVICES

- A. Hinges: ANSI/BHMA A156.1 butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.
  - 1. Quantity: Provide the following hinge quantity:
    - a. Two Hinges: For doors with heights up to 60 inches.
    - b. Three Hinges: For doors with heights 61 to 90 inches.
    - c. Four Hinges: For doors with heights 91 to 120 inches.
    - d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
  - 2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
    - a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
    - b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.
  - 3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
    - a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
    - b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
  - 4. Hinge Options: Comply with the following:
    - a. Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.
  - 5. Manufacturers:
    - a. Hager Companies (HA) - BB Series, 5 knuckle.
    - b. Ives (IV) - 5BB Series, 5 knuckle.

- c. McKinney (MK) - TA/T4A Series, 5 knuckle.
- B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 continuous geared hinge. with minimum 0.120-inch thick extruded 6063-T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.
  - 1. Manufacturers:
    - a. Hager Companies (HA).
    - b. Ives (IV).
    - c. Pemko (PE).

## 2.03 DOOR OPERATING TRIM

- A. Door Push Plates and Pulls: ANSI/BHMA A156.6 door pushes and pull units of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.
  - 1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
  - 2. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.
  - 3. Manufacturers:
    - a. Ives (IV).
    - b. Rockwood (RO).
    - c. Trimco (TC).

## 2.04 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.
  - 1. Manufacturers:
    - a. Dormakaba Best (BE).
    - b. No Substitution.
- B. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:
  - 1. Threaded mortise cylinders with rings and cams to suit hardware application.
  - 2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
  - 3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
  - 4. Tubular deadlocks and other auxiliary locks.
  - 5. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
  - 6. Keyway: Manufacturer's Standard.
- C. Interchangeable Cores: Provide small format interchangeable cores as specified, core insert, removable by use of a special key; usable with other manufacturers' cylinders.
- D. Keying System: Each type of lock and cylinders to be factory keyed.
  - 1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.
  - 2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
  - 3. Existing System: Field verify and key cylinders to match Owner's existing system.
- E. Key Quantity: Provide the following minimum number of keys:

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1. Change Keys per Cylinder: Two (2)
2. Master Keys (per Master Key Level/Group): Five (5).
3. Construction Keys (where required): Ten (10).

F. Construction Keying: Provide temporary keyed construction cores.

G. Key Registration List (Bitting List):

1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
2. Provide transcript list in writing or electronic file as directed by the Owner.

## 2.05 MECHANICAL LOCKS AND LATCHING DEVICES

A. Mortise Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 Certified Products Directory (CPD) listed. Locksets are to be manufactured with a corrosion resistant steel case and be field-reversible for handing without disassembly of the lock body.

1. Where specified, provide status indicators with highly reflective color and wording for "locked/unlocked" or "vacant/occupied" with custom wording options if required. Indicator to be located above the cylinder with the inside thumb-turn not blocking the visibility of the indicator status. Indicator window size to be a minimum of 2.1" x 0.6" with a curved design allowing a 180 degree viewing angle with protective covering to prevent tampering.
2. Manufacturers:
  - a. Corbin Russwin Hardware (RU) - ML2000 Series.
  - b. Sargent Manufacturing (SA) - 8200 Series.
  - c. Schlage (SC) - L9000 Series.

## 2.06 AUXILIARY LOCKS

A. Mortise Deadlocks, Small Case: ANSI/BHMA A156.36, Grade 1, small case mortise type deadlocks constructed of heavy gauge wrought corrosion resistant steel. Steel or stainless steel bolts with a 1" throw and hardened steel roller pins. Deadlocks to be products of the same source manufacturer and keyway as other specified locksets.

1. Manufacturers:
  - a. Corbin Russwin Hardware (RU) - DL4000 Series.
  - b. Sargent Manufacturing (SA) - 4870 Series.
  - c. Schlage (SC) - L460 Series.

## 2.07 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.

B. Standards: Comply with the following:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.

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2. Strikes for Bored Locks and Latches: BHMA A156.2.
3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
4. Dustproof Strikes: BHMA A156.16.

## 2.08 ELECTRIC STRIKES

- A. Standard Electric Strikes: Electric strikes conforming to ANSI/BHMA A156.31, Grade 1, for use on non-rated or fire rated openings. Strikes shall be of stainless steel construction tested to a minimum of 1500 pounds of static strength and 70 foot-pounds of dynamic strength with a minimum endurance of 1 million operating cycles. Provide strikes with 12 or 24 VDC capability, fail-secure unless otherwise specified. Where specified provide latchbolt and latchbolt strike monitoring indicating both the position of the latchbolt and locked condition of the strike.
  1. Manufacturers:
    - a. HES (HS) - 1006 Series.
    - b. Von Duprin (VD) - 6200/6400 Series.
- B. Provide electric strikes with in-line power controller and surge suppressor by the same manufacturer as the strike with the combined products having a five year warranty.

## 2.09 CONVENTIONAL EXIT DEVICES

- A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:
  1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
  2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
  3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
  4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
  5. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
    - a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
    - b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
  6. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
  7. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
  8. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
  9. Rail Sizing: Provide exit device rails factory sized for proper door width application.
  10. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.
- B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices furnished in the functions



specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.

1. Manufacturers:
  - a. Corbin Russwin Hardware (RU) - ED4000 / ED5000 Series.
  - b. Sargent Manufacturing (SA) - 80 Series.
  - c. Von Duprin (VD) - 35A/98 XP Series.

## 2.10 DOOR CLOSERS

- A. All door closers specified herein shall meet or exceed the following criteria:
  1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.
  2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
  3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.
  4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
  5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
  6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.
- B. Door Closers, Surface Mounted (Large Body Cast Iron): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control.
  1. Manufacturers:
    - a. Corbin Russwin Hardware (RU) - DC8000 Series.
    - b. Norton Rixson (NO) - 9500 Series.
    - c. Sargent Manufacturing (SA) - 281 Series.

## 2.11 ARCHITECTURAL TRIM

- A. Door Protective Trim
  1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
  2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
  3. Where plates are applied to fire rated doors with the top of the plate more than 16" above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer's catalog and template book for specific requirements for size and applications.
  4. Protection Plates: ANSI/BHMA A156.6 protection plates (kick, armor, or mop), fabricated from the following:
    - a. Stainless Steel: 300 grade, .050-inch thick.

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DOOR HARDWARE

5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
6. Manufacturers:
  - a. Hiawatha, Inc. (HI).
  - b. Rockwood (RO).
  - c. Trimco (TC).

## 2.12 DOOR STOPS AND HOLDERS

- A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
- B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
  1. Manufacturers:
    - a. Hiawatha, Inc. (HI).
    - b. Rockwood (RO).
    - c. Trimco (TC).
- C. Overhead Door Stops and Holders: ANSI/BHMA A156.8, Grade 1 Certified Products Directory (CPD) listed overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.
  1. Manufacturers:
    - a. Norton Rixson (RF).
    - b. Rockwood (RO).
    - c. Sargent Manufacturing (SA).

## 2.13 ARCHITECTURAL SEALS

- A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.
- B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
  1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.
- C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
  1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.
- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.

- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- F. Manufacturers:
  - 1. National Guard Products (NG).
  - 2. Pemko (PE).
  - 3. Reese Enterprises, Inc. (RE).

## 2.14 ELECTRONIC ACCESSORIES

- A. Request-to-Exit Motion Sensor: Request-to-Exit Sensors motion detectors specifically designed for detecting exiting through a door from the secure area to a non-secure area. Include built-in timers (up to 60 second adjustable timing), door monitor with sounder alert, internal vertical pointability coverage, 12VDC or 24VDC power and selectable relay trigger with fail safe/fail secure modes.
  - 1. Manufacturers:
    - a. Alarm Controls (AK) - SREX Series.
    - b. Securitron (SU) - XMS Series.
- B. Door Position Switches: Door position magnetic reed contact switches specifically designed for use in commercial door applications. On recessed models the contact and magnetic housing snap-lock into a 1" diameter hole. Surface mounted models include wide gap distance design complete with armored flex cabling. Provide SPDT, N/O switches with optional Rare Earth Magnet installation on steel doors with flush top channels.
  - 1. Manufacturers:
    - a. Securitron (SU) - DPS Series.
- C. Switching Power Supplies: Provide power supplies with either single or dual voltage configurations at 12 or 24VDC. Power supplies shall have battery backup function with an integrated battery charging circuit and shall provide capability for power distribution, direct lock control and Fire Alarm Interface (FAI) through add on modules. Power supplies shall be expandable up to 16 individually protected outputs. Output modules shall provide individually protected, continuous outputs and/or individually protected, relay controlled outputs.
  - 1. Provide the least number of units, at the appropriate amperage level, sufficient to exceed the required total draw for the specified electrified hardware and access control equipment.
  - 2. Manufacturers:
    - a. Securitron (SU) - AQD Series.
- D. Intelligent Switching Power Supplies: Provide power supplies with single, dual or multi-voltage configurations at 12 and/or 24VDC. Power Supply shall have battery backup function with an integrated battery charging circuit. The power supply shall have a standard, integrated Fire Alarm Interface (FAI). The power supply shall provide capability for secondary voltage, power distribution, direct lock control and network monitoring through add on modules. The power supply shall be expandable up to 16 individually protected outputs. Output modules shall provide individually protected, continuous outputs and/or individually protected, relay controlled outputs. Network modules shall provide remote monitoring functions such as status reporting, fault reporting and information logging.
  - 1. Provide the least number of units, at the appropriate amperage level, sufficient to exceed the required total draw for the specified electrified hardware and access control equipment.
  - 2. Manufacturers:
    - a. Securitron (SU) - AQL Series.

## 2.15 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

## 2.16 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

### 3.02 PREPARATION

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.
- B. Wood Doors: Comply with ANSI/DHI A115-W series.

### 3.03 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
  - 1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
  - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
  - 2. DHI TDH-007-20: Installation Guide for Doors and Hardware.
  - 3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."

- 4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
- C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
- E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

#### 3.04 FIELD QUALITY CONTROL

- A. Field Inspection (Punch Report): Reference Division 01 Sections "Closeout Procedures". Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.
  - 1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

#### 3.05 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.

#### 3.06 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

#### 3.07 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.08 DOOR HARDWARE SETS

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should 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 and functionality.
1. Quantities listed are for each pair of doors, or for each single door.
  2. The supplier is responsible for handing and sizing all products.
  3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.
  4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.

B. Manufacturer's Abbreviations:

	1. MK - MCKINNEY			
	2. PE - PEMKO			
	3. RU - CORBIN RUSSWIN			
	4. SH - SCHLAGE ELECTRONIC SECURITY			
	5. BE - BEST ACCESS & DOOR CLOSERS			
	6. HS - HES			
	7. RO - ROCKWOOD			
	8. RF - RIXSON			
	9. SU - SECURITRON			

HARDWARE SETS

SET: 1.0

DOORS: 101A

2	CONTINUOUS HINGE	10BEFM_SLF- HD1 X LENGTH REQUIRED		PE	
1	CONCEALED VERT ROD EXIT, CLASSROOM	ED5800 128955ET	613E	RU	
1	CONCEALED VERT ROD EXIT, EXIT ONLY	ED5800 EO	613E	RU	
1	CORE	AS REQUIRED TO MATCH FACILITY STANDARD (BEST 5C7DD SYSTEM)	613	BE	
2	CONC OVERHEAD STOP	6-336	613E	RF	
2	SURFACE CLOSER	DC8210 A3 / DC8200	613E	RU	

1	THRESHOLD	273X224-10BE-FGT X LENGTH REQUIRED X MSES25SS		PE	
1	GASKETING	PROVIDED BY DOOR/FRAME SUPPLIER			
2	SWEEP	3452-10BE-NB X LENGTH REQUIRED		PE	
2	POSITION SWITCH	DPS-M-BK		SU	⚡
<p>NOTES:          VERIFY AND COORDINATE SCHEDULED HARDWARE WITH EXISTING CONDITIONS PRIOR TO ORDERING. PREPARE EXISTING FRAME AND PROVIDE ALL FILLER PLATES AND ACCESSORIES REQUIRED FOR PROPER INSTALLATION AND FUNCTION OF NEW HARDWARE.</p> <p>SYSTEM OPERATIONAL NARRATIVE          DOOR POSITION SWITCHES MONITOR THE DOORS OPEN/CLOSED STATUS.</p>					
SET: 2.0					
DOORS: 004C					
3	HINGE, FULL MORTISE, HVY WT	T4A3386 [NRP]	US10BE	MK	
1	STOREROOM LOCK	ML2057 128T CT7D	613E	RU	
1	CORE	AS REQUIRED TO MATCH FACILITY STANDARD (BEST 5C7DD SYSTEM)	613	BE	
1	ELECTRIC STRIKE	1600-CS	613E	HS	⚡
1	SMART PAC BRIDGE RECTIFIER	2005M3		HS	⚡
1	DOOR OPERATOR, ACTUATORS, & ACCESSORIES	PROVIDED BY DOOR OPERATOR SUPPLIER			
1	KICK PLATE	K1050 12" CSK BEV	US10BE	RO	
1	THRESHOLD	273X224-10BE-FGT X LENGTH REQUIRED X MSES25SS		PE	
1	GASKETING	S773BL (HEAD & JAMBS)		PE	
1	SWEEP	3452-10BE-NB X		PE	

		LENGTH REQUIRED			
1	POSITION SWITCH	DPS-M-BK		SU	⚡
1	MOTION SENSOR	XMS		SU	⚡
1	REMOTE PUSH BUTTON	PROVIDED BY SECURITY SUPPLIER			
1	POWER SUPPLY	AQL4-R8E1		SU	⚡
1	WIRING DIAGRAM	ELEVATION AND POINT TO POINT AS SPECIFIED			

NOTES:

SYSTEM OPERATIONAL NARRATIVE

DOOR NORMALLY CLOSED AND SECURE.

ELECTRIC STRIKE OPENS AND DOOR OPERATOR IS SET IN MOTION VIA REMOTE PUSH  
BUTTON ONCE VETTED VIA INTERCOM CALL STATION.

ENTRY ALSO POSSIBLE VIA KEY OVERRIDE.

FREE EGRESS AT ALL TIMES.

MOTION SENSING REQUEST TO EXIT SWITCH TEMPORARILY SHUNTS THE DOOR POSITION  
SWITCH ALLOWING EGRESS WITHOUT INDICATING ALARM AT MONITORING STATION.

DOOR POSITION SWITCH MONITORS DOOR OPEN/CLOSED STATUS.

ELECTRIC STRIKE REMAINS CLOSED DURING POWER LOSS. (FAIL SECURE)

SET: 3.0

DOORS: ST1-2

6	HINGE, FULL MORTISE, HVY WT	T4A3386 [NRP]	US10BE	MK	
1	CONCEALED VERT ROD EXIT, EXIT ONLY	ED5800 EO	613E	RU	
1	CONCEALED VERT ROD EXIT, STOREROOM	ED5800 128959ET CT7SD	613E	RU	
1	CORE	AS REQUIRED TO MATCH FACILITY STANDARD (BEST 5C7DD SYSTEM)	613	BE	
2	SURFACE CLOSER	DC8210 A11	613E	RU	
2	KICK PLATE	K1050 12" CSK BEV	US10BE	RO	
1	THRESHOLD	273X224AFGT X LENGTH REQUIRED X MSES25SS		PE	
1	GASKETING	S773BL (HEAD		PE	

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DOOR HARDWARE



		& JAMBS)			
1	RAIN GUARD	346-10BE		PE	
2	SWEEP	3452-10BE-NB X LENGTH REQUIRED		PE	
1	ASTRAGAL	29324-10BE-NB X DOOR HEIGHT		PE	

NOTES:  
SYSTEM OPERATIONAL NARRATIVE  
DOOR POSITION SWITCHES MONITOR THE DOORS OPEN/CLOSED STATUS.

SET: 4.0  
DOORS: 004B

3	HINGE, FULL MORTISE, HVY WT	T4A3386 [NRP]	US10BE	MK	
1	RIM EXIT DEVICE, CLASSROOM	ED5200 128955ET CT7SD	613E	RU	
1	CORE	AS REQUIRED TO MATCH FACILITY STANDARD (BEST 5C7DD SYSTEM)	613	BE	
1	SURFACE CLOSER	DC8210 A11	613E	RU	
1	KICK PLATE	K1050 12" CSK BEV	US10BE	RO	
1	THRESHOLD	273X224AFGT X LENGTH REQUIRED X MSES25SS		PE	
1	GASKETING	S773BL (HEAD & JAMBS)		PE	
1	RAIN GUARD	346-10BE		PE	
1	SWEEP	3452-10BE-NB X LENGTH REQUIRED		PE	

NOTES:  
SYSTEM OPERATIONAL NARRATIVE  
DOOR POSITION SWITCH MONITORS DOORS OPEN/CLOSED STATUS.

SET: 5.0  
DOORS: 001A, 001B

6	HINGE	T4A3786 [NRP]	US10BE	MK	
1	SURFACE VERT ROD EXIT, STOREROOM	ED5470 128959ET M55 CT7D	613E	RU	
1	SURFACE VERT ROD EXIT, EXIT ONLY	ED5470 EO M55	613E	RU	
2	CORE	AS REQUIRED TO MATCH FACILITY STANDARD (BEST 5C7DD SYSTEM)	613	BE	
2	SURFACE CLOSER	DC8210 A11	613E	RU	
2	KICK PLATE	K1050 12" CSK BEV	US10BE	RO	
2	SILENCER	608		RO	

NOTES:

VERIFY AND COORDINATE SCHEDULED HARDWARE WITH EXISTING CONDITIONS PRIOR TO ORDERING. PREPARE EXISTING DOOR AND FRAME AND PROVIDE ALL FILLER/MOUNTING PLATES AND ACCESSORIES REQUIRED FOR PROPER INSTALLATION AND FUNCTION OF NEW HARDWARE.

SET: 6.0

DOORS: ST1-1

6	HINGE	T4A3786 [NRP]	US10BE	MK	
1	SURFACE VERT ROD EXIT, CLASSROOM	ED5470 128955ET M55 CT7SD	613E	RU	
1	SURFACE VERT ROD EXIT, EXIT ONLY	ED5470 EO M55	613E	RU	
1	CORE	AS REQUIRED TO MATCH FACILITY STANDARD (BEST 5C7DD SYSTEM)	613	BE	
1	SURFACE CLOSER	DC8210 A3 / DC8200	613E	RU	
1	SURFACE CLOSER	DC8210 A11	613E	RU	
2	KICK PLATE	K1050 12" CSK BEV	US10BE	RO	
1	WALL STOP	403 (OR) 441CU	US10BE	RO	
2	SILENCER	608		RO	

NOTES:

VERIFY AND COORDINATE SCHEDULED HARDWARE WITH EXISTING CONDITIONS PRIOR TO ORDERING. PREPARE EXISTING DOOR AND FRAME AND PROVIDE ALL FILLER/MOUNTING

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DOOR HARDWARE

PLATES AND ACCESSORIES REQUIRED FOR PROPER INSTALLATION AND FUNCTION OF NEW HARDWARE.

SET: 7.0

DOORS: 004A

3	HINGE	T4A3786 [NRP]	US10BE	MK	
1	RIM EXIT DEVICE, CLASSROOM	ED5200 128955ET CT7SD	613E	RU	
1	CORE	AS REQUIRED TO MATCH FACILITY STANDARD (BEST 5C7DD SYSTEM)	613	BE	
1	SURFACE CLOSER	DC8210 A11	613E	RU	
1	KICK PLATE	K1050 12" CSK BEV	US10BE	RO	
3	SILENCER	608		RO	

SET: 8.0

DOORS: 101B

8	HINGE	T4A3786 [NRP]	US10BE	MK	
2	DUMMY BAR, EXIT ONLY	ED5000DB EO	613E	RU	
1	DUNNY TRIM	128ET DUNNY LEVER TRIM	613E	RU	
2	SURFACE CLOSER	DC8210 A11	613E	RU	
2	KICK PLATE	K1050 12" CSK BEV	US10BE	RO	
2	SILENCER	608		RO	

NOTES:

VERIFY AND COORDINATE SCHEDULED HARDWARE WITH EXISTING CONDITIONS PRIOR TO ORDERING. PREPARE EXISTING DOOR AND FRAME AND PROVIDE ALL FILLER/MOUNTING PLATES AND ACCESSORIES REQUIRED FOR PROPER INSTALLATION AND FUNCTION OF NEW HARDWARE.

SET: 9.0

DOORS: 005-1A

3	HINGE, FULL MORTISE	TA2714 [NRP]	US10BE	MK	
1	STOREROOM LOCK	ML2057 128T CT7D	613E	RU	
1	CORE	AS REQUIRED TO MATCH	613	BE	

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DOOR HARDWARE

		FACILITY STANDARD (BEST 5C7DD SYSTEM)			
1	WALL STOP	403 (OR) 441CU	US10BE	RO	
1	SILENCER	608		RO	

NOTES:

VERIFY AND COORDINATE SCHEDULED HARDWARE WITH EXISTING CONDITIONS PRIOR TO ORDERING. PREPARE EXISTING FRAME AND PROVIDE ALL FILLER PLATES AND ACCESSORIES REQUIRED FOR PROPER INSTALLATION AND FUNCTION OF NEW HARDWARE.

SET: 10.0

DOORS: 003

3	HINGE, FULL MORTISE	TA2714 [NRP]	US10BE	MK	
1	STOREROOM LOCK	ML2057 128T CT7D	613E	RU	
1	CORE	AS REQUIRED TO MATCH FACILITY STANDARD (BEST 5C7DD SYSTEM)	613	BE	
1	SURF OVERHEAD STOP	10-336	613E	RF	
3	SILENCER	608		RO	

NOTES:

VERIFY AND COORDINATE SCHEDULED HARDWARE WITH EXISTING CONDITIONS PRIOR TO ORDERING. PREPARE EXISTING FRAME AND PROVIDE ALL FILLER PLATES AND ACCESSORIES REQUIRED FOR PROPER INSTALLATION AND FUNCTION OF NEW HARDWARE.

SET: 11.0

DOORS: 005-2A

3	HINGE, FULL MORTISE	TA2714 [NRP]	US10BE	MK	
1	STOREROOM LOCK	ML2057 128T CT7D	613E	RU	
1	CORE	AS REQUIRED TO MATCH FACILITY STANDARD (BEST 5C7DD SYSTEM)	613	BE	
1	SURFACE CLOSER	DC8210 A3 / DC8200	613E	RU	
1	KICK PLATE	K1050 12" CSK	US10BE	RO	

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DOOR HARDWARE

		BEV			
1	WALL STOP	403 (OR) 441CU	US10BE	RO	
3	SILENCER	608		RO	
SET: 12.0					
DOORS: 005-2B					
3	HINGE, FULL MORTISE	TA2714 [NRP]	US10BE	MK	
1	STOREROOM LOCK	ML2057 128T CT7D	613E	RU	
1	CORE	AS REQUIRED TO MATCH FACILITY STANDARD (BEST 5C7DD SYSTEM)	613	BE	
1	SURFACE CLOSER	DC8210 A4	613E	RU	
1	KICK PLATE	K1050 12" CSK BEV	US10BE	RO	
3	SILENCER	608		RO	
SET: 13.0					
DOORS: 108					
3	HINGE, FULL MORTISE	TA2714 [NRP]	US10BE	MK	
1	STOREROOM LOCK	ML2057 128T CT7D	613E	RU	
1	CORE	AS REQUIRED TO MATCH FACILITY STANDARD (BEST 5C7DD SYSTEM)	613	BE	
NOTES:					
VERIFY AND COORDINATE SCHEDULED HARDWARE WITH EXISTING CONDITIONS PRIOR TO ORDERING. PREPARE EXISTING DOOR AND FRAME AND PROVIDE ALL FILLER/MOUNTING PLATES AND ACCESSORIES REQUIRED FOR PROPER INSTALLATION AND FUNCTION OF NEW HARDWARE.					
SET: 14.0					
DOORS: 103					
3	HINGE, FULL MORTISE	TA2714 [NRP]	US10BE	MK	
1	ACCESS CONTROL CYL LOCK	AD-400 PUSH BUTTON SERIES	613	SH	⚡

		(MATCH FACILITY STANDARD)			
1	CORE	AS REQUIRED TO MATCH FACILITY STANDARD (BEST 5C7DD SYSTEM)	613	BE	
1	WALL STOP	403 (OR) 441CU	US10BE	RO	
1	GASKETING	S88BL (HEAD & JAMBS)		PE	
SET: 15.0					
DOORS: 016A, 104					
3	HINGE, FULL MORTISE	TA2714 [NRP]	US10BE	MK	
1	PRIVACY LOCK	ML2060 128T V21	613E	RU	
1	SURFACE CLOSER	DC8210 A3 / DC8200	613E	RU	
1	KICK PLATE	K1050 12" CSK BEV	US10BE	RO	
1	WALL STOP	403 (OR) 441CU	US10BE	RO	
1	GASKETING	S88BL (HEAD & JAMBS)		PE	
1	COAT HOOK	RM801	US10BE	RO	
SET: 16.0					
DOORS: 013					
1	DEADBOLT	DL4122 CT7D	613E	RU	
2	CORE	AS REQUIRED TO MATCH FACILITY STANDARD (BEST 5C7DD SYSTEM)	613	BE	
1	PUSH PLATE	70C-RKW	US10BE	RO	
1	PULL PLATE	BF 110X70C	US10BE	RO	
1	SURFACE CLOSER	DC8210 A3 / DC8200	613E	RU	
NOTES:					
BALANCE OF EXISTING HARDWARE TO REMAIN.					
VERIFY AND COORDINATE SCHEDULED HARDWARE WITH EXISTING CONDITIONS PRIOR TO					

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DOOR HARDWARE

ORDERING. PREPARE EXISTING DOOR AND FRAME AND PROVIDE ALL FILLER/MOUNTING PLATES AND ACCESSORIES REQUIRED FOR PROPER INSTALLATION AND FUNCTION OF NEW HARDWARE.

SET: 17.0

DOORS: 002, 010, 012

1	STOREROOM LOCK	ML2057 128T CT7D	613E	RU	
1	CORE	AS REQUIRED TO MATCH FACILITY STANDARD (BEST 5C7DD SYSTEM)	613	BE	

NOTES:

BALANCE OF EXISTING HARDWARE TO REMAIN.

VERIFY AND COORDINATE SCHEDULED HARDWARE WITH EXISTING CONDITIONS PRIOR TO ORDERING. PREPARE EXISTING DOOR AND FRAME AND PROVIDE ALL FILLER/MOUNTING PLATES AND ACCESSORIES REQUIRED FOR PROPER INSTALLATION AND FUNCTION OF NEW HARDWARE.

SET: 18.0

DOORS: 011, 015

1	STOREROOM LOCK	ML2057 128T CT7SD	613E	RU	
1	CORE	AS REQUIRED TO MATCH FACILITY STANDARD (BEST 5C7DD SYSTEM)	613	BE	

NOTES:

BALANCE OF EXISTING HARDWARE TO REMAIN.

VERIFY AND COORDINATE SCHEDULED HARDWARE WITH EXISTING CONDITIONS PRIOR TO ORDERING. PREPARE EXISTING DOOR AND FRAME AND PROVIDE ALL FILLER/MOUNTING PLATES AND ACCESSORIES REQUIRED FOR PROPER INSTALLATION AND FUNCTION OF NEW HARDWARE.

SET: 19.0

DOORS: 006, 08A

1	ACCESS CONTROL CYL LOCK	AD-400 PUSH BUTTON SERIES (MATCH FACILITY STANDARD)	613	SH	⚡
1	CORE	AS REQUIRED TO MATCH FACILITY STANDARD (BEST 5C7DD SYSTEM)	613	BE	
<p>NOTES: BALANCE OF EXISTING HARDWARE TO REMAIN.</p> <p>VERIFY AND COORDINATE SCHEDULED HARDWARE WITH EXISTING CONDITIONS PRIOR TO ORDERING. PREPARE EXISTING DOOR AND FRAME AND PROVIDE ALL FILLER/MOUNTING PLATES AND ACCESSORIES REQUIRED FOR PROPER INSTALLATION AND FUNCTION OF NEW HARDWARE.</p>					
SET: 20.0					
DOORS: 007					
1	PRIVACY LOCK	ML2060 128T V21	613E	RU	
<p>NOTES: BALANCE OF EXISTING HARDWARE TO REMAIN.</p> <p>VERIFY AND COORDINATE SCHEDULED HARDWARE WITH EXISTING CONDITIONS PRIOR TO ORDERING. PREPARE EXISTING DOOR AND FRAME AND PROVIDE ALL FILLER/MOUNTING PLATES AND ACCESSORIES REQUIRED FOR PROPER INSTALLATION AND FUNCTION OF NEW HARDWARE.</p>					
SET: 21.0					
DOORS: 08B, 201, 202					
1		EXISTING HARDWARE TO REMAIN			

END OF SECTION



## SECTION 08 8100 GLAZING

### PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS

A. Applicable provisions of Bidding Requirements, Contract Requirements in Division 0 and all applicable Division 01 sections.

#### B. RELATED SECTIONS

1. Section 081113 Hollow Metal Frames
2. Section 081416 Flush Wood Doors and other door type sections
3. Section 084113 Aluminum-Framed Entrances and Storefronts
4. Section 085113 Aluminum Windows

#### 1.02 SUMMARY

A. Section Includes: Glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:

1. Windows.
2. Doors.
3. Interior glazing.

#### 1.03 DEFINITIONS

A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

C. Interspace: Space between lites of an insulating-glass unit.

#### 1.04 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

#### 1.05 SUBMITTALS

A. Product Data: For each glass product and glazing material indicated.

B. Glass Samples: For each type of glass product other than clear monolithic vision glass 12 inches square.

- C. Glazing Accessory Samples: For gaskets, sealants and colored spacers, in 12-inch lengths. Install sealant Samples between two strips of material representative in color of the adjoining framing system.
- D. Qualification Data: For installers.
- E. Product Certificates: For glass and glazing products, from manufacturer.
- F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for insulating glass, glazing sealants and glazing gaskets.
  - 1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.
- G. Warranties: Sample of special warranties.

#### 1.06 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.
- B. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
- C. Source Limitations for Glass: Obtain laminated glass and insulating glass from single source from single manufacturer for each glass type.
- D. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.
- E. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
  - 1. NGA/GANA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."
  - 2. FGIA/IGMA Publication for Insulating Glass: IGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
- F. Safety Glazing Labeling: Where safety glazing labeling is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- G. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.
- H. Strength: Do not substitute relative to designations of annealed, heat-strengthened, and fully tempered glass.
- I. Preinstallation Conference: Conduct conference at Project site.
  - 1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
  - 2. Review temporary protection requirements for glazing during and after installation.

#### 1.07 PRODUCT HANDLING

- A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or

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other causes.

- B. Comply with insulating-glass manufacturer's written recommendations for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

#### 1.08 PROJECT CONDITIONS

- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
  - 1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or below 40 deg F.

#### 1.09 WARRANTY

- A. Manufacturer's Special Warranty on Laminated Glass: Manufacturer's standard form in which laminated-glass manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.
  - 1. Warranty Period: 10 years from date of Substantial Completion.
- B. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form in which insulating-glass manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.
  - 1. Warranty Period: 10 years from date of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.01 GLASS PRODUCTS, GENERAL

- A. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.
  - 1. Minimum Glass Thickness for Exterior Lites: Not less than 6.0 mm.
- B. Provide annealed, heat-strengthened, and fully tempered glass as specifically designated, without substitutions unless advance written permission is provided by the project Architect

#### 2.02 GLASS PRODUCTS

- A. Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Guardian Glass LLC; or comparable product by one of the following:
    - a. Guardian Glass LLC (Basis-of design product).
    - b. Pilkington North America.
    - c. Vitro Architectural Glass
- B. Fully Tempered Float Glass: ASTM C 1048; Kind FT,(clear) Low E unless otherwise indicated; of kind and condition indicated.

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- C. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion horizontally oriented after completion of field glazing unless Architect's advanced written approval is provided.
  - 1. For uncoated glass, comply with requirements for Condition A.
  - 2. For coated vision glass, comply with requirements for Condition C (other coated glass).
- D. Low-E-Coated Vision Glass: ASTM C1376, coated by vacuum deposition (sputter-coating) process, and complying with other requirements specified.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Guardian Glass LLC; SunGuard SN 68 on Clear and SN 68 on CrystalGray or comparable product by one of the following:
    - a. Guardian Glass LLC (Basis-of design product).
    - b. Pilkington North America.
    - c. Vitro Architectural Glass

### 2.03 LAMINATED GLASS

- A. Laminated Glass: ASTM C 1172, and complying with testing requirements in 16 CFR 1201 for Category II materials, and with other requirements specified. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
  - 1. Construction: Laminate glass with polyvinyl butyral interlayer to comply with interlayer manufacturer's written recommendations.
  - 2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
  - 3. Interlayer Color: Clear.
- B. Glass: Comply with applicable requirements in "Glass Products" Article as indicated by descriptions in "Glass Types" Article.

### 2.04 INSULATING GLASS

- A. Manufacturers: Basis of Design; Guardian Industries Corp.; Sunguard Architectural Glass; Subject to compliance with requirements, provide products by one of the following:
  - 1. Guardian Glass LLC.
  - 2. Pilkington North America.
  - 3. PPG Industries, Inc.
- B. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190, and complying with other requirements specified.
  - 1. Sealing System: Dual seal, with manufacturer's standard polyisobutylene primary and silicone secondary.
  - 2. Spacer: Aluminum with mill or clear anodic finish.
  - 3. Desiccant: Molecular sieve or silica gel, or blend of both.
- C. Glass: Comply with applicable requirements in "Glass Products" Article and in "Laminated Glass" Article as indicated by descriptions in "Insulating-Glass Types" Article and in "Glass Types" Article.

## 2.05 GLAZING GASKETS

- A. Dense Compression Gaskets: Molded or extruded gaskets of profile and hardness required to maintain watertight seal, made from one of the following:
  - 1. EPDM complying with ASTM C 864.
  - 2. Silicone complying with ASTM C 1115.
  - 3. Thermoplastic polyolefin rubber complying with ASTM C 1115.
- B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned EPDM, silicone or thermoplastic polyolefin rubber gaskets complying with ASTM C 509, Type II, black; of profile and hardness required to maintain watertight seal.
  - 1. Application: Use where soft compression gaskets will be compressed by inserting dense compression gaskets on opposite side of glazing or pressure applied by means of pressure-glazing stops on opposite side of glazing.

## 2.06 GLAZING SEALANTS

- A. General:
  - 1. Compatibility: Provide glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
  - 2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
  - 3. VOC Emissions for Sealants: Provide certificate of compliance with California Department of Public Health (CPDH) Standard Method v1.1- 2010, using the applicable exposure scenario.
  - 4. VOC Content for Sealants: Provide documentation of compliant VOC Content per SCAQMD Rule 1168.
  - 5. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

## 2.07 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
  - 1. AAMA 804.3 tape, where indicated.
  - 2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
  - 3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
- B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
  - 1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
  - 2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

## 2.08 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

## 2.09 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

## 2.10 MONOLITIC LAMINATED GLASS SCHEDULE

- A. Glass Type GL-1: Monolithic Laminated Glass. Application: Interior Doors and Side Lights.
  - 1. Overall Thickness: 7/16 inch.
  - 2. Two plies of fully tempered clear float glass.
  - 3. Basis-of-Design Product: Guardian Glass, LLC; Clear.
  - 4. Minimum Thickness of Each Glass Ply: 5 mm (3/16 inch).
  - 5. Interlayer Thickness: 0.060 inch PVB (1.52 mm).

## 2.11 Insulating-laminated glass schedule

- A. **Glass Type GL-2:** Clear, Low-E Coated Insulating laminated glass. Application: all exterior glazing UNO.
  - 1. Basis-of-Design Product: Guardian Glass LLC; SunGuard SN 68 on Clear.
  - 2. Overall Unit Thickness: 1 and 5/16 inch.
  - 3. Outboard Lite: Guardian Clear float glass.
    - a. Coating on #2 Surface: Guardian SunGuard SN 68.
    - b. Heat Treatment: Heat Strengthened.
  - 4. Interspace: Air filled, 1/2 inch thick, hermetically sealed.
  - 5. Inboard Lite: Clear laminated glass with two plies of Heat Strengthened glass.
    - a. Thickness of Each Glass Ply: 1/4 inch (6 mm).
    - b. Interlayer Thickness: 0.090 inch; Clear SGP or approved equivalent from other manufacturer.
  - 6. Glass Unit Performance Values:

7. Glass Performance Values: U winter = 0.28, SHGC = 0.37, Visible Light Transmittance = 66%
8. Provide safety glazing labeling
9. Safety glazing where required.
10. Note: special translucent version of this glazing for one unit as indicated on drawings.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
  1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
  2. Presence and functioning of weep systems.
  3. Minimum required face and edge clearances.
  4. Effective sealing between joints of glass-framing members.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.02 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
- B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that will leave visible marks in the completed work.

### 3.03 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.
- C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
- D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- G. Provide spacers for glass lites where length plus width is larger than 50 inches.



1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
  2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- J. Set glass lites with proper orientation so that coatings face exterior or interior as specified.
- K. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- L. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.
- 3.04 TAPE GLAZING
- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until right before each glazing unit is installed.
- F. Apply heel bead of elastomeric sealant if required to comply with performance requirements.
- G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- H. Apply cap bead of elastomeric sealant over exposed edge of tape, at locations where fixed stop is located on exterior.

3.05 GASKET GLAZING (DRY)

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.



- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

### 3.06 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

### 3.07 CLEANING AND PROTECTION

- A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.
- C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.
- D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.
- E. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

END OF SECTION 088100 08 8100

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SECTION 08 8300  
MIRRORS

PART 2 PRODUCTS

1.01 MATERIALS

END OF SECTION 08 8300

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## SECTION 08 9110 LOUVERS

### PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS:

- A. Applicable provisions of Bidding Requirements, Contract Requirements in Division 0 and all applicable Division 1 sections.

#### 1.02 SECTION INCLUDES:

- A. Furnish and Install: Louvers.
- B. Related Sections:
  - 1. Section 079200 Joint Sealants
  - 2. Division 23 - Heating, Ventilating, and Air Conditioning
  - 3. Division 26 - Electrical
- C. Engineering by Contractor:
  - 1. Scope: Engineer all louvers including connections to building structure.
  - 2. Submittals: Calculations, shop fabrication drawings, field erection and installation drawings, details of connections.

#### 1.03 SUBMITTALS:

- A. Product Data: Manufacturer's data including instructions, recommendations, and restrictions.
- B. Verification Samples: 12 x 12 inches.

#### 1.04 DELIVERY, STORAGE, HANDLING:

- A. Comply with Division 1 General Requirements and manufacturer's instructions and recommendations.

### PART 2 - PRODUCTS

#### 2.01 MANUFACTURERS:

- A. Airline, Nystrom Building Products, [www.nystrom.com](http://www.nystrom.com)
- B. Airolite Company LLC, [www.airolite.com](http://www.airolite.com)
- C. Buckley [www.buckleyonline.com](http://www.buckleyonline.com)
- D. Construction Specialties, Inc., [www.c-sgroup.com](http://www.c-sgroup.com)
- E. Empire Ventilation Equipment Co., Inc., [www.empirevent.com](http://www.empirevent.com)
- F. Greenheck Fan Corporation, [www.greenheck.com](http://www.greenheck.com)
- G. Industrial Louvers Inc., [www.industriallouvers.com](http://www.industriallouvers.com)

H. Ruskin Company, [www.ruskin.com](http://www.ruskin.com)

## 2.02 LOUVERS:

A. Basis of Design: "RS-7315" Storm Resistant, Construction Specialties, Inc., [www.c-sgroup.com](http://www.c-sgroup.com)

B. Material: Extruded aluminum.

1. Blade Thickness: 0.068 inch.
2. Frame Thickness: 0.068 inch.

C. Assembly: Mechanically fastened with aluminum or alloy 304 stainless steel fasteners.

D. Mullions: Concealed from exterior.

## 2.03 LOUVER ACCESSORIES:

A. Clip Angles, Fasteners: Conceal from exterior view.

1. Clip Angles: 0.125 inch thick aluminum.
2. Fasteners: Alloy 304 stainless steel.

B. Bird Screens: Required for all louvers, but not louvers with insect screens.

1. Free Area: 80 percent.
2. Screen Fabric: 0.5 inch square mesh of 0.063 inch gage aluminum wire.
3. Frame: Formed aluminum.
4. Location: Inside face of louver.
5. Finish: Flat black.

C. Insect Screens: Required for all louvers not directly connected to duct work.

1. Free Area: 60 percent.
2. Screen Fabric: 18 x 14 mesh 0.0123 inch aluminum wire.
3. Frame: Formed aluminum.
4. Location: Inside face of louver.
5. Finish: Flat black.

D. Insulated Blank Off Plates:

1. Face Skins: 0.032 inch thick aluminum sheet on both sides of core.
2. Core: 1 inch thick, non combustible, semi-rigid, mineral fiber insulation.
3. Edges: Closed with aluminum channels.
4. Sizes: Custom for each louver and each condition.
5. Location: Inside face of louver to close all unused louver area.
6. Finish of Surfaces Visible From Exterior: Flat black.

E. Sill Flashing Pan: 0.050 inch aluminum, formed into seamless, welded seam, three sided pans with hemmed drip edge.

## 2.04 LOUVER FABRICATION:

A. Shop fabricate louvers.

B. Fabricate louvers straight, plumb, level, and square with uniform, tight joints.

C. Maintain equal blade spacing from blade to blade and from blade to frame.

D. Provide 0.75 inch deep sealant adhesion legs at entire perimeter of each louver.

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LOUVERS

- E. Visible Metal Finish: Architect to select from manufacturer's standard color chart for Powder Coat and Kynar Finishes.

2.05 JOINT SEALANTS:

- A. Comply with Section 079200 Joint Sealants.

2.06 GALVANIC ISOLATION TAPE:

- A. 7 mils thick, UV resistant, water resistant, vinyl electrical tape.
- B. Basis of Design: "Scotch Super 33+ Vinyl Electrical Tape", 3M Corporation [www.3m.com](http://www.3m.com)

PART 3 - EXECUTION

3.01 LOUVERS INSTALLATION:

- A. Comply with manufacturer's instructions and recommendations.
- B. Comply with approved, engineered installation drawings.
- C. Install plumb, level, square, and in alignment with exterior wall plane.
- D. Conceal clip angles and fasteners from exterior view.
- E. Attach louver to building structure: structural steel, light gage steel framing, or structural masonry.
  - 1. Do not attach to building veneer systems including, without limitation, masonry veneer.
- F. Coordinate installation with flashings built into walls.
- G. Isolate louver from direct contact with masonry, concrete, and dissimilar metals.
- H. Install screens.
- I. Restore damaged finishes to eliminate all evidence of repair.

3.02 ADDITIONAL REQUIREMENTS FOR SILL FLASHING PANS:

- A. Collect, control, and drain water which enters through the louver.
- B. Provide custom fabricated sill flashing pans continuously under louver sills.
- C. Pitch flashing pan 10 degrees toward the exterior of building.
  - 1. Continuously frame or grout under flashing pan to form pitch.
- D. Provide seamless flashing pans up to 9 feet sill length.
  - 1. For over 9 feet sill length, multiple pans are allowed, but minimize seams.
  - 2. Overlap seams at least three inches.
  - 3. Provide two continuous beads of concealed silicone sealant in each overlapped seam.
  - 4. Cover seam with 6 inch wide strip of 40 mil thick, rubberized asphalt flashing.
  - 5. Do not expose flexible flashing strip to view or sunlight in the completed installation.
- E. Fabricate flashing pan from = 0.032 inch aluminum.

- F. Form three sided pans with = 2.0 inches high up turned edges.
- G. Fold and hem pan edges.
- H. Provide permanently waterproof, folded pan corners.
  - 1. Do not provide sealant sealed corners.
- I. Terminate flashing pan exterior edge as shown or, if not shown, flush with exterior face of louver sill with hemmed drip.
- J. Extend flashing pan interior edge as shown or, if not shown, 12 inches inside louver sill.
- K. Support interior projecting pan with aluminum supports spaced = 16 inches on center.
  - 1. Do not mechanically fasten pan to aluminum supports.
  - 2. Adhere pan to aluminum supports or mechanically fold pan edge to aluminum supports.
- L. Do not fasten through or penetrate sill flashing pan at any location.

3.03 ADDITIONAL REQUIREMENTS FOR DUCT CONNECTIONS:

- A. For louvers intended to be connected to building ductwork:
  - 1. Coordinate louvers with building duct work.
  - 2. Provide sheet metal transitions to connect louvers to building duct work.
  - 3. Fabricate sheet metal transitions to match building duct work in size, material, insulation, fabrication, quality.

3.04 ADDITIONAL REQUIREMENTS FOR BLANK OFF PLATES:

- A. Coordinate installation with building duct work and related work, if any.
- B. Accurately cut and fit blank off plates to accommodate all connected ducts and penetrations.
- C. Extend blank-off plates over 100 percent of interior louver areas not used for ventilation.
- D. Orient black painted face of blank off plate toward louver blades.
- E. Provide continuous glazing tape between blank off plate and louver interior frame.
- F. Make waterproof and air tight seals between blank off plates and interior louver frame.
- G. Mechanically attach blank off plates with sheet metal screws.
- H. Locate sheet metal screws within 3 inches of corners and not over 8 inches in between.

END OF SECTION 08 9110



SECTION 09 0561  
COMMON WORK RESULTS FOR FLOORING PREPARATION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Applicable provisions of Bidding Requirements, Contract Requirements in Division 0 and all applicable Division 1 sections.
- B. Related Sections:
  - 1. Section 033000 - Cast-in-Place Concrete.
  - 2. Section 093000 - Tiling.
  - 3. Section 096200 - Resinous Poured In Place Resilient Flooring.
  - 4. Section 096500 - Resilient Flooring.

1.02 SECTION INCLUDES

- A. This section applies to floors identified in Contract Documents that are receiving the following types of floor coverings:
  - 1. Resilient tile and sheet.
  - 2. Thin-set ceramic tile and stone tile.
  - 3. Resinous poured in place resilient flooring.
- B. Patching compound.
- C. Remedial floor coatings.

1.03 REFERENCE STANDARDS

- A. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens); 2016a.
- B. ASTM C472 - Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters and Gypsum Concrete; 1999 (Reapproved 2014).
- C. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2019.
- D. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2016a.
- E. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2017.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate scheduling of cleaning and testing, so that preliminary cleaning has been completed for at least 24 hours prior to testing.

## 1.05 SUBMITTALS

- A. Floor Covering and Adhesive Manufacturers' Product Literature: For each specific combination of substrate, floor covering, and adhesive to be used; showing:
  - 1. Moisture and alkalinity (pH) limits and test methods.
  - 2. Manufacturer's required bond/compatibility test procedure.
- B. Remedial Materials Product Data: Manufacturer's published data on each product to be used for remediation.
  - 1. Manufacturer's qualification statement.
  - 2. Manufacturer's statement of compatibility with types of flooring applied over remedial product.
  - 3. Test reports indicating compliance with specified performance requirements, performed by nationally recognized independent testing agency.
  - 4. Manufacturer's installation instructions.
  - 5. Specimen Warranty: Copy of warranty to be issued by coating manufacturer and certificate of underwriter's coverage of warranty.
- C. Adhesive Bond and Compatibility Test Report.
- D. Floor Moisture Testing Technician Certificate: International Concrete Repair Institute (ICRI) Concrete Slab Moisture Testing Technician- Grade I certificate.

## 1.06 QUALITY ASSURANCE

- A. Remedial Coating Installer Qualifications: Company specializing in performing work of the type specified in this section, trained by or employed by coating manufacturer, and able to provide at least 3 project references showing at least 3 years' experience installing moisture emission coatings.

## 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, handle, and protect products in accordance with manufacturer's instructions and recommendations.
- B. Deliver materials in manufacturer's packaging; include installation instructions.
- C. Keep materials from freezing.

## PART 2 PRODUCTS

### 2.01 MATERIALS

- A. Patching Compound: Floor covering manufacturer's recommended product, suitable for conditions, and compatible with adhesive and floor covering. In the absence of any recommendation from flooring manufacturer, provide a product with the following characteristics:
  - 1. Cementitious moisture-, mildew-, and alkali-resistant compound, compatible with floor, floor covering, and floor covering adhesive, and capable of being feathered to nothing at edges.
  - 2. Compressive Strength: 3000 psi, minimum, after 28 days, when tested in accordance with ASTM C109/C109M or ASTM C472, whichever is appropriate.
  - 3. Products:

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- a. TEC, an H.B. Fuller Construction Products Brand; TEC Feather Edge Skim Coat: [www.tecspecialty.com/#sle](http://www.tecspecialty.com/#sle).
  - b. Substitutions: See Section 012500 "Substitution Procedures"
- B. Alternate Flooring Adhesive: Floor covering manufacturer's recommended product, suitable for the moisture and pH conditions present; low-VOC. In the absence of any recommendation from flooring manufacturer, provide a product recommended by adhesive manufacturer as suitable for substrate and floor covering and for conditions present.
- C. Remedial Floor Coating: Single- or multi-layer coating or coating/overlay combination intended by its manufacturer to resist water vapor transmission to degree sufficient to meet flooring manufacturer's emission limits, resistant to the level of alkalinity (pH) found, and suitable for adhesion of flooring without further treatment.
  - 1. Thickness: As required for application and in accordance with manufacturer's installation instructions.
  - 2. Use product recommended by testing agency.

### PART 3 EXECUTION

#### 3.01 CONCRETE SLAB PREPARATION

- A. Perform following operations in the order indicated:
  - 1. Preliminary cleaning.
  - 2. Specified remediation, if required.
  - 3. Patching, smoothing, and leveling, as required.
  - 4. Other preparation specified.
  - 5. Adhesive bond and compatibility test.
  - 6. Protection.
- B. Remediations:
  - 1. Active Water Leaks or Continuing Moisture Migration to Surface of Slab: Correct this condition before doing any other remediation; re-test after correction.
  - 2. Excessive Moisture Emission or Relative Humidity: If an adhesive that is resistant to the level of moisture present is available and acceptable to flooring manufacturer, use that adhesive for installation of the flooring; if not, apply remedial floor coating or remedial sheet membrane over entire suspect floor area.
  - 3. Excessive Alkalinity (pH): If remedial floor coating is necessary to address excessive moisture, no additional remediation is required; if not, if an adhesive that is resistant to the level present is available and acceptable to the flooring manufacturer, use that adhesive for installation of the flooring; otherwise, apply a skim coat of specified patching compound over entire suspect floor area.

#### 3.02 MOISTURE VAPOR EMISSION TESTING

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. Where this specification conflicts with the referenced test method, comply with the requirements of this section.
- C. Test in accordance with ASTM F1869 and as follows.
- D. Plastic sheet test and mat bond test may not be substituted for the specified ASTM test method, as those methods do not quantify the moisture content sufficiently.

- E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if test values exceed 3 pounds per 1000 square feet per 24 hours.
- F. Report: Report the information required by the test method.

### 3.03 ALKALINITY TESTING

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if alkalinity (pH) test value is over 10.

### 3.04 PREPARATION

- A. See individual floor covering section(s) for additional requirements.
- B. Comply with requirements and recommendations of floor covering manufacturer.
- C. Fill and smooth surface cracks, grooves, depressions, control joints and other non-moving joints, and other irregularities with patching compound.
- D. Do not fill expansion joints, isolation joints, or other moving joints.

### 3.05 ADHESIVE BOND AND COMPATIBILITY TESTING

- A. Comply with requirements and recommendations of floor covering manufacturer.

### 3.06 APPLICATION OF REMEDIAL FLOOR COATING

- A. Comply with requirements and recommendations of coating manufacturer.

### 3.07 INSTALLATION OF REMEDIAL FLOOR SHEET MEMBRANE

- A. Install in accordance with sheet membrane manufacturer's instructions.

### 3.08 PROTECTION

- A. Cover prepared floors with building paper or other durable covering.

END OF SECTION 090561 09 0561

SECTION 09 2216  
NON-STRUCTURAL METAL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Metal partition, ceiling, and soffit framing.
- B. Framing accessories.

1.02 RELATED REQUIREMENTS

- A. Section 05 4000 - Cold-Formed Metal Framing: Execution requirements for anchors for attaching work of this section.
- B. Section 05 5000 - Metal Fabrications: Metal fabrications attached to stud framing.
- C. Section 05 5000 - Metal Fabrications: Execution requirements for anchors for attaching work of this section.
- D. Section 06 1000 - Rough Carpentry: Wood blocking within stud framing.
- E. Section 06 1000 - Rough Carpentry: Wall sheathing.
- F. Section 07 2100 - Thermal Insulation: Acoustic insulation.
- G. Section 07 6200 - Sheet Metal Flashing and Trim: Head and sill flashings.
- H. Section 07 8400 - Firestopping: Sealing top-of-wall assemblies at fire-resistance-rated walls.
- I. Section 07 9200 - Joint Sealants: Sealing acoustical gaps in construction other than gypsum board or plaster work.
- J. Section 08 3100 - Access Doors and Panels.
- K. Section 08 5113 - Aluminum Windows: Product requirements for window anchors.
- L. Section 09 2500-Gypsum Board: Execution requirements for anchors for attaching work of this section.
- M. Section 09 2500-Gypsum Board: Execution requirements for shaft wall framing, anchors for attaching work of this section.

1.03 REFERENCE STANDARDS

- A. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members 2016, with Supplement (2020).
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- D. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members 2015.

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- E. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members 2018.
- F. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing 2017.
- G. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products 2020.
- H. 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.
- I. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2022.
- J. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic) 2019.

#### 1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Shop Drawings:
  1. Indicate prefabricated work, component details, stud layout, framed openings, anchorage to structure, acoustic details, type and location of fasteners, accessories, and items of other related work.
  2. Describe method for securing studs to tracks, splicing, and for blocking and reinforcement of framing connections.
- C. Product Data: Provide data describing framing member materials and finish, product criteria, load charts, and limitations.
- D. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.
- E. SSFSA Manufacturer Qualification: Submit documentation of manufacturer association membership.
- F. SSMA Manufacturer Qualification: Submit documentation of manufacturer association membership.

#### 1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing the work of this section with minimum five years documented experience and approved by manufacturer.

#### 1.06 MOCK-UP

- A. Provide mock-up of stud wall, ceiling, and soffit framing including insulation, sheathing, window frame, and door frame and finish specified in other sections. Coordinate with installation of associated work specified in other sections.
  1. Mock-up may remain as part of the Work.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Metal Framing, Connectors, and Accessories:
  - 1. CEMCO: [www.cemcosteel.com/#sle](http://www.cemcosteel.com/#sle).
  - 2. ClarkDietrich: [www.clarkdietrich.com/#sle](http://www.clarkdietrich.com/#sle).
  - 3. Jaimes Industries: [www.jaimesind.com/#sle](http://www.jaimesind.com/#sle).
  - 4. Marino: [www.marinoware.com/#sle](http://www.marinoware.com/#sle).
  - 5. R-stud, LLC: [www.rstud.com/#sle](http://www.rstud.com/#sle).
  - 6. SCAFECO Corporation: [www.scafco.com/#sle](http://www.scafco.com/#sle).
  - 7. Simpson Strong Tie: [www.strongtie.com/#sle](http://www.strongtie.com/#sle).
  - 8. Steel Construction Systems: [www.steelconsystems.com/#sle](http://www.steelconsystems.com/#sle).
  - 9. Super Stud Building Products, Inc: [www.buysuperstud.com/#sle](http://www.buysuperstud.com/#sle).
  - 10. The Steel Network, Inc: [www.SteelNetwork.com/#sle](http://www.SteelNetwork.com/#sle).

### 2.02 FRAMING MATERIALS

- A. Fire-Resistance-Rated Assemblies: Comply with applicable code and as follows:
  - 1. Fire-Resistance-Rated shaft wall elevator Ceiling : Listed assembly by UL, No. (as indicated on drawings); 2 hour rating.
- B. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf.
  - 1. Studs: C shaped with knurled or embossed faces.
    - a. Products:
      - 1) MBA Building Supplies; ProSTUD: [www.mbastuds.com/#sle](http://www.mbastuds.com/#sle).
      - 2) Super Stud Building Products, Inc; The EDGE: [www.buysuperstud.com/#sle](http://www.buysuperstud.com/#sle).
  - 2. Paired Studs for Sound-Rated Assemblies: Engineered single-piece assemblies comprised of paired studs coupled by sound isolators, designed to replace conventional side-by-side, parallel, double-wall partition framing.
    - a. Widths: As indicated on drawings.
    - b. Products:
      - 1) SCAFECO Corporation; SoundGuard Silent Steel Framing System: [www.scafco.com/#sle](http://www.scafco.com/#sle).
  - 3. Runners: U shaped, sized to match studs.
  - 4. Ceiling Channels: C shaped.
  - 5. Resilient Furring Channels: Single or double leg configuration; 1/2 inch channel depth.
    - a. Products:
      - 1) ClarkDietrich; RC Deluxe Resilient Channel: [www.clarkdietrich.com/#sle](http://www.clarkdietrich.com/#sle).
  - 6. Resilient Sound Isolation Clips: Steel resilient clips with molded rubber isolators, attaches to framing; improves noise isolation for areas between gypsum board assemblies and adjacent sources of noise.
    - a. Products:
      - 1) ClarkDietrich; Sound Clip (CDSC): [www.clarkdietrich.com/#sle](http://www.clarkdietrich.com/#sle).
      - 2) Pliteq, Inc; GenieClip RST: [www.pliteq.com/#sle](http://www.pliteq.com/#sle).
- C. Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection using slotted holes, screws, and anti-friction bushings, preventing rotation of studs while maintaining structural performance of partition.

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NON-STRUCTURAL METAL FRAMING

1. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code, when evaluated in accordance with AISI S100.
2. Material: ASTM A653/A653M steel sheet, SS Grade 50, with G60/Z180 hot-dipped galvanized coating.
3. Provide components UL-listed for use in UL-listed fire-resistance-rated head of partition joint systems indicated on drawings.

D. Non-Loadbearing Framing Accessories:

1. Ceiling Hangers: Type and size as specified in ASTM C754 for spacing required.
2. Partial Height Wall Framing Support: Provides stud reinforcement and anchored connection to floor.
  - a. Materials: ASTM A36/A36M formed sheet steel support member with factory-welded ASTM A1003/A1003M steel plate base.
  - b. Height: 35-3/4 inches.
  - c. Products:
    - 1) ClarkDietrich; Pony Wall (PW): [www.clarkdietrich.com/#sle](http://www.clarkdietrich.com/#sle).
3. Framing Connectors: ASTM A653/A653M G90 galvanized steel clips; secures cold rolled channel to wall studs for lateral bracing.
  - a. Products:
    - 1) ClarkDietrich; FastBridge Clip (FB33): [www.clarkdietrich.com/#sle](http://www.clarkdietrich.com/#sle).
4. Shaft wall fire rated assembly framing in accordance with UL assembly refer to drawings and GWB section for further requirements.
  - a. Shaft Wall Studs and Accessories: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 and specified performance requirements including minimum installation requirements.
  - b. Non-structural Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/120 at 5 psf.
5. Flexible Wood Backing: Fire-retardant-treated wood with sheet steel connectors.
6. Sheet Metal Backing: 0.036 inch thick, galvanized.
7. Fasteners: ASTM C1002 self-piercing tapping screws.
8. Anchorage Devices: Powder actuated.
9. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced. Thickness: 3 inch ( 75 mm).
10. Acoustic Insulation: As specified in Section 07 2100.
11. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20 Type I - Inorganic.

E. Sound Isolation Tape: Elastomeric foam tape for sound decoupling.

1. Surface Burning Characteristics: Provide assemblies with flame spread index of 75 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
2. Tape Thickness: 1/4 inch.

## 2.03 FABRICATION

- A. Fabricate assemblies of framed sections to sizes and profiles required.
- B. Fit, reinforce, and brace framing members to suit design requirements.
- C. Fit and assemble in largest practical sections for delivery to site, ready for installation.



## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that rough-in utilities are in proper location.

### 3.02 INSTALLATION OF STUD FRAMING

- A. Comply with requirements of ASTM C754.
- B. Extend partition framing to structure where indicated and to ceiling in other locations.
- C. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.
- D. Align and secure top and bottom runners at 24 inches on center.
- E. Fit runners under and above openings; secure intermediate studs to same spacing as wall studs.
- F. Align stud web openings horizontally.
- G. Secure studs to tracks using crimping method. Do not weld.
- H. Stud splicing is not permissible.
- I. Fabricate corners using a minimum of three studs.
- J. Install double studs at wall openings, door and window jambs, not more than 2 inches from each side of openings.
- K. Brace stud framing system rigid.
- L. Coordinate erection of studs with requirements of door frames; install supports and attachments.
- M. Coordinate installation of bucks, anchors, and blocking with electrical, mechanical, and other work to be placed within or behind stud framing.
- N. Blocking: Use wood blocking secured to studs. Provide blocking for support of plumbing fixtures, toilet partitions, wall cabinets, toilet accessories, hardware, and opening frames.
- O. Sound Isolation Clips: Mechanically attach to framing or structure with fasteners recommended by clip manufacturer. Install at spacing indicated on drawings.
- P. Furring: Coordinate with sound isolation clip spacing and locations. Lap splices a minimum of 6 inches.
- Q. Use sheet metal backing for reinforcement of casework and behind other wall mounted items.
- R. Refer to GWB Section for Shaft wall execution requirements.

### 3.03 CEILING AND SOFFIT FRAMING

- A. Comply with requirements of ASTM C754.
- B. Install furring after work above ceiling or soffit is complete. Coordinate the location of hangers with other work.
- C. Install furring independent of walls, columns, and above-ceiling work.
- D. Securely anchor hangers to structural members or embed them in structural slab. Space hangers as required to limit deflection to criteria indicated. Use rigid hangers at exterior soffits.
- E. Space main carrying channels at maximum 72 inch on center, and not more than 6 inches from wall surfaces. Lap splice securely.
- F. Securely fix carrying channels to hangers to prevent turning or twisting and to transmit full load to hangers.
- G. Place furring channels perpendicular to carrying channels, not more than 2 inches from perimeter walls, and rigidly secure. Lap splices securely.
- H. Reinforce openings in suspension system that interrupt main carrying channels or furring channels with lateral channel bracing. Extend bracing minimum 24 inches past each opening.

### 3.04 TOLERANCES

- A. Maximum Variation From True Position: 1/8 inch in 10 feet.
- B. Maximum Variation From Plumb: 1/8 inch in 10 feet.

END OF SECTION 09 2216

## SECTION 09 2300 GYPSUM PLASTERING

### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

- A. Gypsum plastering.
- B. Gypsum lath.
- C. Repair of Existing Plaster and Lath to Industry Standards and provided in this section.
  - 1. ASTM C1063-22
  - 2. Industry Best Practice and Requirements of Manufacturer.
  - 3. Historic requirements in Division 1.
- D. Restoration: The work required includes finish restoration of original surfaces to the greatest degree possible, while complying with current codes and construction limitations.
  - 1. The contractor is to provide all necessary systems and materials as required to produce the intended finishes.
  - 2. Where current codes cannot be complied with, and/or construction limitations (including deterioration of existing substrate) are such that the intended finish cannot be achieved, notify the architect for clarification and/or decision prior to proceeding with the work.

#### 1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Wood stud framing for plaster.
- B. Section 07 8400 - Firestopping: Sealing top-of-wall assemblies and through-wall penetrations at fire rated walls.
- C. Section 07 9200 - Joint Sealants: Sealing acoustical gaps in construction other than gypsum board or plaster work.
- D. Section 09 2500 - Gypsum Board: Misc items.
- E. Section 09 2216 - Non-Structural Metal Framing: Metal stud framing and furring for plaster.
- F. Section 09 2400 - Cement Plastering.

#### 1.03 REFERENCE STANDARDS

- A. ASTM A924/A924M - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process 2022.
- B. ASTM C28/C28M - Standard Specification for Gypsum Plasters 2010 (Reapproved 2020).
- C. ASTM C35 - Standard Specification for Inorganic Aggregates for Use in Gypsum Plaster 2001 (Reapproved 2019).
- D. ASTM C61/C61M - Standard Specification for Gypsum Keene's Cement 2000 (Reapproved 2020).
- E. ASTM C206 - Standard Specification for Finishing Hydrated Lime 2014 (Reapproved 2022).

- F. ASTM C631 - Standard Specification for Bonding Compounds for Interior Gypsum Plastering 2009 (Reapproved 2020).
- G. ASTM C841 - Standard Specification for Installation of Interior Lathing and Furring 2003 (Reapproved 2018).
- H. ASTM C842 - Standard Specification for Application of Interior Gypsum Plaster 2005 (Reapproved 2021).
- I. ASTM C1396/C1396M - Standard Specification for Gypsum Board 2017.
- J. ICC (IBC) - International Building Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

#### 1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittals procedures.
- B. Product Data: Provide data on plaster materials, characteristics, and limitations of products specified.

#### 1.05 QUALITY ASSURANCE

- A. Copies of Documents at Site: Maintain at the project site a copy of each referenced document that prescribes execution requirements.

#### 1.06 MOCK-UP

- A. Repair an area of existing plaster and have work reviewed to establish standard of care for remaining repairs.
- B. Locate where directed.
- C. Mock-up may remain as part of the Work.

#### 1.07 FIELD CONDITIONS

- A. Do not apply plaster when substrate or ambient air temperature is under 50 degrees F or over 80 degrees F.
- B. Maintain minimum ambient temperature of 50 degrees F during and after installation of plaster.

### PART 2 PRODUCTS

#### 2.01 MANUFACTURERS

- A. Gypsum Plaster:
  1. National Gypsum Company: [www.nationalgypsum.com/#sle](http://www.nationalgypsum.com/#sle).
  2. USG: [www.usg.com/#sle](http://www.usg.com/#sle).

#### 2.02 GYPSUM PLASTER ASSEMBLIES

- A. Existing Plaster wall repair  
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## 2.03 PLASTER MATERIALS

- A. Gypsum Neat Plaster: ASTM C28/C28M; fibered.
- B. Ready-Mixed Gypsum Plaster: ASTM C28/C28M; mill-mixed type, requiring only the addition of water.
- C. Wood-Fibered Gypsum Plaster: ASTM C28/C28M.
- D. Gypsum Keene's Cement: ASTM C61/C61M.
- E. Lime: ASTM C206, Type S; special finishing hydrated lime.
- F. Aggregate for Base Coats: ASTM C35; sand and lightweight aggregates.
- G. Ready-Mixed Finishing Plaster: Gypsum/Lime putty type, ASTM C28/C28M; mixture of gauging plaster and lime.
- H. Ready-Mixed Finishing Plaster: Keene's cement/lime putty type; ASTM C61/C61M and ASTM C206.
- I. Ready-Mixed Finishing Plaster: Sand float type; ASTM C28/C28M and ASTM C35 prepared mixture of gypsum plaster and sand.
- J. Aggregate for Finish Coats: As specified in ASTM C842.
- K. Water: Clean, fresh, potable and free of mineral or organic matter that could adversely affect plaster.
- L. Bonding Agent: ASTM C631 Type recommended for bonding plaster to monolithic concrete surfaces.

## 2.04 LATH AND ACCESSORIES

- A. Metal Lath and Accessories: As specified in Section 09 2236.
- B. Gypsum Lath: ASTM C1396/C1396M, standard type.
  - 1. Thickness: 3/8 inch.
- C. Finishing Accessories: ASTM C841, extruded aluminum alloy (6063 T5), galvanized steel sheet ASTM A924/A924M G90, galvanized steel wire, or rolled zinc, unless noted otherwise.
  - 1. Types: As detailed or required for finished appearance.
  - 2. Special Shapes: In addition to conventional corner bead and control joints, provide U-bead at exposed plaster edges.
  - 3. Products:
    - a. Same manufacturer as framing materials.
- D. Beads, Screeds, Joint Accessories, and Other Trim: Depth governed by plaster thickness, maximum possible lengths.
  - 1. Material: PVC, open grid flanges or perforated with nailing holes.
  - 2. Casing Beads: Square edges.
  - 3. Corner Beads: Radiused corners.
  - 4. Base Screeds: Bevelled edges.
  - 5. Expansion Joints: Accordion profile with factory-installed protective tape, 2 inch wide flanges.

## 2.05 PLASTER MIXES

- A. Over Gypsum Lath: Two-coat application, ready-mixed plaster, mixed and proportioned in accordance with ASTM C842 and manufacturer's instructions.
- B. Ready-Mixed Plaster Materials: Mix in accordance with manufacturer's instructions.
- C. Finish Coat for Troweled Finish: Lime putty with gypsum gauging plaster, mixed and proportioned in accordance with ASTM C842.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that existing conditions are satisfactory before starting work.
- B. Masonry: Verify joints are cut flush and surface is ready to receive work of this section. Verify no bituminous or water repellent coatings exist on masonry surface.
- C. Concrete: Verify surfaces are flat, honeycomb is filled flush, and surface is ready to receive work of this section. Verify no bituminous, water repellent, or form release agents exist on concrete surface that are detrimental to plaster or plaster bond.
- D. Grounds and Blocking: Verify items within walls for other sections of work have been installed.
- E. Gypsum Lath and Accessories: Verify substrate is flat and surface is ready to receive work of this section. Verify joint and surface perimeter accessories are in place.
- F. Mechanical and Electrical: Verify services within walls have been tested and approved.

### 3.02 PREPARATION

- A. Dampen masonry surfaces to reduce excessive suction.
- B. Clean concrete surfaces of foreign matter. Thoroughly dampen surfaces before using acid solutions, solvent, or detergents to perform cleaning. Wash surface with clean water.
- C. Roughen smooth concrete surfaces and smooth faced masonry.
- D. Apply bonding agent in accordance with manufacturer's instructions.

### 3.03 INSTALLATION - GYPSUM LATH AND ACCESSORIES

- A. Install gypsum lath in accordance with ASTM C841.
- B. Install gypsum lath perpendicular to framing members, with lath face exposed. Stagger end joint of alternate courses. Butt joints tight. Maximum gap allowed: 1/8 inch.
- C. Place corner reinforcement diagonally over gypsum lath and across corner immediately above and below openings. Secure to gypsum lath only.
- D. Continuously reinforce internal angles with corner mesh, return 3 inches from corner to form the angle reinforcement; fasten at perimeter edges only.
- E. Place corner bead at external wall corners; fasten at outer edges of lath only.

- F. Place strip mesh diagonally at corners of lathed openings. Secure rigidly in place.
- G. Place 4 inch wide strips of strip mesh centered over junctions of dissimilar backing materials. Secure rigidly in place.
- H. Place casing beads at terminations of plaster finish. Butt and align ends. Secure rigidly in place.
- I. Control and Expansion Joints:
  - 1. Locate at 20 feet on center.
  - 2. Locate as indicated.
  - 3. Use two casing beads spaced 1/4 inch apart to form joint.
- J. Coordinate installation of frames plumb and level in opening.

### 3.04 PLASTERING

- A. Apply gypsum plaster in accordance with ASTM C842 and manufacturer's instructions.
- B. Thickness of Plaster including Finish Coat:
  - 1. Over metal lath: 5/8 inch.
  - 2. Over gypsum lath: 1/2 inch.
  - 3. Direct to unit masonry: 5/8 inch.
  - 4. Finish coat applied direct to concrete: 3/16 inch, maximum.
  - 5. To vertical concrete surfaces: 5/8 inch.
  - 6. To horizontal concrete surfaces: 1/8 to 3/8 inch.
- C. Apply color tinted finish coat to prepared surfaces within [\_\_\_\_] hours of plaster application. Apply in accordance with manufacturer's instructions.
- D. Finish Texture: Float to a consistent and smooth finish.
- E. Perform work in panels to nearest natural break or between accessories.

### 3.05 TOLERANCES

- A. Maximum Variation from True Flatness: 1/8 inch in 10 feet.
- END OF SECTION 09 2300

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## SECTION 09 2400 CEMENT PLASTERING

### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

- A. Cement Plastering.
- B. Repair of Existing Cement Plaster and substrate to Industry Standards and provided in this section.
  - 1. Portland Cement Plaster/Stucco Manual, EB049
  - 2. Repair of Portland Cement/Stucco, IS526
  - 3. ASTM Standards [www.astm.org](http://www.astm.org):
  - 4. ASTM C 926, Standard Specification for Application of Portland Cement-Based Plaster
  - 5. ASTM C 1063, Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster

#### 1.02 RELATED REQUIREMENTS

- A. Section 05 4000 - Cold-Formed Metal Framing: Structural metal framing for plaster.
- B. Section 06 1000 - Rough Carpentry: Wood stud framing for plaster.
- C. Section 07 8400 - Firestopping: Sealing top-of-wall assemblies and through-wall penetrations at fire rated walls.
- D. Section 08 3100 - Access Doors and Panels: Access panels.
- E. Section 09 2216 Non-Structural Metal Framing: Metal stud framing and furring for plaster.
- F. Section 09 2500 - Gypsum Board: Acoustical sealing in conjunction with metal stud framing and furring for plaster.
- G. Section 09 9113 - Exterior Painting.
- H. Section 09 9123 - Interior Painting.

#### 1.03 REFERENCE STANDARDS

- A. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire 2019.
- B. ASTM A924/A924M - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process 2022.
- C. ASTM C91/C91M - Standard Specification for Masonry Cement 2018.
- D. ASTM C150/C150M - Standard Specification for Portland Cement 2022.
- E. ASTM C206 - Standard Specification for Finishing Hydrated Lime 2014 (Reapproved 2022).
- F. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes 2018.

- G. ASTM C897 - Standard Specification for Aggregate for Job-Mixed Portland Cement-Based Plasters 2015 (Reapproved 2020).
  - H. ASTM C926 - Standard Specification for Application of Portland Cement-Based Plaster 2022a.
  - I. ASTM C932 - Standard Specification for Surface-Applied Bonding Compounds for Exterior Plastering 2006 (Reapproved 2019).
  - J. ASTM C1063 - Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster 2022.
  - K. ASTM C1328/C1328M - Standard Specification for Plastic (Stucco) Cement 2019.
  - L. ASTM C933 - Standard Specification for Welded Wire Lath 2018.
  - M. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2022.
  - N. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials 2020.
  - O. FM (AG) - FM Approval Guide current edition.
  - P. ICC (IBC) - International Building Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
  - Q. ICC (IRC) - International Residential Code for One- and Two-Family Dwellings Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
  - R. ITS (DIR) - Directory of Listed Products Current Edition.
  - S. NTMA (SPECS) - NTMA Terrazzo Specifications Current Edition.
  - T. UL (DIR) - Online Certifications Directory Current Edition.
  - U. UL (FRD) - Fire Resistance Directory Current Edition.
- 1.04 SUBMITTALS
- A. See Section 01 3000 - Administrative Requirements for submittals procedures.
  - B. Product Data: Provide data on plaster materials and trim accessories.
- 1.05 QUALITY ASSURANCE
- A. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.
- 1.06 MOCK-UP
- A. Repair an area of existing cement plaster and have work reviewed to establish standard of care for remaining repairs.
    1. Locate where directed.
    2. Mock-up may remain as part of this work.

## 1.07 FIELD CONDITIONS

- A. Exterior Plaster Work: Do not apply plaster when substrate or ambient air temperature is 40 degrees F or lower, or when temperature is expected to drop below 40 degrees F within 48 hours of application.
- B. Interior Plaster Work: Maintain minimum ambient temperature of 50 degrees F during installation of plaster and until fully cured.

## PART 2 PRODUCTS

### 2.01 CEMENT PLASTER APPLICATIONS

- A. Lath Plaster Base: Metal lath.
  - 1. Plaster Type: Factory prepared plaster mix.
  - 2. Number of Coats: Three.
  - 3. First Coat: Apply to a nominal thickness of 3/8 inch.
  - 4. Second Coat: Apply to a nominal thickness of 3/8 inch.
  - 5. Leveling Coat: Apply to a nominal thickness of 1/32 to 1/16 inch.
  - 6. Finish Coat: Apply to a nominal thickness of 1/8 inch.
- B. Solid Plaster Base: Concrete masonry.
  - 1. Plaster Type: Jobsite mixed plaster.
  - 2. Number of Coats: Three.
  - 3. First Coat: Apply to a nominal thickness of 1/4 inch.
  - 4. Second Coat: Apply to a nominal thickness of 1/4 inch.
  - 5. Leveling Coat: Apply to a nominal thickness of 1/32 to 1/16 inch.
  - 6. Finish Coat: Apply to a nominal thickness of 1/8 inch.

### 2.02 FACTORY PREPARED CEMENT PLASTER

- A. Fire-Resistance Rating: Determined in accordance with test procedures in ASTM E119 and complying with the following:
  - 1. ICC (IBC).
- B. Premixed One-Coat Base: Mixture of Type I Portland cement complying with ASTM C150/C150M, hydrated lime complying with ASTM C207, fibers and other approved ingredients; install in accordance with ASTM C926.
  - 1. Manufacturers:
    - a. Magna Wall, an Oldcastle brand; Magna Wall Fiber Reinforced One Coat Stucco: [www.magnawall.com/#sle](http://www.magnawall.com/#sle).
    - b. The QUIKRETE Companies: [www.quikrete.com/#sle](http://www.quikrete.com/#sle).
- C. Premixed Leveling Coat: Acrylic polymer-based blend approved for use with plaster manufacturer's base coat and finish materials.
- D. Premixed Textured Coating: Polymer modified acrylic coating, integrally colored, and trowel applied to substrates prepared in accordance with manufacturer's written installation instructions.
  - 1. Color: As indicated on drawings.
  - 2. Manufacturers:
    - a. Parex USA Inc; AquaSol Swirl Fine: [www.parex.com/#sle](http://www.parex.com/#sle).

- b. Parex USA Inc; Optimum DPR Swirl Fine: [www.parex.com/#sle](http://www.parex.com/#sle).
- c. Sto Corp; Powerflex Fine: [www.stocorp.com/#sle](http://www.stocorp.com/#sle).
- d. Sto Corp; Powerwall Freeform: [www.stocorp.com/#sle](http://www.stocorp.com/#sle).

## 2.03 JOBSITE MIXED CEMENT PLASTER

- A. Fire Resistance Rating: Determined in accordance with test procedures in ASTM E119 and complying with:
  - 1. ICC (IBC), Section .
- B. Materials:
  - 1. Sand: Clean, well graded, and complying with ASTM C897.
  - 2. Water: Clean, fresh, potable, and free of mineral or organic matter that could adversely affect plaster.
- C. Plaster Mixes: Proportioned in accordance with ASTM C926; parts by volume.
  - 1. First Coat Over Lath:
    - a. Minimum 2-1/2 parts and maximum 4 parts sand, per total volume of cementitious materials.
    - b. Provide fiber reinforcement at 1-1/2 lbs per sack of cement.
  - 2. First Coat Over High Absorption Solid Base:
    - a. Minimum 2-1/2 parts and maximum 4 parts sand, per total volume of cementitious materials.
    - b. Fiber reinforcement at 1-1/2 lbs per sack of cement.
  - 3. Dash Bond Coat: One part Portland cement, with maximum 2 parts sand.
  - 4. First Coat Over Low Absorption Solid Base:
    - a. Minimum 2-1/2 parts and maximum 4 parts sand, per total volume of cementitious materials.
  - 5. Second Coat: Same mixture as first coat, without fiber reinforcement, except minimum 3 parts and maximum 5 parts sand.
  - 6. Finish Coat:
    - a. Minimum 1-1/2 parts and maximum 3 parts sand, per total volume of cementitious materials.

## 2.04 ACCESSORIES

- A. Lath:
  - 1. Wire Size: 17 gauge, 0.453 inch.
  - 2. Galvanized: ASTM A641/A641M.
  - 3. Opening Size: 1-1/2 by 1-1/2 inches.
  - 4. Comply with ASTM C933.
  - 5. Products:
    - a. Structa Wire Corp; Megalath: [www.structawire.com/#sle](http://www.structawire.com/#sle).
- B. Finishing Accessories: ASTM C1063; extruded aluminum alloy (6063 T5), galvanizd steel sheet ASTM A924/A924M G90, rolled zinc, or rigid plastic, unless noted otherwise.
  - 1. Types: As detailed or required for finished appearance.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify existing conditions are acceptable prior to starting this work.

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- B. Verify masonry joints are flush and surfaces are ready to receive work of this section, and that there are no existing bituminous or water repellent coatings on masonry surfaces.
- C. Verify concrete surfaces are flat, honeycombs are filled flush, and surfaces are ready to receive work of this section, and that there are no existing bituminous, water repellent, or form release agent coatings on concrete surfaces that may be detrimental to plaster bond.
- D. Verify lath is flat, secured to substrate, and joint and surface perimeter accessories are properly in place.
- E. Verify mechanical and electrical equipment and services located within areas to receive this work have been properly tested and approved.

### 3.02 PREPARATION

- A. Dampen masonry surfaces to reduce excessive suction.
- B. Clean concrete surfaces of foreign matter using approved acid solutions, solvents, or detergents, and then rinse surfaces thoroughly with clean water.
- C. Apply dash bond coat of plaster to solid bases and moist cure for at least 24 hours before applying first coat of jobsite mixed plaster.

### 3.03 INSTALLATION - WATER-RESISTIVE BARRIER

- A. Where cement plaster is installed as part of a barrier wall system, install two layers of water-resistive barrier in accordance with water-resistive barrier manufacturer's instructions.
- B. Integrate water-resistive barrier with flashing accessories, and adjacent doors, windows, penetrations, and cladding transitions.
- C. Lap water-resistive barrier at least 6 inches at vertical joints.
- D. Lap water-resistive barrier at least 16 inches beyond vertical line of inside and outside corners in both directions.
- E. For two layer applications, start with two horizontal layers at bottom of exterior wall or structure.

### 3.04 INSTALLATION - RAINSCREEN DRAINAGE MATERIAL

- A. Install rainscreen drainage material and metal lath with accessories over sheathing material and water-resistive barrier with fastening system in accordance with ASTM C1063 into wood or metal studs. Install drainage material with filter fabric mortar screen to exterior.

### 3.05 Mixing

- A. Mix only as much plaster as can be used prior to initial set.
- B. Mix materials dry, to uniform color and consistency, before adding water.
- C. Add air entrainment admixtures to each coat to provide 5 to 7 percent air entrainment.
- D. Do not retemper mixes after initial set has occurred.
- E. Protect mixtures from frost or freezing temperatures, contamination, and excessive evaporation.

3.06 APPLICATION

- A. Apply plaster in accordance with manufacturer's written instructions and comply with ASTM C926.
- B. Base Coats:
  - 1. Apply base coat(s) to fully embed lath and to specified thickness.
  - 2. Follow guidelines in ASTM C926 and manufacturer's written installation instructions for moist curing base coats and application of subsequent coats.
- C. Leveling Coat:
  - 1. Apply leveling coat to specified thickness.
- D. Finish Coats:
  - 1. Cement Plaster:
    - a. Apply with sufficient material and pressure to ensure complete coverage of base to specified thickness.
    - b. Apply desired surface texture while mix is still workable.
    - c. Float to a consistent finish.

3.07 REPAIR

- A. Patching: Remove loose, damaged or defective plaster and replace with plaster of same composition; finish to match surrounding area.

END OF SECTION 09 2400

## SECTION 09 2500 GYPSUM BOARD

### PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS

- A. Applicable provisions of Bidding Requirements, Contract Requirements in Division 0 and all applicable Division 1 sections.

#### 1.02 SUMMARY

##### A. Section Includes:

1. Interior gypsum board ceilings as indicated on drawings.
2. Interior high impact gypsum board for exposed conditions up to 8'-0" above floor level.
3. Exterior glass fiber gypsum board for exterior roof sheathing as shown in roof details.
4. Interior heavy duty tile back board for 1/2" tile substrate.
5. Drywall trims and accessories; typical and as shown on drawings.
6. Complete acoustical and fire rated shaft wall assembly for top of elevator shaft and control room enclosure complying with UL assembly and fire rating shown on drawings.

##### B. Related Sections:

1. Section 05 4000 - Cold-Formed Metal Framing: Structural steel stud framing, ceiling joist framing and applicable shaft wall framing.
2. Section 06 1000 - Rough Carpentry: roof sheathing, wood stud framing for patching / extending existing wood framed interior walls.
3. Section 06 1000 - Rough Carpentry: Wood blocking product and execution requirements.
4. Section 07 2100 - Thermal Insulation: Acoustic insulation.
5. Division 07 - Roofing sections: Water-resistive barrier over sheathing.
6. Division 07 - Firestopping: Top-of-wall assemblies at fire-resistance-rated walls.
7. Section 07 9200 - Joint Sealants: Sealing acoustical gaps in construction other than gypsum board or plaster work.
8. Section 092216 "Non Structural Metal Framing".
9. Section 099000 "Paints and Coatings".

#### 1.03 REFERENCE STANDARDS

- A. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members 2016, with Supplement (2018).
- B. ANSI A108.11 - American National Standard Specifications for Interior Installation of Cementitious Backer Units 2018.
- C. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units 1999 (Reaffirmed 2016).
- D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- E. ASTM A924/A924M - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process 2022.
- F. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members 2015.

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- G. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method 2017.
- H. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board 2017.
- I. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing 2003 (Reapproved 2017).
- J. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members 2018.
- K. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products 2020.
- L. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board 2020.
- M. 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 2018.
- N. 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 2020.
- O. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base 2019.
- P. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing 2017.
- Q. ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel 2018.
- R. ASTM C1278/C1278M - Standard Specification for Fiber-Reinforced Gypsum Panel 2017.
- S. ASTM C1280 - Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing 2018.
- T. ASTM C1325 - Standard Specification for Fiber-Mat Reinforced Cementitious Backer Units 2021.
- U. ASTM C1396/C1396M - Standard Specification for Gypsum Board 2017.
- V. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber 2016.
- W. ASTM E413 - Classification for Rating Sound Insulation 2016.
- X. GA-600 - Fire Resistance and Sound Control Design Manual, 22nd edition 2018.
- Y. UL (FRD) - Fire Resistance Directory Current Edition.
- Z. UL 94 - Tests for Flammability of Plastic Materials for Parts in Devices and Appliances Current Edition, Including All Revisions.

1.04 SUBMITTALS

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

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- B. Product Data: Provide data on metal framing, gypsum board, accessories, and joint finishing system.
- C. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.
- D. Shop Drawings: Indicate special details associated with fireproofing and acoustic seals.
- E. SSMA / SSFSA Manufacturer Qualification: Submit documentation of manufacturer association membership.

#### 1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing gypsum board installation and finishing, with minimum 3 years of experience.
- B. Manufacturer Qualifications: Member of Steel Stud Manufacturers Association (SSMA): [www.ssma.com/#sle](http://www.ssma.com/#sle).

#### 1.06 STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against damage from weather, condensation, direct sunlight, construction traffic, and other causes. Stack panels flat to prevent sagging.

#### 1.07 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.
- B. Do not install interior products until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, those that are moisture damaged, and those that are 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.

### PART 2 - PRODUCTS

#### 2.01 GYPSUM BOARD ASSEMBLIES

- A. Provide completed assemblies complying with ASTM C840 and GA-216.
- B. Interior Partitions, Indicated as Sound-Rated: Provide completed assemblies with the following characteristics:
  1. Acoustic Attenuation: STC of 45-49 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.
- C. Shaft Walls at Elevator Shafts: Provide completed assemblies with the following characteristics:
  1. Air Pressure Within Shaft: Intermittent loads of 5 lbf/sq ft with maximum mid-span deflection of L/240.

2. Acoustic Attenuation: STC of 35-39 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.

- D. Fire-Resistance-Rated Assemblies: Provide completed assemblies with the following characteristics:
1. Fire-Resistance-Rated Shaft Walls: UL listed assembly No. (as indicated on drawings); 2 hour rating.
  2. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL (FRD).

## 2.02 PANELS, GENERAL

- A. Size: Provide in maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.
- B. Recycled Content of Gypsum Board: Provide documentation indicating post-consumer recycled content plus one-half of pre-consumer recycled content of at least 25%.

## 2.03 INTERIOR GYPSUM BOARD

- A. Abuse-Resistant Type: Manufactured to produce greater resistance to surface indentation, through-penetration (impact resistance), and abrasion than standard, regular-type and Type X gypsum board.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. G-P Gypsum; ToughRock Abuse-Resistant Gypsum Board.
    - b. National Gypsum Company; Hi-Abuse Brand Wallboard.
    - c. United States Gypsum Co.; Fiberock Brand Abuse-Resistant Gypsum Fiber Panel.
  2. Core: 5/8 inch.
  3. Long Edges: Tapered.
- B. Moisture- and Mold-Resistant Type: With moisture- and mold-resistant core and surfaces.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. G-P Gypsum; DensArmor Interior Guard.
    - b. National Gypsum Company; XP Wallboard.
    - c. USG Corporation; SHEETROCK Brand HUMITEK.
    - d. USG Corporation; FIBEROCK Brand, Aqua Tough Interior Panels.
  2. Core: 5/8 inch, Type X.
  3. Long Edges: Tapered.

## 2.04 TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Board: ASTM C 1178/C 1178M, with manufacturer's standard edges.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. CertainTeed Corp.; GlasRoc Tile Backer.
    - b. Georgia-Pacific Gypsum LLC; DensShield Tile Backer.
  2. Core: 5/8 inch, Type X.
  3. Mold Resistance: ASTM D 3273, score of 10.

## 2.05 EXTERIOR GYPSUM SHEATHING

- A. Products: Subject to compliance with requirements, provide one of the following:
1. G-P Gypsum; DensDeck Roof Board.

2. G-P Gypsum; DensGlass Sheathing Board.
3. National Gypsum Company; XP Wallboard.
4. USG Corporation; SHEETROCK Brand HUMITEK.
5. USG Corporation; FIBEROCK Brand, Aqua Tough Interior Panels.
6. Mat face: fiberglass
7. Core: 5/8 inch gypsum, Type X meeting ASTM E136
8. Long Edges: Tapered.

## 2.06 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
  1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, or paper-faced galvanized steel sheet.
  2. Shapes:
    - a. Cornerbead.
    - b. LC-Bead: J-shaped; exposed long flange receives joint compound.
    - c. Expansion (control) joint.

## 2.07 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape for Interior Gypsum Wallboard: Paper.
- C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
  1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
  2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping or drying-type, all-purpose compound.
    - a. Use setting-type compound for installing paper-faced metal trim accessories.
  3. Fill Coat: For second coat, use setting-type, sandable topping or drying-type, all-purpose compound.
  4. Finish Coat: For third coat, use setting-type, sandable topping or drying-type, all-purpose compound.

## 2.08 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
  1. VOC Emissions for Adhesives: Provide certificate of compliance with California Department of Public Health (CDPH) Standard Method v1.1 – 201, using the applicable exposure scenario.
  2. VOC Content for Adhesives: Provide documentation of compliant VOC content per SCAQMD Rule 1168.
- C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
  1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Examine areas and substrates, with Installer present, for compliance with requirements and other conditions affecting performance.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.02 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

### 3.03 APPLYING INTERIOR GYPSUM BOARD

- A. Install abuse-resistant gypsum board for vertical surfaces, unless otherwise indicated.
- B. Install moisture- and mold-resistant interior gypsum board for ceiling and soffit surfaces, unless otherwise indicated.
- C. Single-Layer Application:
  - 1. On ceilings, apply gypsum panels at right angles to framing, unless otherwise indicated.
  - 2. Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.

### 3.04 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

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GYPSUM BOARD

- B. Interior Trim: Install in the following locations:
  - 1. Cornerbead: Use at outside corners, unless otherwise indicated.
  - 2. LC-Bead: Use at exposed panel edges.
  - 3. U-Bead: Do not use.

### 3.05 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
  - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
  - 2. Level 4: At panel surfaces that will be exposed to view, unless otherwise indicated.

### 3.06 SHAFT WALL INSTALLATION

- A. Shaft Wall Framing: Install in accordance with manufacturer's installation instructions.
  - 1. Fasten runners to structure with short leg to finished side, using appropriate power-driven fasteners at not more than 24 inches on center.
  - 2. Install studs at spacing required to meet performance requirements.
- B. Shaft Wall Liner: Cut panels to accurate dimensions and install sequentially between special friction studs.
  - 1. On walls over sixteen feet high, screw-attach studs to runners top and bottom.
  - 2. Seal perimeter of shaft wall and penetrations with acoustical sealant.

### 3.07 PROTECTION

- A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- B. Remove and replace panels that are wet, moisture damaged, and 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.

END OF SECTION 09 2500

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SECTION 09 3000  
TILING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Applicable provisions of Bidding Requirements, Contract Requirements in Division 0 and all applicable Division 1 sections.

1.02 SECTION INCLUDES:

- A. Furnish and Install:
  - 1. Tiling including bathroom wall and floor finishes.
  - 2. Provide tile section as indicated on room finish schedule.
- B. Related Sections:
  - 1. Section 079200 Joint Sealants
  - 2. Section 092215 Interior Non Structural Metal Framing
  - 3. Section 092500 Gypsum Board
  - 4. Section 102800 Toilet Accessories
  - 5. Division 22 Plumbing
  - 6. Division 23 Heating, Ventilating, and Air Conditioning
  - 7. Division 26 Electrical

1.03 SUBMITTALS:

- A. Product Data: Manufacturer's data including instructions, recommendations, and restrictions.
- B. Verification Samples: 12 x 12 inches.

1.04 QUALITY ASSURANCE:

- A. Comply with manufacturer's instructions and recommendations.

1.05 DELIVERY, STORAGE, HANDLING:

- A. Comply with Division 01 General Requirements and Manufacturer's Instructions and recommendations.

1.06 MAINTENANCE STOCK:

- A. Required.
- B. Material: Each type and color of tile used.
- C. Quantity: 2 percent of actual installation quantity from the same manufactured lots.
- D. Packaging: Factory sealed boxes.
- E. Labeling: Date, vendor, installer, product name, mill, and installation location.

## PART 2 PRODUCTS

### 2.01 TILE SCHEDULE:

- A. Glazed and Porcelain Ceramic Tile as specified on drawings.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Provide Basis of Design products listed on drawings from the following manufacturer:
    - b. Basis of Design:
      - 1) DALTile
    - c. Approved equivalent by one of the following:
      - 1) Crossville Inc.
      - 2) American Olean
- B. Tile Trim: Schluter Systems, coves and corner beads as scheduled in Drawings.

### 2.02 METAL TRIM

- A. Wall Trim, inside and outside corners: See Finish Schedule, Drawings A700.
- B. Wall Base Trim: See Finish Details
- C. Metal Edge Strips: Edge-protection, finishing and transition profiles for floors and walls; stainless-steel, ASTM A 666, Type 316 Series exposed-edge material, except as available in Type 304 only.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide products of Schluter Systems.
  - 2. Refer to Drawings for specific profile designations and use.

### 2.03 SETTING MORTAR AND ADHESIVE:

- A. Organic Adhesive: A136.1 American National Standard Specifications for Organic Adhesives for Installation of Ceramic Tile.
  - 1. Type: Type I.
  - 2. VOC Content: less than or equal to 65 grams per liter.
  - 3. VOC Emissions for Adhesives: Provide certificate of compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario.
  - 4. VOC Content for Adhesives: Provide statement of compliance of VOC content per SCAQMD Rule 1168.
- B. Latex Portland Cement Mortar: A118.4 American National Standard Specifications for Latex Portland Cement Mortar.
- C. Medium Bed Mortar - Basis of Design: "255 MultiMax" mixed with "333 Super Flexible Additive" Laticrete International, Inc.
  - 1. Maximum Mortar Depth: 0.75 inch.
  - 2. ASTM C627 Robinson Floor Test Rating: Extra heavy duty.
  - 3. Trowel Notch Size: Comply with mortar manufacturer's recommendations for tile size.
- D. Epoxy Adhesive: A118.3 American National Standard Specifications for Chemical Resistant, Water Cleanable Tile Setting and Grouting Epoxy and Water Cleanable Tile Setting Epoxy Adhesive.

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TILING



1. VOC Content: less than or equal to 65 grams per liter.
  - a. VOC Emissions for Adhesives: Provide certificate of compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario.
  - b. VOC Content for Adhesives: Provide statement of compliance of VOC content per SCAQMD Rule 1168.

2.04 GROUT:

- A. Regional Materials: When available, aggregate for mortar and grout, cement and lime shall be extracted, harvested, or recovered, as well as manufactured, within 100 miles of project site.
- B. Epoxy Grout: A118.3 American National Standard Specifications for Chemical Resistant, Water Cleanable Tile Setting and Grouting Epoxy and Water Cleanable Tile Setting Epoxy Adhesive.
- C. Latex Cement Grout: A118.7 American National Standard Specifications for Polymer Modified Cement Grouts for Tile Installation.
- D. Grout Colors: Selected by Architect from manufacturer's complete range of options.

2.05 CONTROL JOINT SEALANTS:

- A. Comply with Section 079200 Joint Sealants.
- B. Sealant Colors: Selected by Architect from manufacturer's complete range of options.

2.06 CLEANER:

- A. Basis of Design: "Aqua Mix Concentrated Stone and Tile Cleaner", Custom Building Products, [www.custombuildingproducts.com](http://www.custombuildingproducts.com).
  1. VOC Content: Zero.

PART 3 EXECUTION

3.01 TILING INSTALLATION - GENERAL:

- A. Comply with manufacturer's instructions and recommendations.
- B. Subfloors:
  1. Confirm acceptability of substrate conditions.
  2. Confirm acceptability of ambient and substrate environmental conditions.
- C. Preparation - General: Provide all preparation required by ANSI A108.01 General Requirements: Sub-surfaces and Preparations by Other Trades.
- D. Clean Substrates: Remove all soil, dust, oil, grease, curing compounds, paint, foreign materials, and contamination.
- E. Prepare Substrates:
  1. Grind subfloor protrusions, ridges, and humps flush.
  2. Fill subfloor holes, cracks, and depressions with subfloor treatment material.
  3. Provide smooth subfloors.
- F. Tile Installation Basic Requirements:

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TILING

1. Lay tile in grid pattern with joints accurately aligned throughout each installation area.
2. Center tile in both directions.
3. Avoid use of less than one half tile units.
4. Extend tile into recesses and under and behind movable items.
5. Fit tile accurately at obstructions and perimeter.
6. Do not damage visible tile surfaces or edges.
7. Provide uniform grout joint width for each installation area.
8. For tile installed in factory mounted sheets, make field joints match factory joints.
9. Mix and install grout in compliance with manufacturer's instructions and recommendations.
10. Protect installed tile from traffic for at least 7 days after grouting.
11. Clean tile to remove excess grout, mortar, and adhesive from finished tile surfaces.

G. Wall Tile Basic Requirements:

1. Height: As shown or, if not shown, full height to structure above.
2. Prohibition: Start wall tile at Schluter wall base and work upward. Do not install tile from top down.

H. Patterns: Match patterns shown.

I. Installed Tolerances:

1. Variation from True Plumb, Level, Line, Plane: Maximum 0.062 inch in 10 feet.
2. Variation from True Plane Across Joints [Lippage]: Maximum 0.03 inch.

J. Edge Trim: Provide continuous edge trim for all floor edges not covered by wall base.

1. Minimize edge trim seams.

K. Repair: Replace damaged tile with full size, undamaged tile. Remove and replace damaged work.

3.02 TILE INSTALLATION METHODS:

- A. Standard: Tile Council of North America "Handbook for Ceramic, Glass, and Stone Tile Installation".
- B. Tile Wall Installation on Cement Board: "W244C" with cement bond coat.
- C. Tile Wall Installation on Gypsum Board: "W242".
- D. Tile Wall Installation on concrete curb / existing masonry provide thick set with metal mesh as required for vertical installation for 1/2" tile.

3.03 GROUT:

- A. Epoxy Grout: Floors and bottom course of wall tile.
- B. Latex Cement Grout: All locations where epoxy grout is not specified.
- C. Grout Tooling: Slightly recessed from tile face.

3.04 ADDITIONAL REQUIREMENTS FOR ANTI FRACTURE MEMBRANE:

- A. Comply with Manufacturer's Instructions and Recommendations.
- B. Standards: Comply with

1. A108.17 Installation of Crack Isolation Membranes.
  2. A108.13 Installation of Load Bearing, Bonded, Waterproof Membranes for Thin Set Ceramic Tile and Dimension Stone.
- C. Anti Fracture Membrane Required Locations: All thin set installations over non slab on grade subfloors.
- D. Restrictions:
1. Conceal membrane from view in the completed installation.
  2. Do not span over expansion joints, control joints, and structural cracks in the subfloor.
- E. Waterproof Anti Fracture Membrane Required Locations: Floors throughout:
1. Toilet rooms.
  2. Bathrooms.
- F. Additional Requirements for Waterproof Anti Fracture Membrane:
1. Provide subfloor treatment material to slope to drain.
  2. Provide 100 percent waterproof installation.
  3. Flash membrane into floor drains.
  4. Run membrane continuously from floor up walls at least 4 inches above floor.
  5. Run membrane continuously under thresholds.
- 3.05 ADDITIONAL REQUIREMENTS FOR EXPANSION AND CONTROL JOINTS:
- A. Comply with EJ171, Tile Council of North America "Handbook for Ceramic, Glass and Stone Tile Installation".
- B. Expansion and Control Joint Locations: As shown or, if not shown, as pre approved by Architect:
1. Over all changes in substrates under tile.
  2. Over all expansion joints, control joints, construction joints, cold joints, sawn joints in substrate.
  3. At all intersections of tile work and dissimilar work other than floor drains.
  4. At all intersections between tile and restraining construction.
  5. At inside corners concave corners of tile-to-tile work and changes of plane within tile work.
  6. 20 feet on center, both directions.
- C. Expansion and Control Joint Sealant Width:
1. Substrate Joints: Make tile expansion and control joint width = substrate joint width.
  2. Interior Work: Minimum 0.25 inch, but not less than grout joint width.
- D. Preparation:
1. Clean joints in substrates.
  2. Ensure substrate joints are free of dirt, debris, mortar, setting materials, and grout.
  3. Cover cleaned joint with fiberglass tape to help keep joint clean.
  4. Make the tile joint the full depth of the tile setting bed for the full joint width.
  5. If the joint is deeper than the backer rod, provide compressible filler under the backer rod.
  6. Sand and clean joint edges and tile surfaces to which sealant is adhered to improve adhesion.
  7. Clean tile joints and remove dirt, debris, mortar, setting materials, and grout.
  8. Prime joint edges as recommended by sealant manufacturer prior to sealant installation.
- E. Joint Sealant Installation: Comply with Section 07 9200 Joint Sealants.
1. Install surface of sealant flush with adjacent grout surfaces.

- F. Saw Cutting Tile for Expansion and Control Joints: Not permitted.
  - G. Saw Cutting Concrete Subfloor for Expansion and Control Joints: Permitted.
- END OF SECTION 09 3000

## SECTION 09 6500 RESILIENT FLOORING

### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

- A. Resilient sheet flooring.
- B. Resilient tile flooring as listed on finish schedule.
- C. Resilient base as listed on finish schedule.
- D. Luxury Vinyl Resilient stair accessories as listed on finish schedule and on drawings.
- E. Installation accessories as required to provide basis of design installation.
- F. Luxury Vinyl Plank as listed on finish schedule with special provisions.
- G. Luxury Vinyl Plank floor finish in elevator cab as listed on finish schedule and on drawings / otherwise to match main level.

#### 1.02 RELATED REQUIREMENTS

- A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 09 0561 - Common Work Results for Flooring Preparation: Removal of existing floor coverings, cleaning, and preparation.

#### 1.03 REFERENCE STANDARDS

- A. ASTM D6329 - Standard Guide for Developing Methodology for Evaluating the Ability of Indoor Materials to Support Microbial Growth Using Static Environmental Chambers 1998 (Reapproved 2015).
- B. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements 2009 (Reapproved 2016).
- C. ASTM E492 - Standard Test Method for Laboratory Measurement of Impact Sound Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine 2009, with Editorial Revision (2016).
- D. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source 2019a, with Editorial Revision (2020).
- E. ASTM E2179 - Standard Test Method for Laboratory Measurement of the Effectiveness of Floor Coverings in Reducing Impact Sound Transmission Through Concrete Floors 2021.
- F. ASTM F150 - Standard Test Method for Electrical Resistance of Conductive and Static Dissipative Resilient Flooring 2006 (Reapproved 2018).
- G. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring 2021.

- H. ASTM F970 - Standard Test Method for Measuring Recovery Properties of Floor Coverings after Static Loading 2017.
- I. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile 2004 (Reapproved 2018).
- J. ASTM F1303 - Standard Specification for Sheet Vinyl Floor Covering with Backing 2004 (Reapproved 2021).
- K. ASTM F1344 - Standard Specification for Rubber Floor Tile 2021a.
- L. ASTM F1700 - Standard Specification for Solid Vinyl Floor Tile 2020.
- M. ASTM F1859 - Standard Specification for Rubber Sheet Floor Covering Without Backing 2021a.
- N. ASTM F1861 - Standard Specification for Resilient Wall Base 2021.
- O. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride 2022.
- P. ASTM F1913 - Standard Specification for Vinyl Sheet Floor Covering Without Backing 2019.
- Q. ASTM F2034 - Standard Specification for Sheet Linoleum Floor Covering 2018.
- R. ASTM F2169 - Standard Specification for Resilient Stair Treads 2015 (Reapproved 2020).
- S. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes 2019a.
- T. ASTM F2195 - Standard Specification for Linoleum Floor Tile 2018.
- U. ASTM F2982 - Standard Specification for Polyester Composition Floor Tile 2018.
- V. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source 2023.
- W. NSF 332 - Sustainability Assessment for Resilient Floor Coverings 2015.
- X. RFCI (RWP) - Recommended Work Practices for Removal of Resilient Floor Coverings 2011.
- Y. UL 2824 - GREENGUARD Certification Program Method for Measuring Microbial Resistance From Various Sources Using Static Environmental Chambers Current Edition, Including All Revisions.

#### 1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- C. Shop Drawings: Indicate seaming plans and floor patterns.
- D. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.
- E. Verification Samples: Submit two samples, 6 by 6 inch in size illustrating color and pattern for each resilient flooring product specified.

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RESILIENT FLOORING

- F. Sustainable Design Submittal: Submit VOC content documentation for flooring and adhesives.
- G. Concrete Subfloor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.
- H. Certification: Prior to installation of flooring, submit written certification by flooring manufacturer and adhesive manufacturer that condition of subfloor is acceptable.
- I. Manufacturer's Qualification Statement.
- J. Installer's Qualification Statement.
- K. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.
- L. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  1. See Section 01 6000 - Product Requirements, for additional provisions.
  2. Extra Flooring Material: 6 square feet of each type and color.
  3. Extra Wall Base: 24 linear feet of each type and color.

#### 1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing specified flooring with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in installing specified flooring with minimum three years documented experience.
- C. Testing Agency Qualifications: Independent firm specializing in performing concrete slab moisture testing and inspections of the type specified in this section.

#### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.
- B. Store all materials off of the floor in an acclimatized, weather-tight space.
- C. Maintain temperature in storage area between 55 degrees F and 90 degrees F.
- D. Protect roll materials from damage by storing on end.
- E. Do not double stack pallets.

#### 1.07 FIELD CONDITIONS

- A. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

## PART 2 PRODUCTS

### 2.01 SHEET FLOORING; Luxury Vinyl Plank as listed on finish schedule with special provisions.

- A. Vinyl Sheet Flooring / Luxury Vinyl Plank : Homogeneous without backing, with color and pattern throughout full thickness.
1. Provide Basis of Design products listed on drawings from the following manufacturer: Luxury Vinyl Plank system by SHAW as listed on finish schedule with special provisions.
  2. Manufacturers: Subject to compliance with requirements and only if basis of design products are not readily available and can work seamlessly (without transition strips) with SHAW carpet tile.
    - a. Armstrong Flooring, Inc; Accolade Plus: [www.armstrongflooring.com/#sle](http://www.armstrongflooring.com/#sle).
    - b. Gerflor USA, Inc; Mipolam Affinity: [www.gerflorusa.com/#sle](http://www.gerflorusa.com/#sle).
    - c. Shannon Specialty Floors, Inc; TEKNOFLOR Medscapes HPD: [www.shannonspecialtyfloors.com/#sle](http://www.shannonspecialtyfloors.com/#sle).
    - d. Only SHAW products will be accepted for main level flooring where carpet tile and LVT need to be coordinated to not have transition strips unless substitutions can demonstrate compliance to this requirement to satisfaction of the architect..
    - e. Substitutions: See Section 01 6000 - Product Requirements.
  3. Minimum Requirements: Comply with ASTM F1913.
  4. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648 or NFPA 253.
  5. VOC Content Limits: As specified in Section 01 6116.
  6. Thickness: 0.080 inch nominal.
  7. Sheet Width: 49 inch minimum.
  8. Static Load Resistance: 250 psi minimum, when tested as specified in ASTM F970.
  9. Pattern: LVT Plank as indicated on drawings..
  10. Color: As indicated on drawings.

### 2.02 TILE FLOORING

- A. Vinyl Composition Tile - Type as indicated on drawings: Homogeneous, with color extending throughout thickness.
1. Provide Basis of Design products listed on drawings from the following manufacturer: Armstrong Flooring, Inc.
  2. Manufacturers: (subject to compliance with requirements and only if basis of design products are not readily available).
    - a. Armstrong Flooring, Inc; Excelon SDT: [www.armstrongflooring.com/#sle](http://www.armstrongflooring.com/#sle).
    - b. Johnsonite, a Tarkett Company: [www.johnsonite.com/#sle](http://www.johnsonite.com/#sle).
    - c. VCT only for ground level as indicated on drawings..
    - d. Substitutions: See Section 01 6000 - Product Requirements.
  3. Minimum Requirements: Comply with ASTM F1066, of Class corresponding to type specified.
  4. Size: 12 by 12 inch or as indicated on drawings.
  5. VOC Content Limits: As specified in Section 01 6116.
  6. Thickness: 0.125 inch.
  7. Pattern: as indicated on drawings.
  8. Color: As indicated on drawings.
- B. Vinyl Tile - Type as indicated on drawings: Solid vinyl with color and pattern throughout thickness.



1. Provide Basis of Design products listed on drawings from the following manufacturer: Armstrong Flooring, Inc.
2. Manufacturers: (subject to compliance with requirements and only if basis of design products are not readily available).
  - a. Armstrong Flooring Inc; Natural Creations with Diamond 10 Technology ArborArt: [www.armstrong.com/#sle](http://www.armstrong.com/#sle).
  - b. Burke Flooring: [www.burkeflooring.com/#sle](http://www.burkeflooring.com/#sle).
  - c. Johnsonite, a Tarkett Company: [www.johnsonite.com/#sle](http://www.johnsonite.com/#sle).
  - d. LG Hausys America, Inc; : [www.lghausysusa.com/#sle](http://www.lghausysusa.com/#sle).
  - e. Metroflor Corporation; Aspecta Five LVT: [www.aspecta flooring.com/#sle](http://www.aspecta flooring.com/#sle).
  - f. Roppe Corporation: [www.roppe.com/#sle](http://www.roppe.com/#sle).
  - g. Shannon Specialty Floors, Inc; Tuf Stuf T3 Luxury Vinyl Tile: [www.shannonspecialtyfloors.com/#sle](http://www.shannonspecialtyfloors.com/#sle).
  - h. VCT only for ground level as indicated on drawings..
  - i. Substitutions: See Section 01 6000 - Product Requirements.
3. Minimum Requirements: Comply with ASTM F1700, of Class corresponding to type specified.
4. Mold and Microbial Resistance: Highly resistant when tested in accordance with ASTM D6329; certified in accordance with UL 2824.
5. VOC Content Limits: As specified in Section 01 6116.
6. Square Tile Size: 12 by 12 inch.
7. Total Thickness: 0.125 inch.
8. Pattern: as indicated on drawings.
9. Color: As indicated on drawings.

C. Feature Strips: Of same material as tile, as indicated on drawings inch wide.

## 2.03 STAIR COVERING

- A. Stair Treads: Rubber; full width and depth of stair tread in one piece; tapered thickness.
- B. Luxury Vinyl Plank system by SHAW CONTRACT as listed on finish schedule with special provisions.
  1. Manufacturers: (subject to compliance with requirements and only if basis of design products are not readily available and can work seamlessly with SHAW CONTRACT carpet tile).
    - a. Burke Flooring: [www.burkeflooring.com/#sle](http://www.burkeflooring.com/#sle).
    - b. Johnsonite, a Tarkett Company: [www.johnsonite.com/#sle](http://www.johnsonite.com/#sle).
    - c. Roppe Corporation; Rubber Stair Treads: [www.roppe.com/#sle](http://www.roppe.com/#sle).
  2. Minimum Requirements: Comply with ASTM F2169, Type TP, rubber, thermoset.
  3. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648 or NFPA 253.
  4. Nosing: Square.
  5. Striping: 2 inch wide contrasting color abrasive strips.
  6. Color: As indicated on drawings.
- C. Stair Treads: Rubber with interwoven synthetic fibers; full width and depth of stair tread in one piece; tapered thickness.
  1. Manufacturers: SHAW CONTRACT as indicated on drawings.
  2. Nosing: Square.
- D. Stair Risers: Full height and width of tread in one piece, matching treads in material and color.
  1. Manufacturers: SHAW CONTRACT as indicated on drawings; subject to compliance with requirements and only if basis of design products are not readily available and can work

- seamlessly with SHAW CONTRACT carpet tile:
      - a. Burke Flooring: [www.burkeflooring.com/#sle](http://www.burkeflooring.com/#sle).
      - b. Johnsonite, a Tarkett Company: [www.johnsonite.com/#sle](http://www.johnsonite.com/#sle).
      - c. Roppe Corporation: [www.roppe.com/#sle](http://www.roppe.com/#sle).
      - d. Substitutions: See Section 01 6000 - Product Requirements.
    - 2. Thickness: 0.080 inch.
- E. Stair Treads with Integral Risers: Rubber; full height of riser, full width and depth of tread in one piece; tapered thickness.
  - 1. Manufacturers: SHAW CONTRACT as indicated on drawings and subject to compliance with requirements and only if basis of design products are not readily available and can work seamlessly with SHAW CONTRACT carpet tile:
    - a. Burke Flooring: [www.burkeflooring.com/#sle](http://www.burkeflooring.com/#sle).
    - b. Johnsonite, a Tarkett Company: [www.johnsonite.com](http://www.johnsonite.com).
    - c. Roppe Corporation: [www.roppe.com/#sle](http://www.roppe.com/#sle).
    - d. Substitutions: See Section 01 6000 - Product Requirements.
  - 2. Nosing: Square.
  - 3. Striping: 2 inch wide contrasting color abrasive strips.
  - 4. Tread Texture: Smooth.
  - 5. Color: As indicated on drawings.
- F. Stair Nosings: 1-1/2 inch horizontal return, 1-1/8 inch vertical return, full width of stair tread in one piece.
  - 1. Material: Rubber.

#### 2.04 RESILIENT BASE

- A. Resilient Base - Type as indicated on drawings: ASTM F1861, Type TS rubber, vulcanized thermoset; style as scheduled.
  - 1. Provide Basis of Design products listed on drawings from the following manufacturer: Armstrong Flooring, Inc.
  - 2. Manufacturers: (subject to compliance with requirements and only if basis of design products are not readily available).
    - a. Burke Flooring: [www.burkeflooring.com/#sle](http://www.burkeflooring.com/#sle).
    - b. Johnsonite, a Tarkett Company: [www.johnsonite.com/#sle](http://www.johnsonite.com/#sle).
    - c. Roppe Corporation; Contours Profiled Wall Base System: [www.roppe.com/#sle](http://www.roppe.com/#sle).
  - 3. Height: 4 inch.
  - 4. Thickness: 0.125 inch.
  - 5. Finish: Satin.
  - 6. Color: As indicated on drawings.
  - 7. Accessories: Premolded external corners and internal corners.

#### 2.05 ACCESSORIES

- A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.
- B. Primers, Adhesives, and Seam Sealer: Waterproof; types recommended by flooring manufacturer.
  - 1. VOC Content Limits: As specified in Section 01 6116.
- C. Adhesive for Vinyl Flooring:
  - 1. Provide compatible adhesives as recommended by Basis of Design products listed on drawings from the following manufacturer: Armstrong Flooring, Inc.

2. Manufacturers: (subject to compliance with requirements and only if basis of design products are not readily available).
  - a. H.B. Fuller Construction Products, Inc; TEC Flexera Premium Universal Adhesive: [www.tecspecialty.com/#sle](http://www.tecspecialty.com/#sle).
  - b. Loba-Wakol, LLC; WAKOL D 3120 PVC Adhesive: [www.loba-wakol.com/#sle](http://www.loba-wakol.com/#sle).
  - c. Stauf USA, LLC; D737 High-Tack: [www.staufusa.com/#sle](http://www.staufusa.com/#sle).
- D. Moldings, Transition and Edge Strips: Same material as flooring.
  1. Provide Basis of Design products listed on drawings from the following manufacturer: Armstrong Flooring, Inc.
  2. Manufacturers: (subject to compliance with requirements and only if basis of design products are not readily available).
    - a. Burke Flooring: [www.burkeflooring.com/#sle](http://www.burkeflooring.com/#sle).
- E. Filler for Coved Base: Plastic.

### PART 3 EXECUTION

#### 3.01 EXAMINATION

- A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.
- C. Cementitious Subfloor Surfaces: Verify that substrates are ready for resilient flooring installation by testing for moisture and alkalinity (pH).
  1. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.

#### 3.02 PREPARATION

- A. Remove existing resilient flooring and flooring adhesives; follow the recommendations of RFCI (RWP).
- B. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- C. Remove subfloor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with subfloor filler to achieve smooth, flat, hard surface.
- D. Prohibit traffic until filler is fully cured.
- E. Clean substrate.
- F. Apply primer as required to prevent "bleed-through" or interference with adhesion by substances that cannot be removed.

#### 3.03 Installation - General

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install in accordance with manufacturer's written instructions.

- C. Adhesive-Applied Installation:
  1. Spread only enough adhesive to permit installation of materials before initial set.
  2. Place copper grounding strip in conductive adhesive and apply additional adhesive to top side of strip before installing static control flooring. Allow strip to extend beyond flooring in accordance with static control flooring manufacturer's instructions. Refer to Section 26 0526 for grounding and bonding to building grounding system.
  3. Fit joints and butt seams tightly.
  4. Set flooring in place, press with heavy roller to attain full adhesion.
- D. Loose-Laid Installation: Set flooring in place in accordance with manufacturer's instructions.
- E. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.
- F. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
  1. Metal Strips: Attach to substrate before installation of flooring using stainless steel screws.
  2. Resilient Strips: Attach to substrate using adhesive.
- G. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.
- H. Install flooring in recessed floor access covers, maintaining floor pattern.
- I. At movable partitions, install flooring under partitions without interrupting floor pattern.
- J. Install feature strips where indicated.

#### 3.04 Installation - Sound Control Underlayment

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

#### 3.05 Installation - Sheet Flooring

- A. Lay flooring with joints and seams parallel to longer room dimensions, to produce minimum number of seams. Lay out seams to avoid widths less than 1/3 of roll width; match patterns at seams.
- B. Seams are prohibited in bathrooms, kitchens, toilet rooms, and custodial closets.
- C. Cut sheet at seams in accordance with manufacturer's instructions.
- D. Seal seams by heat welding where indicated.
- E. Coved Base: Install as detailed on drawings, using coved base filler as backing at floor to wall junction. Extend sheet flooring vertically to height indicated, and cover top edge with metal cap strip.

#### 3.06 Installation - Tile Flooring

- A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.
- B. Lay flooring with joints and seams parallel to building lines to produce symmetrical pattern.

- C. Install square tile to ashlar pattern. Allow minimum 1/2 full size tile width at room or area perimeter.
- D. Install loose-laid tile, fit interlocking edges tightly.
- E. Install loose-laid tile using interlocking pins to secure tiles to each other.
- F. Install plank tile with a random offset of at least 6 inches from adjacent rows.

3.07 Installation - Resilient Base

- A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.
- B. Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.
- C. Install base on solid backing. Bond tightly to wall and floor surfaces.
- D. Scribe and fit to door frames and other interruptions.

3.08 Installation - Stair Coverings

- A. Install stair coverings in one piece for full width and depth of tread.
- B. Install stringers configured tightly to stair profile.
- C. Adhere over entire surface. Fit accurately and securely.

3.09 CLEANING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean in accordance with manufacturer's written instructions.

3.10 PROTECTION

- A. Prohibit traffic on resilient flooring for 48 hours after installation.

3.11 SCHEDULE

- A. As indicated on drawings.

END OF SECTION 09 6500

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## SECTION 09 6813 TILE CARPETING

### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

- A. Carpet tile, loose laid with edges and control grid adhered.
- B. Removal of existing carpet tile.
- C. Matching roll carpet for direct glue installation on base, stairs, and as recommended per basis of design.

#### 1.02 RELATED REQUIREMENTS

- A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 09 0561 - Common Work Results for Flooring Preparation: Removal of existing floor coverings, cleaning, and preparation.

#### 1.03 REFERENCE STANDARDS

- A. ASTM D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials 2016 (Reapproved 2021).
- B. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source 2019a, with Editorial Revision (2020).
- C. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring 2021.
- D. CRI 104 - Standard for Installation of Commercial Carpet 2015.
- E. CRI (GLP) - Green Label Plus Testing Program - Certified Products Current Edition.
- F. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source 2023.

#### 1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.
- C. Shop Drawings: Indicate layout of joints.
- D. Samples: Submit two carpet tiles illustrating color and pattern design for each carpet color selected.
- E. Submit two, 6 inch long samples of edge strip, base cap, and 6.
- F. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and as recommended per basis of design.

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TILE CARPETING

- G. Manufacturer's Qualification Statement.
- H. Installer's Qualification Statement.
- I. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.
- J. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  1. See Section 01 6000 - Product Requirements, for additional provisions.
  2. Extra Carpet Tiles: Quantity equal to 5 percent of total installed of each color and pattern installed.

#### 1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing specified carpet tile with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in installing carpet tile with minimum three years documented experience and approved by carpet tile manufacturer.
- C. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

#### 1.06 FIELD CONDITIONS

- A. Store materials in area of installation for minimum period of 24 hours prior to installation.

### PART 2 PRODUCTS

#### 2.01 MANUFACTURERS

- A. Tile Carpeting:
  1. Provide Basis of Design products listed on drawings from the following manufacturer: SHAW
  2. Subject to compliance with requirements and only if basis of design products are not readily available:
  3. Interface, Inc: [www.interface.com/#sle](http://www.interface.com/#sle).
  4. Milliken & Company: [www.milliken.com/#sle](http://www.milliken.com/#sle).
  5. Mohawk Group: [www.mohawkgroup.com/#sle](http://www.mohawkgroup.com/#sle).
  6. Substitutions: See Section 01 6000 - Product Requirements.

#### 2.02 MATERIALS

- A. Tile Carpeting, Type as indicated on drawings: Tufted, manufactured in one color dye lot.
  1. Product: as indicated on drawings manufactured by SHAW.
  2. Tile Size: 18 by 18 inch, nominal.
  3. Thickness: as indicated on drawings inch.
  4. Color: as indicated on drawings.
  5. Pattern: as indicated on drawings.
  6. Critical Radiant Flux: Minimum of 0.22 watts/sq cm, when tested in accordance with ASTM E648 or NFPA 253.
  7. Surface Flammability Ignition: Pass ASTM D2859 (the "pill test").



8. VOC Content: Comply with Section 01 6116.
9. VOC Content: Provide CRI (GLP) certified product; in lieu of labeling, independent test report showing compliance is acceptable.
10. Static Control Fiber: per basis of design.
11. Maximum Electrostatic Charge: 3 Kv. at 20 percent relative humidity.
12. Rows: per basis of design per inch.
13. Gauge: per basis of design inch.
14. Stitches: per basis of design per inch.
15. Yarn Size: per basis of design denier.
16. Pile Weight: per basis of design oz/sq yd.
17. Density Factor: per basis of design kilotex.
18. Primary Backing Material: Polypropylene.
19. Primary Backing Weight: as recommended per basis of design oz/sq yd.
20. Laminate: as recommended per basis of design.
21. Laminate Weight: as recommended per basis of design oz/sq yd.
22. Secondary Backing Material: Jute.
23. Secondary Backing Weight: as recommended per basis of design oz/sq yd.
24. Total Weight: as recommended per basis of design oz/sq yd.

- B. Roll Carpet: Same manufacturer, type, color and pattern, and face fiber characteristics as carpet tile, per basis of design feet wide, manufactured in same color dye lot as tile.

## 2.03 ACCESSORIES

- A. Subfloor Filler: White premix latex; type recommended by flooring material manufacturer.
- B. Base Cap: as recommended per basis of design type, as recommended per basis of design finish, color as selected by Architect.
- C. Edge Strips: Embossed aluminum, color as selected by Architect.
- D. Stair Nosing: As specified in Section 09 6500.
- E. Adhesives:
  1. Compatible with materials being adhered; maximum VOC content as specified in Section 01 6116.
- F. Carpet Tile Adhesive: Recommended by carpet tile manufacturer; releasable type.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that subfloor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive carpet tile.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive carpet tile.
- C. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to subfloor surfaces.
- D. Cementitious Subfloor Surfaces: Verify that substrates are ready for flooring installation by testing for moisture and alkalinity (pH).

1. Obtain instructions if test results are not within limits recommended by flooring material manufacturer and adhesive materials manufacturer.

### 3.02 PREPARATION

- A. Remove existing carpet tile.

### 3.03 INSTALLATION

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install carpet tile in accordance with manufacturer's instructions.
- C. Blend carpet from different cartons to ensure minimal variation in color match.
- D. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.
- E. Lay carpet tile in square pattern, with pile direction parallel to next unit, set parallel to building lines.
- F. Locate change of color or pattern between rooms under door centerline.
- G. Fully adhere carpet tile to substrate.
- H. Adhere carpet tile as base finish up vertical surfaces to form base. Terminate top of base with cap strip.
- I. Trim carpet tile neatly at walls and around interruptions.
- J. Complete installation of edge strips, concealing exposed edges.

### 3.04 CLEANING

- A. Remove excess adhesive without damage, from floor, base, and wall surfaces.
- B. Clean and vacuum carpet surfaces.

END OF SECTION 09 6813

SECTION 09 9000  
PAINTS AND COATINGS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Applicable provisions of Bidding Requirements, Contract Requirements in Division 0 and all applicable Division 1 sections.

1.02 SUMMARY

- A. Section Includes: Surface preparation and field painting of the following:
1. Exposed exterior items and surfaces.
  2. Exposed interior items and surfaces.
  3. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.
  4. Exposed duckwork and other building service items as noted.
- B. Paint exposed surfaces, except where the paint schedules indicate that a surface or material is not to be painted or is to remain natural. If the paint schedules do not specifically mention an item or a surface, paint the item or surface the same as similar adjacent materials or surfaces whether or not schedules indicate colors. If the schedules do not indicate color or finish, the Architect will select from standard colors and finishes available.
1. Painting includes field painting of exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron work, and primed metal surfaces of mechanical and electrical equipment.
- C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.
1. Prefinished items include the following factory-finished components:
    - a. Toilet compartments.
    - b. Prefinished lockers.
    - c. Finished mechanical and electrical equipment.
    - d. Light fixtures.
  2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:
    - a. Foundation spaces.
    - b. Furred areas.
    - c. Ceiling plenums.
    - d. Utility tunnels.
    - e. Pipe spaces.
    - f. Duct shafts.
  3. Finished metal surfaces include the following:
    - a. Anodized aluminum.
    - b. Stainless steel.
    - c. Chromium plate.
    - d. Copper.
    - e. Bronze and brass.
  4. Operating parts include moving parts of operating equipment and the following:
    - a. Valve and damper operators.
    - b. Linkages.

- c. Sensing devices.
- d. Motor and fan shafts.
- 5. Labels: Do not paint over Underwriters Laboratories (UL), Factory Mutual (FM), or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

D. Related Sections:

- 1. Section 055000 "Metal Fabrications".
- 2. Section 064000 "Architectural Woodwork"
- 3. Section 081113 "Hollow Metal Frames"
- 4. Section 081416 "Flush Wood Doors"
- 5. Section 083113 "Access Doors and Panels"
- 6. Section 092500 "Gypsum Board"
- 7. Section 096200 "Resinous Poured in Place Resilient Flooring"

1.03 SUBMITTALS

- A. Product Data: For each paint system specified. Include block fillers and primers.
- B. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available for each type of finish-coat material indicated.
- C. Samples for Verification: Of each color and material to be applied, with texture to simulate actual conditions, on representative Samples of the actual substrate.
  - 1. Provide a list of materials and applications for each coat of each sample. Label each sample for location and application.
- D. Qualification Data: For firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.04 QUALITY ASSURANCE

- A. Applicator Qualifications: Engage an experienced applicator who has completed painting system applications similar in material and extent to that indicated for this Project with a record of successful in-service performance.
- B. Source Limitations: Obtain block fillers, primers, and undercoat materials for each coating system from the same manufacturer as the finish coats.

1.05 PRODUCT HANDLING

- A. Deliver materials to the Project Site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label.
- B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F. Maintain containers used in storage in a clean condition, free of foreign materials and residue.
  - 1. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing, and application.

## 1.06 PROJECT CONDITIONS

- A. Apply water-based paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 50 and 90 deg F.
- B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 45 and 95 deg F.
- C. Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85 percent; or at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.
  - 1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.
- D. Provide adequate ventilation, including mechanical ventilation, to remove paint odors and fumes from areas of the building where odors might migrate to occupied spaces.

## 1.07 EXTRA MATERIALS

- A. Furnish extra paint materials from the same production run as the materials applied in the quantities described below. Package paint materials in unopened, factory-sealed containers for storage and identify with labels describing contents. Deliver extra materials to area designated by Owner.
  - 1. Quantity: Furnish the Owner with an additional 5 percent, but not less than 1 gal. or 1 case, as appropriate, of each material and color applied.

## PART 2 - PRODUCTS

### 2.01 MANUFACTURERS

- A. Provide Basis of Design products listed on drawings from the following manufacturer: Sherwin Williams Company (S-W).
- B. Products: Subject to compliance with requirements, provide one of the products in the paint schedules, or an approved equal product of another acceptable manufacturer and only if basis of design products are not readily available.
- C. Manufacturers Names: The following manufacturers are referred to in the paint schedules by use of shortened versions of their names, which are shown in parentheses:
  - 1. Sherwin Williams Company (S-W).
  - 2. Benjamin Moore (B-M).
  - 3. PPG Industries, Inc (PPG).

### 2.02 PAINT MATERIALS, GENERAL

- A. VOC Emissions for Interior Paints and Coating: Provide certificate of compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario.
- B. VOC Content for Interior Paints and Coatings: Provide documentation of compliant VOC contender per SCAQMD Rule 1113.
- C. Material Compatibility:

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PAINTS AND COATINGS

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
  2. For each coat in a coating system, provide products recommended in writing by manufacturers of topcoat for use in coating system and on substrate indicated.
- D. VOC Content of Field-Applied Interior Paints and Coatings: Provide products that comply with the following limits for VOC content, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24); these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:
1. Flat Paints, Coatings, and Primers: VOC content of not more than 50 g/L.
  2. Nonflat Paints, Coatings, and Primers: VOC content of not more than 150 g/L.
  3. Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC not more than 250 g/L.
  4. Wood stain and clear finish: VOC content not more than 350 g/L.
  5. Floor Coatings: VOC not more than 100 g/L.
- E. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified. Paint-material containers not displaying manufacturer's product identification will not be acceptable.
1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.
- F. Colors: Provide color selections made by the Architect from manufacturer's full range of available colors. Where directed, provide custom colors of the finished paint systems to match the Architect's samples.
- G. Exposed Galvanized Steel Surfaces:
1. Basis of Design Primer for stained ferrous metal spot prime using: S-W Pro Industrial Pro-Cryl Universal Acrylic Primer.
  2. Basis of Design for Paint on galvanized metal: S-W Pro Industrial Waterborne Acrylic Dryfall.
  3. Exposed underside of galvanized roof deck and other galvanized steel surfaces:

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with the Applicator present, under which painting will be performed for compliance with paint application requirements.
1. Do not begin to apply paint until unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.
  2. Start of painting will be construed as the Applicator's acceptance of surfaces and conditions within a particular area.
- B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.
1. Notify the Architect about anticipated problems using the materials specified over substrates primed by others.

### 3.02 PREPARATION

- A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of the size or weight of the item, provide surface-applied protection before surface preparation and painting.
  - 1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.
- B. Preparing Previously Painted Wood Surfaces: Remove existing paint from wood surfaces using scrapers or chemical paint stripper as follows:
  - 1. Strip loose, chipped, alligatored or otherwise deteriorated paint using methods that will not damage existing woodwork.
  - 2. Remove paint to sound substrate. Sound, well-adhered paint may remain on surface.
  - 3. Allow surfaces to dry and sand smooth.
  - 4. Clean surfaces so they are free of dust and dirt.
  - 5. Fill cracks, gouges and nail holes with wood filler prior to application of first coat.
  - 6. Complete surface preparation to produce a smooth, uniform substrate suitable for application of primer and finish coats specified.
- C. Preparing Previously Painted Metal Surfaces: Remove existing paint from ferrous metal surfaces as follows:
  - 1. Scrape to remove paint, exercising care not to damage metalwork.
  - 2. Following paint stripping, rub steel surfaces to remove rust bloom, and solvent clean prior to priming. Ferrous metal surfaces may be rinsed with water.
  - 3. Prior to application of finish materials, clean all surfaces so they are free of dust and dirt.
  - 4. Following initial priming, fill gouges, holes and other surface imperfections with epoxy filler. Spot prime filled areas and allow to dry prior to application of first finish coat.
- D. Cleaning: Before applying paint or other surface treatments, clean the substrates of substances that could impair the bond of the various coatings. Remove oil and grease before cleaning.
  - 1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
- E. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.
  - 1. Provide barrier coats over incompatible primers or remove and re-prime.
  - 2. Cementitious Materials: Prepare concrete and masonry surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.
    - a. Use abrasive blast-cleaning methods if recommended by paint manufacturer.
    - b. Determine alkalinity and moisture content of surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct this condition before application. Do not paint surfaces where moisture content exceeds that permitted in manufacturer's written instructions.
    - c. Clean concrete floors to be painted with a 5 percent solution of muriatic acid or other etching cleaner. Flush the floor with clean water to remove acid, neutralize with ammonia, rinse, allow to dry, and vacuum before painting.
  - 3. Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off.
    - a. Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer before applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand



- smooth when dried.
- b. Prime, stain, or seal wood to be painted immediately on delivery. Prime edges, ends, faces, undersides, and backsides of wood, including cabinets, counters, cases, and paneling.
- 4. Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with the Steel Structures Painting Council's (SSPC) recommendations.
  - a. Blast steel surfaces clean as recommended by paint system manufacturer and according to requirements of SSPC-SP 10.
  - b. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
  - c. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with the same primer as the shop coat.
- 5. Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents so surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.
- F. Materials Preparation: Mix and prepare paint materials according to manufacturer's written instructions.
  - 1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
  - 2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
  - 3. Use only thinners approved by paint manufacturer and only within recommended limits.
- G. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of the same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

### 3.03 APPLICATION

- A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.
  - 1. Surface treatments and finishes are indicated in the schedules.
  - 2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
  - 3. Provide finish coats that are compatible with primers used.
  - 4. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, convector covers, covers for finned-tube radiation, grilles, and similar components are in place. Extend coatings in these areas, as required, to maintain the system integrity and provide desired protection.
  - 5. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before the final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
  - 6. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
  - 7. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
  - 8. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.
  - 9. Sand lightly between each succeeding enamel or varnish coat.



- B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
1. The number of coats and the film thickness required are the same regardless of application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
  2. Omit primer on metal surfaces that have been shop primed and touchup painted.
  3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
  4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and where application of another coat of paint does not cause the undercoat to lift or lose adhesion.
- C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.
1. Brushes: Use brushes best suited for the type of material applied. Use brush of appropriate size for the surface or item being painted.
  2. Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by the manufacturer for the material and texture required.
  3. Spray Equipment: Use airless spray equipment with orifice size as recommended by the manufacturer for the material and texture required.
  4. Block Filler on CMU: Follow Manufacturer's recommendations - squeegee block filler to force material into pores in order to produce a relatively smooth surface. In wet areas, a smooth continuous pinhole-free appearance is necessary for proper protection before top-coating and require two coats to provide most uniform surface.
- D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate. Provide the total dry film thickness of the entire system as recommended by the manufacturer.
- E. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items exposed in equipment rooms and in occupied spaces.
- F. Mechanical items to be painted by General Contractor to include, but are not limited to, the following:
1. Piping, pipe hangers, and supports.
  2. Tanks.
  3. Exposed ductwork.
  4. Insulation.
  5. Supports.
  6. Motors and mechanical equipment.
  7. Accessory items.
- G. Electrical items to be painted include, but are not limited to, the following:
1. Conduit and fittings.
  2. Panelboards.
- H. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.
1. Squeegee block filler to force material into pores in order to produce a relatively smooth surface. A smooth continuous pinhole-free appearance is necessary for proper protection

before topcoating and require two coats to provide most uniform surface. Spotting, laps, roller marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

- I. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by the manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn through or other defects due to insufficient sealing.
- J. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.
- K. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

### 3.04 FIELD QUALITY CONTROL

- A. The Owner reserves the right to invoke the following test procedure at any time and as often as the Owner deems necessary during the period when paint is being applied:
  - 1. The Owner will engage the services of an independent testing agency to sample the paint material being used. Samples of material delivered to the Project will be taken, identified, sealed, and certified in the presence of the Contractor.
  - 2. The testing agency will perform appropriate tests for the following characteristics as required by the Owner:
    - a. Quantitative material analysis.
    - b. Abrasion resistance.
    - c. Apparent reflectivity.
    - d. Flexibility.
    - e. Washability.
    - f. Absorption.
    - g. Accelerated weathering.
    - h. Dry opacity.
    - i. Accelerated yellowness.
    - j. Recoating.
    - k. Skinning.
    - l. Color retention.
    - m. Alkali and mildew resistance.
  - 3. The Owner may direct the Contractor to stop painting if test results show material being used does not comply with specified requirements. The Contractor shall remove noncomplying paint from the site, pay for testing, and repaint surfaces previously coated with the rejected paint. If necessary, the Contractor may be required to remove rejected paint from previously painted surfaces if, on repainting with specified paint, the 2 coatings are incompatible.

### 3.05 CLEANING AND PROTECTION

- A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from the site.
  - 1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping. Be careful not to scratch or damage adjacent finished surfaces.

- B. Protect work of other trades, whether being painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.
- C. Provide "Wet Paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others to protect their work after completing painting operations.
  - 1. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

### 3.06 EXTERIOR PAINT SCHEDULE

- A. General: Provide the finish systems scheduled for each material type indicated, applied at spreading rate recommended by manufacturer to achieve the total dry film thickness (DFT) listed.
  - 1. Provide 2 finish coats over the listed base coats (primer, filler, bond coat) except as otherwise indicated.
- B. Exterior Ferrous Metal:
  - 1. Semigloss, Acrylic-Enamel Finish:
    - a. Primer: 1.3 mils DFT.
      - 1) Corrosion Fighting Primer.
        - a) S-W: Rust-O-Lastic Anti-Corrosive Primer.
        - b) B-M: IronClad Retardo Rust-Inhibitive Paint #163.
        - c) PPG: 6-208 Speedhide Interior/Exterior Rust Inhibitive Steel Primer.
    - b. First and Second Coats: 2.6 mils DFT.
      - 1) S-W: House & Trim Acrylic Semi-Gloss Enamel.
      - 2) B-M: MoorGlo Latex House & Trim Paint #096.
      - 3) PPG: 78 Line Sun-Proof Semi-Gloss Acrylic Latex House and Trim Paint.
- C. Exterior Zinc-Coated Metal:
  - 1. Semigloss, Acrylic-Enamel Finish:
    - a. Pretreatment Surface Preparation: As recommended by coating manufacturer.
    - b. Primer: 1.2 mils DFT.
      - 1) S-W: Rust-O-Lastic Hydro-Prime II.
      - 2) B-M: IronClad Galvanized Metal Latex Primer #155.
      - 3) PPG: 90-709 Pitt-Tech One Pack Interior/Exterior Primer/Finish DTM Industrial Enamel.
    - c. First and Second Coats: 2.6 mils DFT.
      - 1) S-W: Sea Shore/Four Seasons Acrylic Trim Enamel.
      - 2) B-M: MoorGlo Latex House & Trim Paint #096.
      - 3) PPG: 78 Line Sun-Proof Semi-Gloss Acrylic Latex House and Trim Paint.

### 3.07 INTERIOR PAINT AND COATING SCHEDULE

- A. General: Provide the finish systems scheduled for each material type indicated, applied at spreading rate recommended by manufacturer to achieve the total dry film thickness (DFT) listed.
  - 1. Provide 2 finish coats over the listed base coats (primer, filler, bond coat) except as otherwise indicated.
  - 2. See Finish Schedule on drawings for location of paint and coating types.
- B. Interior Concrete; Non-Traffic Surfaces:
  - 1. Water-Reducible Epoxy Coating System:
    - a. Primer or Filler: As recommended by coating manufacturer.

- b. First and Second Coats:
      - 1) S-W: Water Based Catalyzed Epoxy, 3.0 mils DFT. Semi-Gloss, 051 Line; 2.0 mils DFT.
      - 2) B-M: Corotech High Performance Clear Acrylic Sealer, Low Lustre V027; 1.5 mils DFT.
      - 3) PPG: Pitt-Glaze WB1 Interior Pre-Catalyzed Acrylic Water Borne Epoxy, eggshell; 1.5 mils DFT.
- C. Interior Concrete; Traffic Surfaces:
  - 1. Urethane Finish with Slip-Resistant Aggregate Finish: For mechanical room, technology room, and electrical room.
    - a. First and Second Coats: water-based urethane.
      - 1) S-W: Moisture Cured Urethane Pigmented: 2 coats SW ArmorSeal Rexthane1 with non-skid additive.
      - 2) B-M:
      - 3) PPG:
    - b. Color: Architect to select from full range of colors.
  - 2. Epoxy Finish: For storage rooms.
    - a. Primer: Latex sealer undercoat.
    - b. First Coat: Latex enamel.
    - c. Second Coat: Two-component, high build epoxy.
      - 1) S-W:
      - 2) B-M:
      - 3) PPG:
- D. Interior Concrete Masonry Units (CMU); Location as indicated on drawings:
  - 1. High-Performance, Interior/Exterior Polyamine Epoxy Coating System: Total system thickness not less than 10 mils DFT.
    - a. Block Filler Coat:
      - 1) Basis of Design: Sherwin Williams Pro Industrial Heavy Duty Block Filler B42W150.
      - 2) Approved equivalent by one of the following:
        - a) B-M:
        - b) PPG: 97-685/97-686 Aquapon Polyamide-Epoxy Block Filler.
    - b. First and Second Coats:
      - 1) Basis of Design: S-W Pro Industrial Water Based Catalyzed Epoxy.
      - 2) Approved equivalent by one of the following:
        - a) PPG: 97-1 Series Aquapon Polyamide-Epoxy.
        - b) B-M: Ironclad Chemical and Water Resistant Epoxy Enamel 182.
- E. Interior Gypsum Board:
  - 1. Water-Reducible Epoxy Coating System:
    - a. Primer:
      - 1) S-W: PrepRite 200 Latex Primer; 1.4 mils DFT.
      - 2) PPG:TCD Acrylic Primer Sealer; 1.5 mils DFT.
      - 3) B-M:Rich Lux Latex Sealer Undercoater 037-154; 1.5 mils DFT.
    - b. First and Second Coats:
      - 1) S-W:Water Based Catalyzed Epoxy, B70-200 Series; 3.0 mils DFT.
      - 2) B-M:PPG Water Based 191 Epoxy; 2.0 mils DFT.
      - 3) S-W:Ply-Tile 530 Water Reducible Acrylic Epoxy Semi-Gloss, 051 Line; 2.0 mils DFT.
- F. Interior Woodwork: Including wood doors and trim.
  - 1. Semigloss, Acrylic-Enamel, Low-VOC Finish:

- a. Primer: 0.8 mil DFT.
  - 1) Harmony Low Odor Interior Latex Primer.
  - 2) Duron: Terminator 2 Water Based Primer/Sealer.
  - 3) Moore: Pristine Eco Spec Interior Latex Primer Sealer 231.
  - 4) Enviro-Pure Primer.
- b. First and Second Coats: 2.8 mils DFT.
  - 1) S-W: Harmony Low Odor Interior Latex Semigloss.
  - 2) B-M: Pristine Eco Spec Interior Latex Demi Gloss.
  - 3) PPG:
- 2. Semi-gloss, Low-VOC Wood Stain and Finish:
  - a. Basis of Design: Sherwin Williams Minwax Fast-Drying Polyurethane Finish system.
    - 1) Pre-Stain Wood Conditioner: Oil Based.
      - a) Stain Color: Minwax Wood Finish Golden Oak 210B.
      - b) Clear finish: Oil-based protective finish.
      - c) Sheen: Semi-gloss
  - b. Approved equivalent by one of the following:
    - 1) B-M:
    - 2) PPG:
- G. Interiorly Exposed Galvanized Metal Roof Deck:
  - 1. Primer (Ferrous and Non-Ferrous Metal): ProIndustrial Pro-cryl Universal Primer
  - 2. 2 coats: Low VOC Waterborne Acrylic Dryfall, Flat B42-W00081 / Eg-shell B42-W00082
- H. Interior Ferrous Metal:
  - 1. Semigloss, Acrylic-Enamel, Low-VOC Finish:
    - a. Primer: 0.8 mil DFT.
      - 1) S-W: Procryl Universal Water Based Primer.
      - 2) B-M: IronClad Latex Low Lustre Metal and Wood Enamel 363.
      - 3) PPG: Rich Lux Latex Sealer Undercoater.
    - b. First and Second Coats: 2.8 mils DFT.
      - 1) S-W: Harmony Low Odor Interior Latex Semigloss.
      - 2) B-M: Pristine Eco Spec Interior Latex Semi-Gloss Enamel 224.
      - 3) PPG:

END OF SECTION 09 9000

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## SECTION 09 9133 MINERAL SILICATE COATINGS

### PART 1 GENERAL

#### 1.01 RELATED DOCUMENTS

- A. Submittal requirements shall be coordinated with Division 01.

#### 1.02 SUMMARY

- A. Section includes surface preparation and the field application of silicate coating, on the following exterior substrates:
  - 1. As indicated on drawings.
- B. Related Requirements:
  - 1. Section 03 01 30 – Maintenance of Cast-in-Place Concrete
  - 2. Section 04 01 01 – Masonry Repair
- C. Related Products
  - 1. Cleaning Agents
  - 2. Crack fillers
  - 3. Water Repellent / Sealers

#### 1.03 REFERENCES

- A. American Society for Testing and Materials (ASTM) D 16 – Standard Terminology for Paint, Related Coatings, Materials, and Applications.
- B. General: The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by the basic designation only.
- C. ASTM (ASTM)
  - 1. ASTM E 96, "Standard Test Methods for Water Vapor Transmission of Materials.
  - 2. ASTM E 514, "Standard Test Method for Water Penetration and Leakage Through Masonry.
  - 3. ASTM ASTM G 154, "Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials.
  - 4. ASTM D 6886-12, "Standard Test Method for Determination of the Individual Volatile Organic Compounds (VOCs) in Air-Dry Coatings by Gas Chromatography.
- D. Deutsches Institut für Normung (DIN), European Standard (EN), and International Organization for Standardization (ISO):
  - 1. DIN EN 1062, manufacturing standard for sol-silicate coating.
  - 2. ISO 6504-3, "Paints and varnishes - Determination of hiding power - Part 3: Determination of contrast ratio of light-colored paints at a fixed spreading rate.
  - 3. ISO 2813, "Paints and varnishes - Determination of specular gloss.
  - 4. EN 1062-3, "Paints and varnishes - Coating materials and coating systems for exterior masonry and concrete - Part 3: Determination of liquid water permeability.
  - 5. DIN EN 1504-2, "Products and systems for the protection and repair of concrete structures - Definitions, requirements, quality control and evaluation of conformity - Part 2: Surface protection systems for concrete."

6. DIN EN ISO 7783-2, "Coating materials and coating systems for exterior masonry and concrete - Part 2: Determination and classification of water-vapor transmission rate (permeability):
7. DIN 4102-A2, "Fire Behavior of Building Materials and Building Components - Part 2: Building Components; Definitions, Requirements and Tests.

#### 1.04 DEFINITIONS

- A. Silicate coating, base coat: The first applied textured coat of the sol-silicate coating.
- B. Silicate coating, top coat: The second applied coat of the sol-silicate coating.
- C. Dilution: A sol-silicate based diluent.

#### 1.05 SYSTEM DESCRIPTION

- A. A materials-compatible highly vapor permeable decorative coating system offering strong weathering protection for exterior exposure.
  1. Silicate Coating: An incombustible two coat system comprising a "Grob" minerally filled base coat and a smooth top coat.
    - a. Silicate coating penetrates the surface and in a chemical reaction combines with the substrate through chemical and mechanical bonds forming a hard amorphous microporous layer with extremely high vapor permeability.
    - b. Unaffected by acids, UV exposure, or air-borne pollutants.
    - c. Unique mineral layer structure prevents liquid water penetration into the coated substrate and maintains moisture balance through vapor diffusion to keep wall assemblies breathable and dry, thus resisting mold and biological growth.
    - d. Will not reduce substrate vapor permeability.

#### 1.06 ACTION SUBMITTALS

- A. Product Data: Submit product data showing material proposed. Submit sufficient information to determine compliance with the Drawings and Specifications. Provide published documentation describing materials, characteristics, and limitations.
- B. Samples: Submit samples for verification purposes, fabrication techniques and workmanship.
- C. Manufacturer's Instructions: Submit manufacturer's instructions including technical data sheets, material safety data sheets, mixing instructions, application requirements, special procedures, and conditions requiring special attention.
- D. Samples for Initial Selection: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- E. Samples for Verification: For each type of finish system and each color and gloss of topcoat, two samples, representing actual product, color, and patterns
  1. Submit Samples on rigid backing, 8 inches square.
  2. Apply coats on Samples in steps to show each coat required for system.
  3. Label each coat of each Sample.
  4. Label each Sample for location and application area.
- F. Product List: Cross-reference to paint and stain system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.



1.07 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Paint: 5 percent, but not less than 1 gal. or 1 case, as appropriate, of each material and color applied.

1.08 CLOSE-OUT SUBMITTALS

- A. Manufacturer's Warranty: Executed copy of manufacturer's warranty.

1.09 QUALITY ASSURANCE

- A. Qualifications
  - 1. Manufacturer Qualifications: Provide evidence that Manufacturer is a firm engaged in the manufacture of silicate coatings of types required, and whose products have been in satisfactory use in similar service for a minimum of fifteen years.
  - 2. Applicator Qualifications:
    - a. Provide evidence Applicator is a firm having successful application of products within this specification with at least one project in the last 18 months similar in type and scope to that required for this Project, and having passed a product certification training course provided by the manufacturer prior to the execution of this unit of work.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name, material and product brand name, and lot number, if any.
- B. Store materials in their original undamaged packages and containers inside a well ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity with ambient temperatures continuously maintained at not less than 45 deg F.
  - 1. Maintain containers in clean condition, free of foreign materials and residue.
  - 2. Remove rags and waste from storage areas daily.

1.11 FIELD CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
  - 1. Do not apply in freezing conditions, when rain is expected, or in high winds.

1.12 WARRANTY

- A. Provide manufacturer's written product warranty
  - 1. Warranty period from date of Substantial Completion is 15 years.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Basis of Design:
1. Items specified are to establish a standard of quality for design, function, materials, compatibility, performance, warranty, and appearance
  2. Equivalent products by listed manufacturers are acceptable.
  3. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.
- B. Manufacturers:
1. Basis of Design: KEIM Mineral Coatings, Inc., 10615 Texland Blvd. #600, Charlotte, North Carolina 28273. Telephone 704-588-4811. Email keim-info@keim.com
    - a. Local Representative, Cohalan Company, LLC - Mid-Atlantic Representative for KEIM, Shannon Cohalan Phone: 302-684-3299, Email: Shannon@keimmineralsystems.com
  2. BEECK Mineral Paints, 8161 Regent Parkway #101, Fort Mill. South Carolina 29715 Telephone 704-940-3603. Email info@beeckmineralpaints.com Web: www.BeeckMineralPaints.com
  3. Cathedral Stone Products
  4. Mineral Life International

### 2.02 MATERIALS

- A. Cleaners
1. Basis of Design: KEIM Heavy Duty Cleaner Concentrate
- B. Repair Material
1. Basis of Design:
    - a. Poured in place Concrete Stairs: KEIM Concretal Mortar R
    - b. Station Building Base: KEIM Concretal Universal Mortar
- C. Water Repellant
1. Basis of Design: KEIM Silan-100
- D. Mineral Silicate Paint/Coating, Base Coat: Provide mineral silicate based opaque paint/coating meeting or confirming to:
1. DIN EN 1062, manufacturing standard for sol-silicate coating.
  2. DIN EN 1504-2/2.2, Products and systems for the protection and repair of concrete structures/Surface protection systems for concrete.
  3. DIN 4102-A2 & EN 13501-1, non-flammable standard – will not burn
  4. ASTM E 96 Vapor Permeability- 75 – 85 perms.
  5. ASTM G 154 Accelerated Weathering – no fading, cracking, peeling.
  6. ASTM E 514 62-MPH Wind-Driven Rain Test – no water penetration.
  7. ASTM D 6886-12 Standard Test Method for Individual Volatile Organic Compounds (VOCs) – Less than 1 gram per liter VOC (Volatile Organic Content).
  8. Tinted lighter than the top finish coating.
  9. Basis of Design: KEIM Concretal W
- E. Mineral Silicate Paint/Coating, Top Coat: Provide mineral silicate based opaque paint/coating meeting or confirming to:
1. DIN EN 1062, manufacturing standard for sol-silicate coating.

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2. DIN EN 1504-2/2.2, Products and systems for the protection and repair of concrete structures/Surface protection systems for concrete.
3. DIN 4102-A2 & EN 13501-1, non-flammable standard – will not burn
4. ASTM E 96 Vapor Permeability- 75 – 85 perms.
5. ASTM G 154 Accelerated Weathering – no fading, cracking, peeling.
6. ASTM E 514 62-MPH Wind-Driven Rain Test – no water penetration.
7. ASTM D 6886-12 Standard Test Method for Individual Volatile Organic Compounds (VOCs) – Less than 1 gram per liter VOC (Volatile Organic Content).
8. Tinted lighter than the top finish coating.
9. Basis of Design: KEIM Concretal W

- F. Dilution for Silicate Coating: Provide sol-silicate dilution meeting or conforming to:
1. DIN 4102-A2, non-flammable standard – will not burn.
  2. ASTM E 96 Vapor Permeability – 77 perms.
  3. ASTM D 6886-12 Standard Test Method for Individual Volatile Organic Compounds (VOCs) – Less than 1 gram per liter VOC (Volatile Organic Content).
  4. Basis of Design: “KEIM Concretal Dilution”
- G. Refer to Finish Schedule and Paint Legend for paint colors.

## 2.03 EQUIPMENT

- A. Tools:
1. Silicate Coating, Base and Top Coats: Apply by natural bristle façade brush, professional roller, or professional airless spray equipment and back-roll as required for even distribution.

## 2.04 FINISHES

- A. Silicate Coating, Base and Top Coats:
1. Apply in full coverage evenly distributed coats to a smooth mineral matte finish without lap lines, voids, “holidays”, or drips. Compare manufacturer-verified mock up consumption data with application consumption data to ensure enough product is applied.
  2. Maintain a wet edge to prevent sight lines and textural differences.
  3. Apply enough product to prevent shading and textural differences that contribute to striping, especially with the base coat. Applying inadequate amount of product requires corner to corner recoating.
  4. When rolling product, roll off in same direction across façade to prevent shading differences that affect appearance of color.
  5. When spraying product.
    - a. Do not strain silicate coatings.
    - b. Remove paint filters from spray gun and spray pump.
    - c. Use only new hoses. Used hoses may contain paint thinners or solvents.
    - d. Paint thinners and cleaning solvents are not compatible with silicate coatings.
    - e. Clear gun and spray equipment with warm soapy water and rinse well with clean water to remove residual paint thinners and solvents.
    - f. Never use tips with smaller orifices than recommended. Smaller tips clog and prevent proper coating application. Improper application voids warranty and shortens longevity of the coatings.
    - g. Prevent overspray drift or misting onto glass objects.
  6. When working from scaffolding, work as a team moving across façade maximum eight (8) vertical feet per applicator to ensure complete coverage and wet edge left to right and top to bottom of each section.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verification of Conditions: Confirm by examination the areas and conditions under which the work is to be applied for compliance with manufacturer's instructions. Do not proceed with the work until unsatisfactory conditions have been corrected.
1. Verify substrate is secure, sound, dry, and absorbent, and free of dirt, grease, salts, oil-based paints, release agents, curing agents, and other bond breakers.
  2. Verify substrate has no pretreatments or priming materials applied unless such conditions are approved by manufacturer.
  3. Verify surfaces or materials to be coated are fully cured to manufacturer recommendations.
  4. Confirm coating surfaces are less than 40 percent relative humidity as measured by a masonry moisture meter prior to application of silicate coatings.
  5. Beginning of the work shall indicate acceptance of the areas and conditions as satisfactory by the Applicator.

### 3.02 PREPARATION

- A. Protection:
1. Lay ground cloths and take measures as necessary to protect surfaces subject to contact by products specified by this Section.
  2. Silicate paint coatings and dilution may etch or bond to glass, metal, and concrete.

### 3.03 .APPLICATION

- A. Conform to reviewed product data, manufacturer's written instructions, and provisions of the Contract Documents
- B. Plan the work properly.
1. Maintain temperature during and after application. Substrate and ambient air temperature must be between 41 °F (5 °C) and 86 °F (30 °C).
  2. Work ahead of the sun on shaded façades to avoid working on hot substrates.
  3. Work to logical stopping points (corners, seams, architectural features, etc.).
  4. Apply silicate coatings as directed by 2.4 FINISHES.
  5. Protect from wind and rain prior to, during, and for a minimum 24 hours after application.
  6. Obtain manufacturer's written instructions for application outside of the above parameters.
- C. Silicate Coating:
1. Base Coat:
    - a. Dilute sol-silicate coating with maximum 15 percent dilution (4 gallons with 2.3 liters dilution). Stir well by hand or 600-800 RPM mixing equipment.
    - b. Apply base coat of diluted silicate coating.
    - c. Allow minimum 12 hours drying time.
  2. Top Coat
    - a. Do not dilute. Stir well by hand or 600-800 RPM mixing equipment.
    - b. Apply top coat of undiluted silicate coating.
  3. Touch Up:
    - a. Some colors touch up well, some do not. Always perform a test and allow the touch up to cure minimum 12 hours before evaluation. Colors become lighter upon

- drying.
- b. For colors that do not touch up well, expect corner to corner recoating for acceptable results.
- c. When touching up or recoating, use the same tools and techniques for best results.
- d. Articulate the application confining the recoating to the borders of the repair

#### 3.04 CLEANING AND PROTECTION

- A. Clean tools, spills, and accidental drips immediately with plenty of water.
- B. Leave applications clean and premises free from residue and debris from work of this Section. Do not scratch or damage adjacent finished surfaces.
- C. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- D. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- E. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

END OF SECTION 09 9133

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## SECTION 10 1400 SIGNAGE

### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

- A. Room and door signs.
- B. Interior directional and informational signs.

#### 1.02 GENERAL REQUIREMENTS

- A. The drawings and general provisions of the Contract including the General Conditions apply to work under this Section.
- B. The work in this Section shall be completely coordinated with the work of other Sections. Verify and work of other trades that adjoin materials of this Section before the installation of items herein dimensions specified. Cooperate with such trades to assure the steady progress of all work under this Contract.
- C. All Signs listed in the Scope of Work shall be fabricated and installed.

#### 1.03 RELATED REQUIREMENTS

- A. Section 22 0553 - Identification for Plumbing Piping and Equipment.
- B. Section 26 0553 - Identification for Electrical Systems.
- C. Section 26 5100 - Interior Lighting: Exit signs required by code.

#### 1.04 SCOPE OF WORK

- A. The Contractor shall furnish all materials, labor, tools, equipment and incidentals to fabricate and install all Signing as described herein.
- B. Union members are required for any on-site labor and/or installation.
- C. The scope of work is also to include the removal of all existing signs as designated by the Architect, and to fill and repair any damaged surfaces.
- D. The Contractor shall fabricate and install signs as indicated in the drawings and schedules attached and as specified herein, shown on drawings and including:
  - 1. Acrylic with stainless steel frame Signs as shown on drawings:
  - 2. Suspended Identification
  - 3. Wall Mounted Directional
  - 4. Elevator
  - 5. Projecting Identification
  - 6. Vinyl Letters
  - 7. Stack End Insert Holder
  - 8. Shelf Topper
  - 9. Room Number Identification

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10. Stair Level Identification Sign
11. Stair Information Sign
12. Maximum Occupancy Sign

E. The above Scope of Work is documented as follows:

1. Technical Specifications
2. Graphic Standards
3. Detail Drawings
4. Sign Message Schedules
5. Sign Location Plans

#### 1.05 REFERENCE STANDARDS

- A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines current edition.
- B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- C. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.
- D. UL 1994 - Luminous Egress Path Marking Systems Current Edition, Including All Revisions.

#### 1.06 ADDITIONAL STANDARDS

- A. AA: Aluminum Association, 818 Connecticut Avenue, NW, Washington, D.C. 20006.
- B. ADAAG: Americans with Disabilities Act Accessibility Guidelines
- C. ANSI: American National Standards Institute
- D. ASTM: American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103 as published in "Compilation of ASTM Standards in Building Codes"
- E. NEC: National Electric Code - Latest Edition
- F. UL: Underwriters Laboratories Inc. Publication Stock, 333 Pfingsten Road, Northbrook, IL 60062.

#### 1.07 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's printed product literature for each type of sign, indicating sign styles, font, foreground and background colors, locations, overall dimensions of each sign.
- C. Signage Schedule: Provide information sufficient to completely define each sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.
  1. When room numbers to appear on signs differ from those on drawings, include the drawing room number on schedule.
  2. When content of signs is indicated to be determined later, request such information from Owner through Architect at least 2 months prior to start of fabrication; upon request, submit preliminary schedule.
  3. Submit for approval by Owner through Architect prior to fabrication.

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- D. Samples: Submit two samples of each type of sign, of size similar to that required for project, illustrating sign style, font, and method of attachment.
- E. Selection Samples: Where colors are not specified, submit two sets of color selection charts or chips.
- F. Verification Samples: Submit samples showing colors specified.
- G. Manufacturer's Installation Instructions: Include installation templates and attachment devices.
- H. Manufacturer's Qualification Statement.

#### 1.08 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
- B. The approved manufacturer shall have at least five years of experience in the type of work required; shall have a reputation for doing satisfactory work on time; and shall have recently successfully completed similar work.
- C. The Drawings in this Bid Package are for design intent only. The Contractor is responsible for the proper engineering of all items. The internal structure, dimensions and specifications for all items shall be indicated in the Contractor's shop drawings. Sign Contractor to engineer signs to proper level to withstand abuses of their environment.
- D. The Contractor shall inform the Architect and Owner of any product and/or material deficiencies or incompatibilities that will prevent the signs from withstanding the conditions and abuses of their environment.

#### 1.09 DELIVERY, STORAGE, AND HANDLING

- A. Package signs as required to prevent damage before installation.
- B. Package room and door signs in sequential order of installation, labeled by floor or building.
- C. Store tape adhesive at normal room temperature.
- D. Deliver and store work under this Section in a manner to prevent cracking or stress of components and to prevent mechanical damage or damage by the elements.
- E. Deliver work under this Section to Site in ample time to avoid delay in job progress and at such times as to permit proper coordination of the various parts.

#### 1.10 GUARANTEES

- A. Attention is directed to provisions of the GENERAL CONDITIONS regarding guarantees and warranties for work under this Contract.
- B. Manufacturers shall provide their standard guarantees for work under this Section. However, such guarantees shall be in addition to and not in lieu of all other liabilities which manufacturers and Contractors may have by law or by other provisions of the Contract Documents.

- C. Contractor shall guarantee all work under this Contract for a period of not less than one year during which time the Contractor shall maintain and service all signs provided under this Contract.

#### 1.11 FIELD CONDITIONS

- A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.
- B. Maintain this minimum temperature during and after installation of signs.

### PART 2 PRODUCTS

#### 2.01 MATERIALS

- A. Acrylic
  1. Acrylic shall be cast acrylic sheet that is optically clear, has high impact resistance, weather resistance, formability and machineability.
  2. Acrylic plastic shall be Plexiglas G with smooth finish, Rohm and Haas, Philadelphia, PA, or approved equal.
  3. Clear Non-glare acrylic shall be Clear N2001 Non-glare cell cast acrylic, Calsak Corp. or equal.
  4. Scratch resistant acrylic shall be SRA Acrylic with smooth finish as manufactured by Rohm and Haas Co., Philadelphia, PA, or approved equal.
  5. Saw-cut acrylic letters shall be cut from acrylic sheet, thickness as indicated on Drawings. Letters shall be saw-cut with sharp corners, flat faces and accurate profiles. Polish sides to a smooth finish.
  6. Cast acrylic letters shall have sharp corners and accurate profiles. Remove burrs and rough spots, belt polish to smooth finish.
- B. Stainless Steel
  1. Stainless steel for all Signing shall be Type 304-18-8 alloy, bright cold-rolled stainless steel with no markings.
  2. Cut stainless steel letterforms shall be water jet cut with sharp corners, flat faces, and accurate profiles. Sand sides to smooth finish.
  3. Fabricated stainless steel letterforms shall be of solid stainless steel sheeting. Letterforms shall be rigid, self-supporting and structurally sound. Use brackets and supports as appropriate. All exposed welds shall be filed smooth with all tool marks removed by fine abrasive grain air blasting or other approved method.
  4. Stainless steel shall receive finish as indicated on drawings. Finish shall be uniform without waves or imperfections of any kind. Finishes shall be as follows:
    - a. Satin Finish - #6 brushed finish
- C. Aluminum
  1. Aluminum plate for all signs shall conform to ASTM-B209, Alloy 6061-T6 to thickness indicated on drawings.
  2. Aluminum extrusions for all signs shall conform to ASTM-B221 Alloy 6061-T6 to dimensions and thickness indicated on drawings.
  3. Aluminum shall be of best commercial quality and their various forms shall be straight and true. There shall be no scratches, scars, creases or buckles.

4. Stencil cut aluminum shall be cut from sheet aluminum. Letters shall be cut true to form, with no irregularities. Remove all burrs and rough spots. Finish all edges same as sign face.
  5. Fabricated aluminum letterforms shall be of solid aluminum sheeting. Letterforms shall be rigid, self-supporting and structurally sound. Use brackets and supports as required. All exposed welds shall be filed smooth with all tool marks removed by fine abrasive grain air blasting or other approved method.
  6. Where aluminum is shop fabricated, all joints, returns and the like shall be properly joined together and welded edges shall be ground smooth to proper aluminum finish.
  7. Aluminum in contact with dissimilar metals shall have bituminous or other protective coating to prevent electrolytic action.
  8. Anodic Finish: All exposed aluminum members shall be free from scratches and other blemishes. Aluminum shall be caustic etched followed by anodized coating equal to Aluminum Association M21 C22 A31 as approved by Architect. Clear anodic finish to match Architect's sample.
  9. Aluminum shall receive finish as indicated on drawings. Finish shall be uniform without waves or imperfections of any kind. Finishes shall be as follows:
    - a. Satin Finish - 150 grit
- D. Steel
1. Structural steel materials, details and workmanship shall conform to the requirements of the latest edition of the A.I.S.C. Specifications for the Design, Fabrication, and Erection of Structural Steel Buildings.
- E. Polycarbonate
1. Polycarbonate sheet shall be formed polycarbonate clear or with integral color.
  2. Polycarbonate over laminate shall be .015 Lexan Film 8A35-112 with velvet finish first surface, polished finish second surface, GE Plastics.
- F. Welding
1. Welding materials and practices shall conform to the requirements of the latest edition of American Welding Society code for steel and aluminum. Shop welders shall be certified by AWS. Welding rods shall be of a composition compatible to the base metal being welded. Welding rods for structural steel shall be an E70 category. Welding of aluminum shall be the MIG process, using ER-5356 wire.
  2. Fabrication shall be accomplished using the highest standards of workmanship. All pieces shall be saw cut and carefully fit together. All visible connections shall be full welded and ground flush and smooth. All visible surfaces and connections shall be without visible grounding marks, surface differentiation or variation.
- G. Hardware
1. Anchor bolts shall conform to ASTM-A576 with a minimum yield strength of 50,000 PSI. Hexagonal nuts and washers shall be furnished with each bolt.
  2. High strength bolts (other than anchor bolts), nuts and washers shall conform to ASTM-A325.
  3. All hardware shall be galvanized per ASTM-A153 requirements.
  4. Where mechanical fasteners and hardware are required, they shall be of adequate thickness, length and construction to properly secure the sign unit. Any visible portion of any mounting device shall be finished to match adjacent sign surface, unless otherwise specified.
  5. Metal fasteners and hardware in contact with dissimilar metals shall have a protective coating or neoprene shields to prevent electrolytic action.

6. Lock cylinders shall be interchangeable core pin tumblers with nickel silver keys; all locks to be keyed alike. Locks to be flush with adjacent cabinetry as indicated in the Drawings. Painted finish to match color and finish of adjacent cabinetry. Provide five sets of keys.
  7. Mobile Cable Systems fasteners are by Mobile Cable Systems, Chicago, IL.
  8. Tri Pyramid Fasteners are by Tri Pyramid Structures, Inc., Westford, MA
- H. Expanded PVC Panel
1. Rigid PVC panel to be expanded closed-cell polyvinyl chloride (PVC) in a homogenous sheet material with a low-gloss matte finish material suitable for the application of paint, and adhesive vinyl, such as Sintra, as manufactured by 3A Composites USA Inc., Davidson, NC, or Komatex, as manufactured by Kommerling USA, Inc., Huntsville, or Celtec, as manufactured by Vycom, Scranton, PA, or approved equal.
- I. Tactile and Braille Plaques
1. Opaque Photo-Polymer - Indoor/Dry Conditions
    - a. Tactile signs shall consist of a 1/32" synthetic (nylo-plastic) light sensitive photo emulsion permanently bonded to a phenolic, aluminum or steel substrate.
    - b. The photo-emulsion shall be removed with a water etching process.
    - c. The background field shall be sprayed with an automotive grade acrylic lacquer with an eggshell finish. The faces of the raised graphics shall be silk-screened with an eggshell finish vinyl ink (LOV). Apply clear coat over all for extra protection.
    - d. This product shall not be used in Exterior or damp conditions.
- Vinyl
1. Vinyl for die-cut letters shall be Scotchcal as manufactured by 3M Co., St. Paul, MN, or approved equal.
  2. Vinyl shall have a matte finish with a .003 to .006 film thickness and shall match colors as shown on Drawings.
- K. Large Format Digital Graphics
1. Output: Ink et
    - a. Graphics shall be produced using a continuous ink-jet printing machine suitable for the printing of large-format, full-color images and text directly from a digital file, one step directly to substrate. The print resolution must be 1200-dpi minimum. The ink-jet output device shall have a minimum width capacity of 63 inches with the capability of printing on the following substrates: vinyl (frontlit, backlit, adhesive), net (thin and thick), Tyvek, panaflex, silk, canvas, vinyl coated nylon (Vylon), and nylon.
    - b. Inks and solvents shall be durable and provide a minimum of 2 years of colorfastness without the use of protective coatings or laminates. Colors shall be derived from four-process color CMYK pigments with a 6 million color combination range. Black shall be process black only.
- L. Paper Stock
1. Specifications for the Paper Stock for all inserts shall be natural white, minimum 65 lb. cover stock.
- M. Magnetic Sheeting
1. Magnetic sheet shall be flexible rubber magnetic sheet material with pressure sensitive adhesive backing by Magnetic Aids Corp., Clifton, N , or approved equal.
- N. Adhesives
1. Where adhesive mounting techniques are specified, the Contractor shall use adhesives specifically designed for compatibility with the base materials and the desired adhesive

strength. All adhesives shall be tested on site. All adhesives shall be indicated in the shop drawings.

2. Surfaces on which Signing is to be installed using adhesive shall be free of grease, oil, or any other residue.
3. Foam tape shall be 1/32" thick, high density open cell double coated polyurethane foam tape, Scotch Mount #4016 by 3M Co., St. Paul, MN, or approved equal.
4. VHB tape shall be double coated acrylic foam tape #4920 by 3M Co., St. Paul, MN, or approved equal.
5. Provide necessary amounts of clear silicone sealant or grout for use in pin mounting.

O. Silk Screening

1. Screen printed text and symbols shall utilize photographically prepared screens and shall be printed in accordance with accepted industry standards. No hand-cut screens shall be accepted. All screen-printing shall be executed in such a manner that all edges and corners of letterforms are true and clean. Letterforms, color areas, or lines with rounded positive or negative corners, built-up edges, bleeding, spattering, etc. will not be accepted. All photoscreens shall be prepared from typesetter's reproduction of the text specified, or camera ready artwork. All artwork and typesetting shall be no less than 50 of actual specified size. All inks shall be applied evenly without show through, pinholes, scratches, orange peeling, etc. Back up with white to prevent show through if necessary.
2. All silk screening processes shall be approved by the Designer prior to fabrication.

P. Masking and Spraying

1. All masking shall be executed with pre-spaced vinyl legends prepared from typesetter's reproductions of the copy specified. Typesetter's reproductions shall be no smaller than 50 of the actual size specified. Graphic mask shall be assembled on sign panel or wall in a professional manner prior to spraying. No hand-cut masks shall be used.
2. Masking and spraying shall be done carefully so as not to leave bleeding or rough edges at painted surfaces. All edges and corners of the finished graphics shall be true and clean. Graphics with rounded positive or negative corners will not be accepted.
3. Spray guns used for artwork shall be airless type as approved. All graphic work shall receive at least two coats of paint.

Q. Acid Etching

1. Graphics shall be acid-etched into metal plate to a minimum depth of 1/32".
2. Etched areas shall be filled with semi-gloss epoxy ink.
3. Etched areas shall be stained.

R. Laser Printing

1. Graphics for paper inserts shall be generated on a Macintosh or IBM PC, and output on a laser printer with a minimum resolution of 300 dpi. All graphics shall be printed at full size whenever possible. Graphics shall be laser printed at no less than 1/2 full size, then photocopied into final insert. All printed images shall be solid black, with no streaking, shadows, or background.
2. At the conclusion of the project the Contractor shall provide the Owner with all formats for the laser printed inserts on disc in order to facilitate future updating and maintenance. This work shall include pictographs, symbols, maps, etc. that were provided as laser printed inserts on the project.

S. Typeface

1. All copy shall be in the typeface Gill Sans Book and Gill Sans Regular to match the letterforms shown in the Detail Drawings.
2. The Contractor is responsible for purchasing all fonts and typesetting all messages, and providing final sign layouts for review and approval.

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3. All types of graphics - engraved, photo-polymer, saw-cut, vinyl, silk screened, etc. shall be produced using specified using a PC or Mac link to the final graphic output device.

T. Braille

1. All Braille on tactile signs shall be Grade 2 domed Braille and shall conform to the standard dimensions for literary Braille - as outlined in the Americans With Disabilities Act (ADA).

U. Typesetting

1. All typeset messages shall be prepared on a Macintosh or IBM PC. Letterforms shall match the samples shown in the drawings.
2. Standard letter spacing and standard word spacing shall be approved by Designer for all fonts before final manufacture.
3. Typical type and symbol layout for each sign type is indicated on the Design Drawings. All type shall be placed according to the dimensions shown on the drawings. Should any design conflict occur in the fabrication of the signs; i.e., type not fitting, it shall be brought to the attention of the Designer.

## 2.02 MANUFACTURERS

A. Flat Signs:

1. ASI Sign Systems, Inc.: [www.asisignage.com/](http://www.asisignage.com/)
2. Best Sign Systems, Inc: [www.bestsigns.com/#sle](http://www.bestsigns.com/#sle).
3. Cosco Industries (ADA signs); ADA Series 1: [www.coscoarchitecturalsigns.com/#sle](http://www.coscoarchitecturalsigns.com/#sle).
4. Cosco Industries (non-ADA signs); Changeable Message Signs: [www.coscoarchitecturalsigns.com/#sle](http://www.coscoarchitecturalsigns.com/#sle).
5. FASTSIGNS: [www.fastsigns.com/#sle](http://www.fastsigns.com/#sle).
6. Inpro: [www.inprocorp.com/#sle](http://www.inprocorp.com/#sle).
7. Mohawk Sign Systems, Inc: [www.mohawksign.com/#sle](http://www.mohawksign.com/#sle).
8. Seton Identification Products: [www.seton.com/aec/#sle](http://www.seton.com/aec/#sle).

B. Dimensional Letter Signs:

1. ASI Sign Systems, Inc.: [www.asisignage.com/](http://www.asisignage.com/)
2. Cosco Industries; Cast Aluminum: [www.coscoarchitecturalsigns.com/#sle](http://www.coscoarchitecturalsigns.com/#sle).
3. FASTSIGNS: [www.fastsigns.com/#sle](http://www.fastsigns.com/#sle).
4. Inpro: [www.inprocorp.com/#sle](http://www.inprocorp.com/#sle).

C. Other Signs - as indicated on drawings:

## 2.03 SIGNAGE APPLICATIONS

- A. Accessibility Compliance: Signs are required to comply with ADA Standards and ICC A117.1, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.

- B. Room and Door Signs: Provide a sign for every doorway, whether it has a door or not, not including corridors, lobbies, and similar open areas.

1. Sign Type: Flat signs with engraved panel media as specified.
2. Provide "tactile" signage, with letters raised minimum 1/32 inch and Grade II braille.
3. Character Height: 1 inch.
4. Sign Height: 2 inches, unless otherwise indicated.

5. Office Doors: Identify with room numbers to be determined later, not the numbers indicated on drawings; in addition, provide "window" section for replaceable occupant name.
  6. Conference and Meeting Rooms: Identify with room numbers to be determined later, not the numbers indicated on drawings; in addition, provide "window" section with sliding "In Use/Vacant" indicator.
  7. Service Rooms: Identify with room names and numbers to be determined later, not those indicated on drawings.
  8. Rest Rooms: Identify with pictograms, the names "MEN" and "WOMEN", room numbers to be determined later, and braille.
- C. Interior Directional and Informational Signs:
- D. Luminous Egress Path Marking and Other "Glow-in-the-Dark" Signs: Photoluminescent media.
- E. Emergency Evacuation Maps:
1. Allow for one map at lower level.
  2. Map content to be provided by Owner.
  3. Use clear plastic panel silk-screened on reverse, in brushed aluminum frame, screw-mounted.

## 2.04 SIGN TYPES

- A. Flat Signs: Signage media without frame.
1. Edges: Square.
  2. Corners: Square.
  3. Clear Cover: For customer produced sign media, provide clear cover of polycarbonate plastic, glossy on back, non-glare on front.
  4. Wall Mounting of One-Sided Signs: Tape adhesive.
  5. Wall and Ceiling Mounting of Two-Sided Signs: Aluminum wall bracket, powder coated, color selected from manufacturer's standard colors, attached with screws in predrilled mounting holes, set in clear silicone sealant.
- B. Color and Font: Unless otherwise indicated:
1. Character Font: Helvetica, Arial, or other sans serif font.
  2. Character Case: Upper case only.
  3. Background Color: Clear.
  4. Character Color: Contrasting color.

## 2.05 TACTILE SIGNAGE MEDIA

- A. Engraved Panels: Laminated colored plastic; engraved through face to expose core as background color:
1. Total Thickness: 1/16 inch.

## 2.06 NON-TACTILE SIGNAGE MEDIA

- A. Silk Screened Plastic Panels: Letters and graphics silk screened onto reverse side of plastic surface:
1. Sign Color: Clear.
  2. Total Thickness: 1/8 inch.



## 2.07 DIMENSIONAL LETTERS

### A. Metal Letters:

1. Metal: Aluminum casting.
2. Metal Thickness: 1/8 inch minimum.
3. Text and Typeface:
  - a. Character Font: Helvetica, Arial, or other sans serif font.
  - b. Character Case: Upper case only.
4. Finish: Brushed, satin.
5. Mounting: Tape adhesive.

## 2.08 FINISHES

### A. Paints

1. Paints for metal signs shall be finished with acrylic polyurethane semi-gloss enamel as manufactured by Matthews Paint Co., Wheeling, Ill., or approved equal.
2. Paints for plastic signs shall be eggshell finish Gripflex enamel by Wyandotte Co., Norcross, GA or approved equal.
3. Paints for backgrounds of photo-polymer signs shall be eggshell finish automotive grade lacquer.
4. All surfaces shall be cleaned, primed and pre-treated according to manufacturer's specifications and noted in Shop Drawings as part of the finished surface work.

### B. Paints on Wall

1. All paint used for the project shall match the following manufacturer or as approved by the Designer:
2. The following schedule is not intended to restrict competitive bidding. The materials hereinafter mentioned are solely to designate and identify the quality of material to be used on the project:
3. All painting shall be carefully done and left perfect. No paint spots shall be left on glass, hardware or other finished work. Properly prepare all surfaces before painting by cutting, stopping, filling, etc., to ensure a smooth uniform surface without blemishes or variations of gloss.
4. All material shall be applied by skilled mechanics and paint shall be evenly flowed on, spread and thoroughly brushed out. Finished surfaces shall be uniform in gloss, finish and shall be free from brush marks, sags and runs.
5. All lines of demarcation between paints of different colors or shades shall be carefully drawn so as to be true and free from blurred edges.
6. All painting shall be done by a Contractor accustomed to doing only work of the highest quality.

### C. Inks

1. Inks for metal signs, glass and wall surfaces shall be 5,900 series Alkyd enamel, Nazdar Co., Chicago, IL, or approved equal.
2. Inks for plastic signs shall be Plasti-Vac 70,000 series lacquer, Nazdar Co., Chicago, IL, or approved equal.
3. Inks for raised graphics on photo-polymer signs shall be eggshell finish Low Odor Vinyl Ink.
4. Inks for silk-screening on reflective sheeting shall be "Scotchlite" brand screen printing ink series 700 by 3M Co., St. Paul, MN, or approved equal.
5. Inks for filling acid-etched graphics in metal signs shall be semi-gloss epoxy ink.
6. All inks and paints shall be evenly applied without pinholes, scratches or application marks. Prime coats or other surface pre-treatments, where recommended by the

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manufacturers, shall be included in the work and noted in the shop drawings as part of the finished surface work.

## 2.09 ACCESSORIES

- A. Concealed Screws: Stainless steel, galvanized steel, chrome plated, or other non-corroding metal.
- B. Exposed Screws: Chrome plated.
- C. Tape Adhesive: Double sided tape, permanent adhesive.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.

### 3.02 PREPARATION AND INSPECTION

- A. All surfaces to receive work shall be prepared and finished by the respective trades. The Sign Contractor shall notify the Designer if surfaces or openings are not satisfactory to receive this work. Commencement of work by Sign Contractor shall constitute acceptance of conditions and surfaces. Subsequent work not accepted by the Designer shall be replaced at no additional cost to the Owner.
- B. Prior to installation of all sign types each type shall be verified in field as to meet field conditions. Sign Contractor shall notify Architect if corresponding room name and number signs do not meet field conditions.
- C. All work shall be performed in accordance with a written schedule agreed on by Owner, Contractor, Designer and Sign Installer. In any case where work cannot be completed on schedule, the Contractor shall supply temporary signs at no additional expense to the Owner.
- D. All work shall be subject to inspection and approval by the Designer in the shop or field at any reasonable time. Provide at least 72 hours notice for Designer's inspection of complete fabricated signs before delivery.

### 3.03 WORKMANSHIP, PERFORMANCE

- A. All work shall present clean, straight sharply defined lines, free from defects impairing strength or durability, and shall be performed in a shop where the grade of work is of a quality acceptable to the Designer. All work shall be installed plumb, straight, square, level and in proper elevation plane, location, and alignment with other work. All work shall be designed for adjustment to field variations, fitted with proper joints and intersections, and adequately anchored in place. All workmanship and finishes shall be of best quality in every particular, strictly in accordance with best practice. All work shall be complete in every detail. Finish work shall be subject to approval by the Designer.

### 3.04 INSTALLATION / APPLICATION / ERECTION

- A. Members shall be shop-fabricated, and where practical, all work shall be delivered to the site completely assembled. All joints of such fabricated work shall be completely smooth without apparent marks showing throughout the finish. All work "broken down" shall be erected so that all parts fit accurately with hairline joints.
- B. Unless otherwise shown on the Drawings, all members shall be continuous lengths without seams. Work shall be formed to profiles indicated on the Drawings.
- C. Where material lengths require joints, all joints shall be flush. Similar materials at joints shall be either bonded or welded together, or shall be lap jointed to provide for expansion. All joints to be lightproof.
- D. Protect adjacent or adjoining surfaces and work from damage during installation in this section.
- E. Work shall be designed and anchored so that work will neither be distorted nor the fasteners overstressed from expansion and contraction of metal or other materials as applicable.

### 3.05 CLEANING AND PROTECTION

- A. At completion, all work shall be checked over, re-adjusted, and left in first class condition. Signs shall be cleaned with non-abrasive cleaning agents without damage to sign surfaces.
- B. Manufacturer shall provide Owner with information on cleaning and maintenance recommendations for all signs.
- C. Names, stamps and decals of manufacturers, installers or maintainers of signs shall not be visible in the finish work.

### 3.06 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install neatly, with horizontal edges level.
- C. Locate signs and mount at heights indicated on drawings and in accordance with ADA Standards and ICC A117.1.
- D. Protect from damage until Date of Substantial Completion; repair or replace damaged items.

END OF SECTION 10 1400

SECTION 10 2113.19  
PLASTIC TOILET COMPARTMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Solid plastic toilet compartments.
- B. Urinal and vestibule screens.

1.02 RELATED REQUIREMENTS

- A. Section 10 2800 - Toilet, Bath, and Laundry Accessories.

1.03 REFERENCE STANDARDS

- A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2022.
- C. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth 2019.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate the work with placement of support framing and anchors in walls and ceilings.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on panel construction, hardware, and accessories.
- C. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall supports, door swings.
- D. Samples: Submit two samples of partition panels, 6 by 6 inch in size illustrating panel finish, color, and sheen.
- E. Manufacturer's Installation Instructions: Indicate special procedures.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Solid Plastic Toilet Compartments:
  - 1. Scranton Products; Hiny Hiders Partitions: [www.scrantonproducts.com/#sle](http://www.scrantonproducts.com/#sle).
  - 2. Santana Products Co..

## 2.02 PLASTIC TOILET COMPARTMENTS

- A. Solid Plastic Toilet Compartments: Factory fabricated doors, pilasters, and divider panels made of solid molded high density polyethylene (HDPE), tested in accordance with NFPA 286; floor-mounted unbraced.
  - 1. Color: Single color as selected / as indicated on drawings.
  - 2. Doors:
    - a. Thickness: 1 inch.
    - b. Width: 24 inch.
    - c. Width for Handicapped Use: 36 inch, out-swinging.
    - d. Height: 55 inch.
  - 3. Panels:
    - a. Thickness: 1 inch.
    - b. Height: 55 inch.
  - 4. Pilasters:
    - a. Thickness: 1 inch.
    - b. Width: As required to fit space; minimum 3 inch.

## 2.03 ACCESSORIES

- A. Pilaster Shoes: Stainless steel, satin finish, 3 inches high; concealing floor fastenings.
- B. Attachments, Screws, and Bolts: Stainless steel , tamper proof type.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify correct spacing of and between plumbing fixtures.
- C. Verify correct location of built-in framing, anchorage, and bracing.

### 3.02 INSTALLATION

- A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's instructions.
- B. Maintain 3/8 inch to 1/2 inch space between wall and panels and between wall and end pilasters.
- C. Attach panel brackets securely to walls using anchor devices.
- D. Attach panels and pilasters to brackets. Locate head rail joints at pilaster center lines.

### 3.03 TOLERANCES

- A. Maximum Variation From True Position: 1/4 inch.
- B. Maximum Variation From Plumb: 1/8 inch.

3.04 SCHEDULES

- A. TA2 floor mounted Toilet Partition system with stall doors and hardware including heavy-duty surface-mounted Coat Hook for public restrooms

END OF SECTION 10 2113.19

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SECTION 10 2800  
TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Commercial toilet accessories as indicated on drawings.
- B. Toilet accessories.
- C. Mirrors
- D. Under-lavatory pipe supply covers.
- E. Electric hand/hair dryers; only as indicated on drawings.
- F. Diaper changing stations as indicated on drawings.
- G. Utility room accessories as indicated on drawings.

1.02 RELATED REQUIREMENTS

- A. Section 09 3000 - Tiling: Ceramic washroom accessories.
- B. Section 10 2113.19 - Plastic Toilet Compartments.
- C. Section 22 4000 - Plumbing Fixtures: Under-lavatory pipe and supply covers.

1.03 ABBREVIATIONS AND ACRONYMS

- A. PPE: Personal Protective Equipment.

1.04 REFERENCE STANDARDS

- A. ADA Standards - 2010 ADA Standards for Accessible Design 2010.
- B. ASME A112.18.9 - Protectors/Insulators for Exposed Waste and Supplies on Accessible Fixtures 2011 (Reaffirmed 2022).
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- D. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service 2015a (Reapproved 2019).
- E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- F. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- G. ASTM B86 - Standard Specification for Zinc and Zinc-Aluminum (ZA) Alloy Foundry and Die Castings 2018, with Editorial Revision (2021).

- H. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium 2017.
- I. ASTM C1036 - Standard Specification for Flat Glass 2021.
- J. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass 2018.
- K. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror 2018.
- L. ASTM C1822 - Standard Specification for Insulating Covers on Accessible Lavatory Piping 2021.
- M. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2022.
- N. ASTM F2285 - Standard Consumer Safety Performance Specification for Diaper Changing Tables for Commercial Use 2004, with Editorial Revision (2016).
- O. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi 2015, with Editorial Revision (2021).
- P. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.

#### 1.05 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the work with the placement of internal wall reinforcement, concealed ceiling supports, and reinforcement of toilet partitions to receive anchor attachments.

#### 1.06 SUBMITTALS

- A. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.
- B. Samples: Submit two samples of each accessory, illustrating color and finish.
- C. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

### PART 2 PRODUCTS

#### 2.01 MANUFACTURERS

- A. See Accessories Schedule below and drawings for basis of design products.
- B. Toilet, Shower, and Bath Accessories:
  1. American Specialties, Inc [www.americanspecialties.com/#sle](http://www.americanspecialties.com/#sle).
  2. Under-Lavatory Pipe Supply Covers:
    - a. Handicap Lavatory Pipe Insulation Kit (HLPI): Handicap Lavatory P-Trap and Angle Valve Assemblies, shall be insulated with the fully molded, TRUEBRO, "Handi Lav-Guard" insulation kit. Install one (1) Model # 102, to a lavatory in each bathroom having a designated stall for users on a wheel chair. Furnish grey color.
    - b. Plumberex Specialty Products, Inc: [www.plumberex.com/#sle](http://www.plumberex.com/#sle).
- C. Electric Hand Dryers:

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TOILET, BATH, AND LAUNDRY ACCESSORIES



1. Bradley Corporation, [www.bradleycorp.com](http://www.bradleycorp.com)
2. ASI American Specialties, Inc., [www.americanspecialties.com](http://www.americanspecialties.com)
3. Excel Dryer: [www.exceldryer.com](http://www.exceldryer.com)

D. Diaper Changing Stations:

1. Bradley Corporation: [www.bradleycorp.com/#sle](http://www.bradleycorp.com/#sle).
2. Diaper Deck & Company: [www.diaperdeck.com/#sle](http://www.diaperdeck.com/#sle).
3. Koala Kare Products: [www.koalabear.com/#sle](http://www.koalabear.com/#sle).
4. Provide products of each category type by single manufacturer.

## 2.02 MATERIALS

- A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
  1. Grind welded joints smooth.
  2. Fabricate units made of metal sheet of seamless sheets, with flat surfaces.
- B. Keys: Provide 2 keys for each accessory to Owner; master key lockable accessories.
- C. Stainless Steel Sheet: ASTM A666, Type 304.
- D. Stainless Steel Tubing: ASTM A269/A269M, Grade TP304 or TP316.
- E. Galvanized Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G90/Z275 coating.
- F. Zinc Alloy: Die cast, ASTM B86.
- G. Mirror Glass: Tempered safety glass, ASTM C1048; and ASTM C1036 Type I, Class 1, Quality Q2, with silvering as required.
- H. Adhesive: Two component epoxy type, waterproof.
- I. Fasteners, Screws, and Bolts: Hot dip galvanized; tamper-proof; security type.
- J. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

## 2.03 FINISHES

- A. Stainless Steel: Satin finish, unless otherwise noted.
- B. Back paint components where contact is made with building finishes to prevent electrolysis.

## 2.04 Commercial Toilet Accessories

- A. Toilet Paper Dispenser: Single roll, semi-recessed, stainless steel unit with pivot hinge, tumbler lock.
  1. Products:
    - a. Toilet Tissue Dispensers (TTD): Bradley 5061- "BradEX," one per toilet. Surface mounted type, single roll with controlled delivery, made of 18 gauge heavy duty stainless steel.
- B. Paper Towel Dispenser: Manual, roll paper type.
  1. Cover: Stainless steel.
  2. Paper Discharge: Manual dispense by lever operation.

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TOILET, BATH, AND LAUNDRY ACCESSORIES

3. Capacity: 6-inch diameter roll.
  4. Mounting: Surface mounted.
  5. Refill Indicator: Transparent viewing slot.
  6. Products:
    - a. Provide a total of 2 unit(s) of the recessed mounted type per each multi-fixture restroom and one in single occupancy restrooms. The body is fabricated of 22 gauge stainless steel with all welded construction; flange is 1" wide with ¼" return fabricated in one piece seamless construction 20 gauge satin finish stainless steel; the door is fabricated of 18 gauge stainless steel with full length piano hinge and tumbler lock key. Subject to the wall thickness, this unit shall be a recessed or semi-recessed Bradley model #2481 with a lever operated mechanism. The unit(s) shall be installed in all new built bathrooms, or in a new built wall in a existing bathrooms, or where indicated on the construction drawing in an existing building.
    - b. Provide a surface mounted type, lever operated Roll Towel Dispenser, made of 20 gauge CRS heavy duty steel body with a grey baked enamel finish and 18 gauge CRS top. Front is an Tan color ABS high impact plastic. Provide a unit with a crank mechanism per each existing bathroom of the model #2491 Bradley unless otherwise noted. This unit shall be installed where the recessed housing in the wall is not available.
    - c. AJW Architectural Products; with approval to be equal: [www.ajw.com/#sle](http://www.ajw.com/#sle).
- C. Waste Receptacle: Stainless steel, freestanding style.
1. See drawings for Accessories Schedule.
    - a. Liner: Removable seamless stainless steel receptacle.
    - b. Liner: Removable, heavy-duty vinyl liner, attached at a minimum of four points with stainless steel grommets and hooks.
- D. Soap Dispenser: Liquid soap dispenser, wall-mounted, surface, with stainless steel cover and horizontal stainless steel tank and working parts; push type soap valve, check valve, and window gauge refill indicator, tumbler lock. See drawings for Accessories Schedule.
- E. Mirrors: Stainless steel framed, 1/4 inch thick tempered safety glass; ASTM C1048.
1. Frame: 0.05 inch angle shapes, with mitered and welded and ground corners, and tamperproof hanging system; satin finish.
  2. Backing: Full-mirror sized, minimum 0.03 inch galvanized steel sheet and nonabsorptive filler material.
  3. Products: See Accessories Schedule on drawings.
    - a. Framed SS security mirror (M): Fabricated of 20 gauge type 430 stainless steel, bright annealed. Strecher leveled for uniform finish. Reflective surface is bright and smooth with a mirror like finish after being polished to a #8 architectural finish. The mirrors are fully reinforced with a fiberboard backing. Mirror's frame surface will be made in a seamless construction with a SS-4D finish. Acceptable model Bradley SA03-2, size 12 x 16 inches. Mirrors are factory furnished with ¼ - 20 torx "pinhead" fasteners, and having countersink holes on the frame for mounting. Provide one unit for each standard lavatory.
    - b. AJW Architectural Products: [www.ajw.com/#sle](http://www.ajw.com/#sle).
- F. Mirrors, Public Restroom: Stainless steel framed, Type 400 polished stainless steel mirror; Exposed front mount.
- G. Seat Cover Dispenser: Stainless steel, surface-mounted, reloading by concealed opening at base, tumbler lock.
1. Minimum capacity: 250 seat covers.
  2. Products:
    - a. AJW Architectural Products: [www.ajw.com/#sle](http://www.ajw.com/#sle).

- b. Georgia-Pacific Professional; GP Safe-T-Gard Chrome 1/2 Fold Seatcover Dispenser: [www.blue-connect.com/#sle](http://www.blue-connect.com/#sle).

H. Grab Bars: Stainless steel, smooth surface.

- 1. Grab Bars Set (GB): Straddle type concealed mounting, design and tested to sustain 1300 pounds; 1½ inches diameter by 18 gauge 304 stainless steel tubing; fully welded 11 gauge 304 stainless steel mounting flanges; grab bars, shall allow 1½ inches clear space. Furnish one (1) set of Bradley, models 8122-00142 and 8122-00136 per each handicap stall or otherwise, in the combination indicated on drawings.
  - a. Push/Pull Point Load: 250 pound-force, minimum.
  - b. Dimensions: 1-1/4 inch outside diameter, minimum 0.05 inch wall thickness, exposed flange mounting, 1-1/2 inch clearance between wall and inside of grab bar.
  - c. Finish: Satin.
  - d. Length and Configuration: As indicated on drawings.

- i. Sanitary Napkin Disposal Unit: Stainless steel, surface-mounted, self-closing door, locking bottom panel with full-length stainless steel piano-type hinge, removable receptacle.

2.05 Electric Hand/Hair Dryers

A. Electric Hand Dryers: Traditional fan-in-case type, with downward fixed nozzle.

- 1. Operation: Automatic, sensor-operated on and off.
- 2. Mounting: Surface mounted.
- 3. Cover: Plastic.
  - a. Color: White.
  - b. Tamper-resistant screw attachment of cover to mounting plate.
  - c. Screened or shielded air intake.
  - d. Screen or shield to prevent access to motor/heater.
- 4. Air Velocity: 15,000 linear feet per minute, minimum.
- 5. Fan Control: Field adjustable down to approximately half-speed.
- 6. Total Wattage: 500 W, maximum; no heater.
- 7. Runtime: Field adjustable or automatic, up to 35 seconds.

2.06 Diaper Changing Stations

A. Diaper Changing Station: Wall-mounted folding diaper changing station for use in commercial toilet facilities, meeting or exceeding ASTM F2285.

- 1. Material: Polyethylene.
- 2. Mounting: Surface.
- 3. Color: Gray.
- 4. Minimum Rated Load: 250 pounds.
- 5. Products: as indicated on drawings.

2.07 JANITOR'S CLOSET ACCESSORIES

A. Combination Utility Shelf/Mop and Broom Holder: 0.05 inch thick stainless steel, Type 304, with 1/2 inch returned edges, 0.06 inch steel wall brackets.

- 1. Drying rod: Stainless steel, 1/4 inch diameter.
- 2. Hooks: Two, 0.06 inch stainless steel rag hooks at shelf front.
- 3. Mop/broom holders: Three spring-loaded rubber cam holders at shelf front.
- 4. Length: 36 inches.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify exact location of accessories for installation.
- C. For electrically-operated accessories, verify that electrical power connections are ready and in the correct locations.
- D. Verify that field measurements are as indicated on drawings.

### 3.02 PREPARATION

- A. Deliver inserts and rough-in frames to site for timely installation.
- B. Provide templates and rough-in measurements as required.

### 3.03 INSTALLATION

- A. Install accessories in accordance with manufacturers' instructions in locations indicated on drawings.
- B. Install plumb and level, securely and rigidly anchored to substrate.
- C. Comply with manufacturer's printed instructions, except where more stringent authorities' requirements are mandated by the governing authorities, and except where project conditions require extra precautions or provisions.
- D. Install plumb and level, securely and rigidly anchored in place.
- E. At stud walls, verify that at least one side of the item to install is located so that the fasteners will be set directly into stud. Use fasteners of 1/4" x 2 1/2" size. If stud spacing is other than the horizontal distance on centers between the fastener holes, use Rawl 4231 toggles for installation at the opposite side.
- F. At solid masonry walls or 3/4 solid CMU no larger than 6", drill pilot holes for installation of Rawl 9220 expansion-type fasteners. At hollow masonry walls, drill pilot holes for installation of Rawl 4231 toggles.
- G. At toilet partitions, use "one-way" "sex-bolt" stainless steel fasteners for installation.
- H. Install metal signs on restroom doors, using molly-jack nuts with stainless steel torx pinhead fasteners.
- I. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.
  - 1. Grab Bars: As indicated on drawings.
  - 2. Mirrors: 44" inch, measured from floor to bottom of mirrored surface.
  - 3. Electric Hand Dryers: Measured from floor to bottom of nozzle:
    - a. Men: 44 inches.
    - b. Women: 42 inches.
    - c. Teenager: 41 inches.
    - d. Child: 32 inches.

- e. Handicap: 36 inches.
- 4. Other Accessories: As indicated on drawings.

### 3.04 ADJUSTING

- A. Check for proper mechanical functioning and/or rolling operation in not more than five days prior to the Date of Final Completion.

### 3.05 cleaning

- A. Upon completion of installation, clean all surfaces that have become soiled during installation. Finished surfaces shall be clean after installation and left free of imperfections.
- B. No evidence of drilling, cutting or patching shall be visible in the finished work. Field touch-up of scratches or damaged finish will not be permitted.
- C. Replace all damaged materials with new.

### 3.06 PROTECTION

- A. Protect installed accessories from damage due to subsequent construction operations.

### 3.07 Toilet Accessory Schedule

- A. TA1 post to ceiling urinal screen as specified in other sections.
- B. TA2 floor mounted Toilet Partition system with stall doors and hardware including heavy-duty surface-mounted Coat Hook as specified in other sections.
- C. TA3 - Toilet Tissue Dispenser (TTD): one per Toilet Compartment for 4-1/2 / 5-inch-diameter tissue rolls. Bradley, Partition mounted Unit with double-roll toilet tissue dispenser; HC stall dual access with two tissue rolls per compartment and with one side that mounts flush with partition of accessible compartment. Controlled delivery with theft-resistant spindles; Stainless steel, No. 4 finish (satin) 18 gauge. Lockset: Tumbler type.
- D. TA4 - Toilet Tissue Dispenser (TD) for single restroom: Bradley Designed for 4-1/2- or 5-inch-diameter tissue rolls - Single-roll dispenser with hood; Surface mounted; Stainless steel, No. 4 finish (satin).
- E. TA5 - Towel Pin (TP): Bobrick Model No. B-677; Projecting minimum of 3 3/8 inches from mounting surface. 2x2 inch flange. Stainless steel, No. 4 finish (satin); One wall mounted per Restroom and one stall mounted per Toilet Compartment.
- F. TA6 - Grab Bar (GB): Bradley models 8122-00142 and 8122-00136; Flanges with concealed fasteners Mounting; 0.05 inch thick Stainless steel, No. 4 finish (satin); Smooth Finish on ends and slip-resistant texture in grip area; Outside Diameter: 1-1/2 inches. As indicated on Drawings provide Straight 36" and 48" and 18" (vertical).
- G. TA7 - sanitary napkin receptacle - one per women's room stall - Stainless steel, No. 4 finish (satin)
- H. TA8 - Liquid-Soap Dispenser (SD) one between each Lavatory: Bradley unit Designed for dispensing soap in liquid form 12 oz. Capacity; Horizontally oriented, surface mounted; Stainless steel, No. 4 finish (satin) 18 gauge. Lockset: Tumbler type; Window type Refill Indicator.

- I. TA9 - Underlavatory Guard (PG) on each Lavatory drain: TruBro Insulating pipe covering for supply and drain piping assemblies that prevents direct contact with and burns from piping; allow service access without removing coverings. Material and Finish: Antimicrobial, molded plastic, white.
- J. TA10 - Waste Receptacle (WR): Bradley Open top, Semi-recessed Mounting; 4 Gallon (15 Liter) Capacity with Reusable vinyl liner; Stainless steel, No. 4 finish (satin) 18 gauge. Lockset: Tumbler type. Provide matching folded paper towel dispenser in recess above.
- K. TA11 - Mirror Unit (MU) One unit for each standard lavatory: Bradley 7481; Framed Stainless Steel security mirror 24x36 inches: fabricated of 20 gauge type 430 stainless steel, bright annealed. Stretcher leveled for uniform finish. Reflective surface is bright and smooth with a mirror finish after being polished to a #8 architectural finish. Stainless-steel channel Frame with Welded and ground smooth Corners. Rigid, tamper- and theft-resistant installation Hangers, using Wall bracket of galvanized steel, equipped with concealed locking devices requiring a special tool to remove.
- L. TA12 - Medicine Cabinet (MMC) for single restroom: Bradley 18 by 30 inches Recessed wall mounted. Framed mirror door concealing storage cabinet equipped with continuous hinge and spring buffered, rod-type stop and magnetic door catch. Three adjustable Shelves. Material and Finish: Cabinet: Stainless steel, No. 4 finish (satin) 20 gauge, type 430 stainless steel; Mirror and Frame: Polished Stainless steel; Hinge: stainless steel; Shelves: Stainless steel, No. 4 finish (satin) 20 gauge.
- M. TA13 - Multiple Airflow Warm-Air Dryer (HD): One per two lavatories in Public Use Washrooms and one per Single User restrooms. Dyson - Multiple airflow warm-air hand dryer, using two or more airstreams for rapid hand drying. Surface mounted, with low-profile design. Electronic-sensor activated with operation time of 10 seconds. Cover Material and Finish: Stainless steel, No. 4 finish (satin). Electrical Requirements: 115 V, 15 A, 1725 W.
- N. TA14 - Diaper-Changing Station (DCS) one per public restroom: KoalaKare Model KB200-05SS; Horizontal unit that opens by folding down from stored position and with child protection strap. Engineered to support minimum of 250-lb static load when opened. Surface mounted, with unit projecting not more than 4 inches from wall when closed. Operation: By pneumatic shock-absorbing mechanism. Material and Finish: Stainless steel, No. 4 finish (satin), exterior shell with rounded plastic corners; HDPE interior in manufacturer's standard color. Liner Dispenser: Built in.
- O. TA15 - Utility Shelf (US) one per custodial room: Bobrick 16 inches long by 6 inches deep with exposed edges turned down not less than 1/2 inch and supported by two triangular brackets welded to shelf underside. Material and Finish: Not less than nominal 0.05-inch-thick stainless steel, No. 4 finish (satin).
- P. TA16 - Mop and Broom Holder (MH) one per custodial room: Bobrick - 36 inches Length Unit with shelf, hooks, holders, and rod suspended beneath shelf; 4 Hooks; Mop/Broom Holders: Three (3), spring-loaded, rubber hat, cam type. Material and Finish: Stainless steel, No. 4 finish (satin). Shelf: Not less than nominal 0.05-inch-thick stainless steel. Rod: Approximately 1/4-inch-diameter stainless steel.

END OF SECTION 10 2800

## SECTION 10 4415 FIRE EXTINGUISHERS AND CABINETS

### PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS:

- A. Applicable provisions of Bidding Requirements, Contract Requirements in Division 0 and all applicable Division 1 sections.

#### 1.02 SECTION INCLUDES:

- A. Furnish and Install: Fire extinguishers and cabinets.
  - 1. semi-recessed for installation into new masonry walls with all code required signage and lighting.
  - 2. surface mounted for installation on existing masonry walls with all code required signage and lighting for projection greater than 4" from wall.
- B. Related Sections: Without limitation, related sections include: Section 09 2215 Interior Non Structural Metal Framing Division 21 Fire Suppression

#### 1.03 SUBMITTALS:

- A. Product Data: Manufacturer's data including instructions, recommendations, and restrictions.
- B. Sustainable Design Submittals: Provide Health Product Declaration (HPD) or material ingredient disclosure.

#### 1.04 DELIVERY, STORAGE, HANDLING:

- A. Comply with Division 1 General Requirements and manufacturer's instructions and recommendations.

### PART 2 - PRODUCTS

#### 2.01 MANUFACTURERS:

- A. JL Industries, division of Activar Construction Products Group, [www.jlindustries.com](http://www.jlindustries.com)
- B. Larsen's Manufacturing Company, [www.larsensmfg.com](http://www.larsensmfg.com)
- C. Potter Roemer, division of Acorn Engineering Company [www.potterroemer.com](http://www.potterroemer.com)

#### 2.02 FIRE EXTINGUISHER CABINETS:

- A. Basis of Design: "Architectural Series", Larsen's Manufacturing Company.
- B. Mounting:
  - 1. Semi-recessed with ≈2.5 inches projection; typical UNO.
  - 2. Surface mounted where shown on existing masonry in existing Gym.
- C. Door Material, Finish: Steel, factory painted white.

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FIRE EXTINGUISHERS AND CABINETS

- D. Door Style: Vertical duo panel, safety glass.
- E. Latch: Roller catch.
- F. Pull: Satin chrome "staple" pull.
- G. Door Lettering: Black, vinyl die cut, vertical, all capitals.

2.03 FIRE EXTINGUISHERS:

- A. Filled, charged, pressurized, tagged, dated, and rechargeable.
  - 1. Listing: Underwriters Laboratories and FM approved.
  - 2. Container: Painted steel.
  - 3. Agent: Multi purpose dry chemical A-B-C.
  - 4. Agent Capacity: 10 pounds.
  - 5. UL Rating: 4-A:80-B:C.

PART 3 - EXECUTION

3.01 CABINET INSTALLATION:

- A. Comply with manufacturer's instructions and recommendations.
  - 1. Coordinate rough in and concealed blocking.
  - 2. Install at height shown or, if not shown, barrier free Code complying and approved by Architect.
  - 3. Install plumb and level.
  - 4. Anchor securely.
    - a. Provide one fastener for each factory provided fastener hole.
    - b. Conceal fasteners within cabinet.
  - 5. If not factory applied, apply signage plumb and level and aligned with door edge.
  - 6. Restore damaged finishes to eliminate evidence of repair.
  - 7. Place items inside cabinets.

3.02 ADDITIONAL REQUIREMENTS FOR FIRE RATED WALLS:

- A. Provide complete cabinet assembly which maintains the assembly fire rating.

END OF SECTION 104415 10 4415



SECTION 10 5617  
WALL MOUNTED STANDARDS AND SHELVING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Steel shelf standards, brackets, and accessories.
- B. Aluminum shelf standards, brackets, and accessories.
- C. Steel shelf support brackets.
- D. Closet rods for mounting on brackets.
- E. Shelves.
- F. See drawings for locations and configurations.

1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Wood blocking in walls for attachment of standards.
- B. Section 06 2000 - Finish Carpentry: Wood shelves.
- C. Section 09 2116 - Gypsum Board Assemblies: Blocking in metal stud walls for attachment of standards.

1.03 REFERENCE STANDARDS

- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum 2020.
- B. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2021.
- C. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2021, with Errata (2022).
- D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- E. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2021.
- F. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2021.
- G. NEMA LD 3 - High-Pressure Decorative Laminates 2005.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used.

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WALL MOUNTED STANDARDS AND SHELVING

- C. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 01 6000 - Product Requirements for additional provisions.
  - 2. Extra Brackets: Ten of each size of standard straight bracket.

#### 1.05 QUALITY ASSURANCE

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

#### 1.06 DELIVERY, STORAGE, AND HANDLING

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

### PART 2 PRODUCTS

#### 2.01 MANUFACTURERS

- A. Steel Shelf Standards and Brackets:
  - 1. Knapé & Vogt Manufacturing Company; 87™/187™ Series: [www.knapeandvogt.com/#sle](http://www.knapeandvogt.com/#sle).
- B. Steel Shelf Support Brackets:
  - 1. Centerline Brackets; Floating Wall Mount: [www.countertopbracket.com/#sle](http://www.countertopbracket.com/#sle).
- C. Shelving:
  - 1. Rakks/Rangine Corporation; Aluminum Shelving: [www.rakks.com/#sle](http://www.rakks.com/#sle).

#### 2.02 COMPONENTS

- A. Steel Shelf Standards, Brackets, and Accessories:
  - 1. Super-Duty Shelf Standards and Brackets: Single-slotted channel standards for brackets adjustable in 1 inch increments along entire length of standard, drilled and countersunk for screws.
    - a. Product: KV 87/187.
    - b. Load Capacity: Recommended by manufacturer for loading of 540 to 1,060 pounds per pair of standards.
    - c. Face Width: 5/8 inch, single slotted.
    - d. Material: 12 gauge, 0.1046 inch sheet steel.
    - e. Lengths: As indicated on drawings.
    - f. Finish: Electroplated, chrome-look.
    - g. Brackets: 12 gauge, 0.1046 inch sheet steel, reinforced, locking into slots with molded nylon cam lock lever; size to suit shelves; same finish as standards.
    - h. Application: Use extra heavy duty standards at [\_\_\_\_\_].
    - i. Bracket Quantity: Provide one bracket for each 12 inches of standard length.
  - 2. Extra-Duty Shelf Standards and Brackets: Double-slotted channel standards for brackets adjustable in 1 inch increments along entire length of standard, drilled and countersunk for screws.

- a. Product: KV 85/187.
  - b. Load Capacity: Recommended by manufacturer for loading of 300 to 680 pounds per pair of standards.
  - c. Finish: Electroplated, chrome-look.
  - d. Brackets: Double tab type, locking into slots; size to suit shelves; same finish as standards.
  - e. Bracket Quantity: Provide one bracket for each 12 inches of standard length.
3. Heavy-Duty Shelf Standards and Brackets: Double-slotted channel standards for brackets adjustable in 1 inch increments along entire length of standard, drilled and countersunk for screws.
- a. Product: KV 82/182.
  - b. Load Capacity: Recommended by manufacturer for loading of 300 to 450 pounds per pair of standards.
  - c. Lengths: As indicated on drawings.
  - d. Finish: Powder-coated.
  - e. Color: To be selected by Architect from manufacturer's full line.
  - f. Brackets: Double tab type, locking into slots; size to suit shelves; same finish as standards.
  - g. Provide snap-in cover strips to hide unused slots and screw holes.
  - h. Application: Use decorative heavy duty standards at [\_\_\_\_\_].
  - i. Bracket Quantity: Provide one bracket for each 12 inches of standard length.
4. Heavy-Duty Shelf Standards and Brackets: Single-slotted channel standards for brackets adjustable in 1 inch increments along entire length of standard, drilled and countersunk for screws.
- a. Product: KV 83/183.
  - b. Load Capacity: Recommended by manufacturer for loading of 300 to 450 pounds per pair of standards.
  - c. Lengths: As indicated on drawings.
  - d. Finish: Powder-coated.
  - e. Color: To be selected by Architect from manufacturer's full line.
  - f. Brackets: Double tab type, locking into slots; size to suit shelves; same finish as standards.
  - g. Provide snap-in cover strips to hide unused slots and screw holes.
  - h. Application: Use decorative heavy duty standards at [\_\_\_\_\_].
  - i. Bracket Quantity: Provide one bracket for each 12 inches of standard length.
5. Regular-Duty Shelf Standards and Brackets: Single-slotted channel standards for brackets adjustable in 1 inch increments along entire length of standard, drilled and countersunk for screws.
- a. Product: KV 70/170.
  - b. Load Capacity: Recommended by manufacturer for loading of 120 to 320 pounds per pair of standards.
  - c. Material: 16 gauge, 0.0598 inch sheet steel.
  - d. Lengths: As indicated on drawings.
  - e. Finish: Zinc coated.
  - f. Brackets: 14 gauge, 0.0747 inch sheet steel, locking into slots; size to suit shelves; zinc coated finish.
  - g. Application: Use standard duty standards at [\_\_\_\_\_].
  - h. Bracket Quantity: Provide one bracket for each 12 inches of standard length.
6. Shelf Standard Accessories:
- a. At shelves indicated as sloping provide adjustable slant brackets.
  - b. Where cornices are indicated as part of shelving provide cornice brackets.
  - c. Where shelves are indicated to be fastened to brackets provide brackets with flanges for screwing into end of shelf, steel shelf rests, or flanged brackets; fasten

- d. with screws.
- d. At glass shelves provide clear plastic shelf rests, front and back, with rubber cushions.
- e. Provide other accessories as indicated.
- 7. Closet Rods: Steel tubing for wall mounting in flange fittings.
  - a. Type: Oval chrome look, extra heavy duty, welded seam; 1.18 inches high by 0.59 inches wide, 0.047 inch wall thickness.
  - b. Length: As required for application, up to 12 feet.
  - c. Provide mounting fittings to suit application.
- B. Steel Shelf Support Brackets:
  - 1. Material: Steel, ASTM A36/A36M.
  - 2. Bracket Type: L-shaped, with predrilled mounting holes on vertical leg for attachment to wood stud or blocking.
  - 3. Bracket Horizontal Support Length: As indicated on drawings.
  - 4. Bracket Thickness: 3/8 inch.
  - 5. Finish: White powdercoat.
- C. Shelving:
- D. Fasteners: Screws as recommended by manufacturer for intended application or as otherwise required by project conditions. Finish of exposed to view fasteners to match finish of standards and other components.

### PART 3 EXECUTION

#### 3.01 EXAMINATION

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

#### 3.02 PREPARATION

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

#### 3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Mount standards or brackets to solid backing capable of supporting intended loads.
- C. Install brackets, shelving, and accessories.

#### 3.04 PROTECTION

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

END OF SECTION 10 5617

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WALL MOUNTED STANDARDS AND SHELVING

SECTION 10 5723  
CLOSET AND UTILITY SHELVING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Wall mounted wire closet shelving.
- B. Laminated shelves associated with wire shelving.
- C. Laminated wood storage systems.
- D. Accessories.

1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Blocking in walls for attachment of shelving or storage system.
- B. Section 09 2116 - Gypsum Board Assemblies: Blocking in metal stud walls for attachment of standards or mounting rails.

1.03 REFERENCE STANDARDS

- A. NEMA LD 3 - High-Pressure Decorative Laminates 2005.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, with installation instructions.
- C. Shop Drawings: Provide drawings prepared specifically for this project; show dimensions of shelving or storage system and attachment to substrates.
- D. Selection Samples: For each color selection required, submit color chips representing manufacturer's full range of available colors and finish.

1.05 QUALITY ASSURANCE

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

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store products under cover and elevated above grade.
- C. Store flat to prevent warpage and bending.

1.07 FIELD CONDITIONS

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

1.08 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Wire Storage Shelving:
  - 1. Rubbermaid, Inc; Wire Closets: [www.rubbermaidpro.com/#sle](http://www.rubbermaidpro.com/#sle).

2.02 WIRE STORAGE SHELVING SYSTEMS

- A. Applications:
- B. Wire Shelving: Factory-assembled coated wire mesh shelf assemblies for wall-mounting, with components and connections required to produce a rigid structure that is free of buckling and warping.
  - 1. Construction: Cold-drawn steel wire with average tensile strength of 100,000 psi resistance welded into uniform mesh units, square, rigid, flat, and free of dents or other distortions, with wires trimmed smooth.
  - 2. Coating: PVC or epoxy, applied after fabrication, covering surfaces.
  - 3. PVC Coating: 9 to 11 mils thick.
  - 4. Epoxy Coating: Nontoxic epoxy-polyester powder coating baked-on finish, 3 to 5 mils thick.
  - 5. Standard Mesh Shelves: Cross deck wires spaced at 1 inch.
- C. Mounting Hardware for Wire Shelving: Provide manufacturer's standard mounting hardware; include support braces, wall brackets, back clips, end clips, poles, and other accessories as required for complete and secure installation; factory finished to match shelving.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Inspect areas to receive shelving or storage system, to verify that spaces are properly prepared to receive shelf units, and are of dimensions indicated on shop drawings.
- B. Verify appropriate fastening hardware.
- C. Do not begin installation until substrates have been properly prepared.
- D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 INSTALLATION

- A. Install wire shelving in accordance with manufacturer's instructions, with shelf surfaces level.
- B. Cap exposed ends of cut wire shelving.
- C. Install wire shelving back clips, end clips at side walls, and support braces at open ends. Install intermediate support braces as recommended by manufacturer.

3.03 CLEANING

- A. Clean soiled surfaces after installation.

3.04 PROTECTION

- A. Protect installed work from damage.
- B. Touch-up, repair, or replace damaged products before Substantial Completion in a manner that eliminates evidence of replacement.

END OF SECTION 10 5723

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## SECTION 11 3013 RESIDENTIAL APPLIANCES

### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

- A. Kitchen appliances as shown on drawings.

#### 1.02 RELATED REQUIREMENTS

- A. Section 22 1005 - Plumbing Piping: Plumbing connections for appliances.
- B. Section 26 0583 - Wiring Connections: Electrical connections for appliances.

#### 1.03 REFERENCE STANDARDS

- A. UL (DIR) - Online Certifications Directory Current Edition.

#### 1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data indicating dimensions, capacity, and operating features of each piece of residential equipment specified.
- C. Copies of Warranties: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

#### 1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- B. Electric Appliances: Listed and labeled by UL (DIR) and complying with NEMA Standards (National Electrical Manufacturers Association).
- C. Gas Appliances: Bearing design certification seal of American Gas Association (AGA).

#### 1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide five (5) year manufacturer warranty on refrigeration system of refrigerators.
- C. Provide ten (10) year manufacturer warranty on magnetron tube of microwave ovens.

### PART 2 PRODUCTS

#### 2.01 KITCHEN APPLIANCES

- A. Provide Equipment Eligible for Energy Star Rating: Energy Star Rated.

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RESIDENTIAL APPLIANCES

- B. Refrigerator, Type [\_\_\_\_]: Free-standing, side-by-side, and frost-free.
  - 1. Capacity: Total minimum storage of 18 cubic ft; minimum 15 percent freezer capacity.
  - 2. Energy Usage: Minimum 20 percent more energy efficient than energy efficiency standards set by U.S. Department of Energy (DOE).
  - 3. Features: Include glass shelves, automatic icemaker, light in freezer compartment, in-door water and ice dispenser, and [\_\_\_\_].
  - 4. Exterior Finish: Porcelain enameled steel, color as indicated.
  - 5. Manufacturers:
    - a. Frigidaire Home Products; [\_\_\_\_]: [www.frigidaire.com/#sle](http://www.frigidaire.com/#sle).
    - b. GE Appliances; [\_\_\_\_]: [www.geappliances.com/#sle](http://www.geappliances.com/#sle).
    - c. Whirlpool Corp; [\_\_\_\_]: [www.whirlpool.com/#sle](http://www.whirlpool.com/#sle).
  
- C. Microwave, Type [\_\_\_\_]: Countertop.
  - 1. Capacity: 0.7 cubic ft.
  - 2. Power: 700 watts.
  - 3. Features: Include turntable, cooktop light, night light, 2-speed exhaust fan, built-in trim kit, undercabinet mounting kit, and [\_\_\_\_].
  - 4. Exterior Finish: Black.
  - 5. Manufacturers:
    - a. Frigidaire Home Products; [\_\_\_\_]: [www.frigidaire.com/#sle](http://www.frigidaire.com/#sle).
    - b. GE Appliances; [\_\_\_\_]: [www.geappliances.com/#sle](http://www.geappliances.com/#sle).
    - c. Whirlpool Corp; [\_\_\_\_]: [www.whirlpool.com/#sle](http://www.whirlpool.com/#sle).

### PART 3 EXECUTION

#### 3.01 EXAMINATION

- A. Verify utility rough-ins are provided and correctly located.

#### 3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Anchor built-in equipment in place.

#### 3.03 ADJUSTING

- A. Adjust equipment to provide efficient operation.

#### 3.04 CLEANING

- A. Remove packing materials from equipment and properly discard.
- B. Wash and clean equipment.

END OF SECTION 11 3013

## SECTION 12 2400 WINDOW SHADES

### PART 1 - GENERAL

- 1.01 Applicable provisions of Bidding Requirements, Contract Requirements in Division 0 and all applicable Division 1 sections.
- 1.02 SECTION INCLUDES
- A. Manual 3% open roller shades and accessories typical for windows in the Offices and other rooms as indicated on drawings; refer to window schedule.
  - B. Manual black out roller shades and accessories typical for windows in indicated rooms indicated as Assembly; refer to window schedule.
  - C. Refer to room finish / window schedule for final product selection.
- 1.03 RELATED REQUIREMENTS
- A. Section 061000 - Rough Carpentry: Concealed wood blocking for attachment of shade brackets and accessories.
- 1.04 REFERENCE STANDARDS
- A. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015.
  - B. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films; 2015.
  - C. UL (GGG) - GREENGUARD Gold Certified Products; Current Edition.
  - D. WCMA A100.1 - Safety of Window Covering Products; 2018.
- 1.05 ADMINISTRATIVE REQUIREMENTS
- A. Coordination:
    - 1. Coordinate the work with other trades to provide rough-in of electrical wiring as required for installation of hardwired motorized shades.
  - B. Preinstallation Meeting: Convene one week prior to commencing work related to products of this section; require attendance of all affected installers.
  - C. Sequencing:
    - 1. Do not fabricate shades until field dimensions for each opening have been taken with finished conditions in place. "Hold to" dimensions are not acceptable.
    - 2. Do not install shades until final surface finishes and painting are complete.
- 1.06 SUBMITTALS
- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product to be used including materials, finishes, fabrication details, dimensions, profiles, mounting requirements, and accessories.

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WINDOW SHADES

- B. Shop Drawings: Include shade schedule indicating size, location and keys to details.
- C. Source Quality Control Submittals: Provide test reports indicating compliance with specified fabric properties.
- D. Selection Samples: Include fabric samples in full range of available colors and patterns.
- E. Verification Samples: Minimum size 6 inches square, representing actual materials, color and pattern.
- F. Manufacturer's Instructions: Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- G. Operation and Maintenance Data: List of all components with part numbers, and operation and maintenance instructions; include copy of shop drawings.
- H. Warranty: Submit sample of manufacturer's warranty and documentation of final executed warranty completed in Owner's name and registered with manufacturer.

#### 1.07 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than ten years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of this type with minimum ten years of documented experience with shading systems of similar size, type, and complexity; manufacturer's authorized representative.

#### 1.08 FIELD CONDITIONS

- A. Do not install products under environmental conditions outside manufacturer's absolute limits.

#### 1.09 WARRANTY

- A. Provide manufacturer's standard, non-depreciating warranty, for interior shading only, covering the following:
  1. Shade Hardware: 10 years unless otherwise indicated.
  2. Shade Fabric: 10 years unless otherwise indicated.

### PART 2 PRODUCTS

#### 2.01 MANUFACTURERS

- A. Basis of Design: Draper (draperinc.com)
  1. Acceptable Manufacturer: Draper Inc., which is located at: 411 S. Pearl Street P. O. Box 425; Spiceland, IN 47385-0425; Toll Free Tel: 800-238-7999; Tel: 765-987-7999; Fax: 866-637-5611; Local Contact: Chris Sitarov – Regional Sales Manager; Tel: 609-437-7763; Email: chris.sitarov@draperinc.com); Web: <http://www.draperinc.com>
- B. Acceptable Basis of Design: MechoShade Systems LLC; [www.mechoshade.com/#sle](http://www.mechoshade.com/#sle).
- C. Or Approved Equal

## 2.02 ROLLER SHADES

- A. General:
  - 1. Provide shade system components that are capable of being removed or adjusted without removing mounted shade brackets or cassette support channel.
  - 2. Provide shade system that operates smoothly when shades are raised or lowered.
- B. Roller Shades - Basis of Design: Draper Or MechoShade Systems LLC; Mecho/5 System; [www.mechoshade.com](http://www.mechoshade.com)
  - 1. Operation: Bead chain and clutch operating mechanism allowing shade to stop when chain is released. Designed never to need adjustment or lubrication. Provide limit stops to prevent shade from being raised or lowered too far.
    - a. Spring-Assist Clutch: Adjustment-free system includes spring-assist components to reduce lifting forces required to raise the shade. Manufacturer shall provide estimated torque for shade unit. Spring-assist is recommended on estimated non-spring-assist torque above 6 lb-in; required on shades with an estimated torque higher than 15 lb-in.
    - b. Bead chain loop: Stainless steel bead chain.
    - c. Bead Chain Hold Down: Spring-Loaded Tensioner complying with ANSI/WCMA A100.1-2018 safety standard.
    - d. Idler end: Height adjustable idler end allows fine leveling adjustments after installation-min plus or minus 1/8 inch without shimming brackets. Contains at least two entry points for the idler end. Safety engagement feature requires idler end pin to have a minimum engagement in bracket, ensuring that the idler end cannot fall out of the bracket due to lack of pin engagement.
  - 2. Single Roller Configuration:
    - a. Mounting: Endcaps and fascia.
    - b. Fascia: L shaped aluminum extrusion to conceal shade roller and hardware.
      - 1) Attachment: Snaps onto endcaps without requiring exposed fasteners of any kind. Fascia can be mounted continuously across two or more shade bands. Notching of fascia to provide for chain clearance is NOT acceptable. Fascia height to match throughout space unless specifically approved in advance by the Architect
      - 2) Selected from Manufacturers standard range.
    - c. Roller Tube: Fabricated from extruded aluminum, galvanized steel, or enameled steel. Diameter, wall thickness, and material selected by manufacturer to accommodate shade type and size. Minimum roller diameter 1.5 inches. Tube diameters less than 1.5 inches shall not be acceptable unless manufacturer provides deflection analysis showing deflection limited to  $\leq \text{width (inches)} / 700$  at 1.5X design load.
      - 1) Fabric to tube attachments: Spline fabric/roller attachment system to allow shade fabric to be removed from roller without having to remove roller from brackets.
    - d. Shade slat:
      - 1) Closed pocket elliptical slat: 1 inch (25 mm) aluminum elliptical slat inside of a 1-5/8 inch (41 mm) pocket with heat sealed ends.
  - 3. Rollers: Extruded aluminum roller tube of appropriate diameter to support shade fabric with minimal deflection.
    - a. Minimum Roller Tube Diameter: 1.5 inches (32 mm). Tube diameters less than 1.5 inches shall not be acceptable unless manufacturer provides deflection analysis showing deflection limited to  $\leq \text{width (inches)} / 700$  at 1.5X design load.
    - b. Fabric Connection to Roller Tube: Spline fabric/roller attachment system to allow shade fabric to be removed from roller without having to remove roller from

- brackets.
    - c. Fabric Length: 6 inches (152 mm) greater than window height minimum.
    - d. Hembar: Extruded aluminum, finished to match fascia.
  - 4. Description: Single roller, manually operated fabric window shades.
    - a. Drop Position: Regular roll.
    - b. Mounting: Above ceiling at all location but the Watch, which is to be mounted between jambs at the ceiling.
    - c. Size: To fit above ceiling as indicated on the Reflected Ceiling Drawings. Contractor to field verify dimensions and include on shop drawings for approval, prior to fabrication..
    - d. Fabric: Refer to Paragraph 2.03 below.
- C. Brackets and Mounting Hardware: As recommended by manufacturer for mounting indicated and to accommodate shade fabric roll-up size and weight.
  - 1. Material: Steel, 1/8 inch thick.
- D. Roller Tubes:
  - 1. Material: Extruded aluminum.
  - 2. Size: As recommended by manufacturer; selected for suitability for installation conditions, span, and weight of shades.
  - 3. Fabric Attachment: Utilize extruded channel in tube to accept vinyl spline welded to fabric edge. Shade band to be removable and replaceable without removing roller tube from brackets or inserting spline from the side of the roller tube.
  - 4. Roller tubes to be capable of being removed and reinstalled without affecting roller shade limit adjustments.
  - 5. Hembars: Designed to maintain bottom of shade straight and flat.
    - a. Style: Full wrap fabric covered bottom bar, flat profile with heat sealed closed ends.
    - b. Room-Darkening Shades: Provide a slot in bottom bar with wool-pile light seal.
- E. Clutch Operator: Manufacturer's standard material and design integrated with bracket/brake assembly.
  - 1. Provide a permanently lubricated brake assembly mounted on a oil-impregnated hub with wrapped spring clutch.
  - 2. Brake must withstand minimum pull force of 50 pounds in the stopped position.
  - 3. Mount clutch/brake assembly on the support brackets, fully independent of the roller tube components.
  - 4. Drive Chain: Continuous loop stainless steel beaded ball chain, 95 pound minimum breaking strength. Provide upper and lower limit stops.
    - a. Chain Retainer: Chain tensioning device complying with WCMA A100.1.
  - 5. Managed Lift: Required lifting force of 3 pounds to a maximum of 8.5 pounds for single band or multi-band shades up to 5 bands and a maximum of 30 pounds hanging weight.
- F. Accessories:
  - 1. Fascia: Removable extruded aluminum fascia, size as required to conceal shade mounting, attachable to brackets without exposed fasteners; clear anodized finish.
    - a. Fascia to be capable of installation across two or more shade bands in one piece.
    - b. Provide single fascia to accommodate regular roll shades.
    - c. Provide front and rear double fascia.
    - d. Color: White.
    - e. Configuration: Captured, fascia stops at captured bracket end.
  - 2. Room-Darkening Channels, Standard: Extruded aluminum side and center channels with brush pile edge seals, SnapLoc mounting base, and concealed fasteners. Channels to accept one-piece exposed blackout hembar to assure side light control and sill light control. Required. Refer to Drawings.

3. Accessories for above ACT ceiling mounting in Day Room, Bunk Room and Officer's Room.

## 2.03 SHADE FABRIC

- A. Fabric - Type 3% Open: Non-flammable, color-fast, impervious to heat and moisture, and able to retain its shape under normal operation.
  1. Material Certificates and Product Disclosures:
    - a. Low-Emitting Material Certification: Greenguard Gold certified and listed in UL (GGG).
    - b. Cradle to Cradle Material Health Certificate: Achievement level of Bronze.
    - c. Health Product Declaration (HPD): Complete, published declaration with full disclosure of known hazards.
  2. Performance Requirements:
    - a. Flammability: Pass NFPA 701 large or small scale test.
  3. Openness Factor: 3%, nominal.
  4. Maximum Roll Width: 63 inches.
  5. Basis of Design Color: Oyster /Pearl Grey by Draper
  6. Fabrication:
    - a. Fabric Orientation: Railroaded, fabric is turned 90 degrees off the roll.
  7. Products:
    - a. Basis of Design: Draper SW2400 (2410); SW2430 3% Oyster /Pearl Grey
    - b. Light-Filtering Fabrics; PVC Coated Fiberglass; Basketweave
    - c. SheerWeave Series SW2400 (2410) by Phifer: 500 denier fiberglass, vinyl coated and woven into a 2 x 2 basket weave. Fire rating: California U.S. Title 19 (small scale), NFPA 701 TM#1 (small scale), NFPA 101 (Class A Rating), IBC Section 803.1.1 (Class A Rating), BS 5867 Part 2 Type B Performance, NFPA 701 TM#2 (large scale), CAN/ULC-S 109 (large and small scale), CAN/CGSB2-4.162-M80. Bacteria and fungal resistance: ASTM E 2180, ASTM G21, ASTM G 22, AATCC30 Part 3, ASTM D 3273, UL GREENGUARD Mold and Bacteria Standard ASTM 6329; includes Microban antimicrobial additives. Environmental certification: Certified to UL GREENGUARD and GREENGUARD Gold standards for low chemical emissions into indoor air during product usage. Safe use: RoHS/Directive 2002/95/EC, US Consumer Product Safety Commission Section 101 and ANSI/WCMA A 100.1-2007 for lead content and REACH (EC 1907/2006) compliant. 3 percent open .019 inches thick. 14.1 oz/square yard.
- B. Fabric: - Type Blackout, Non-flammable, color-fast, impervious to heat and moisture, and able to retain its shape under normal operation.
  1. Material Certificates and Product Disclosures:
    - a. Low-Emitting Material Certification: Greenguard Gold certified and listed in UL (GGG).
    - b. Cradle to Cradle Material Health Certificate: Achievement level of Bronze.
    - c. Health Product Declaration (HPD): Complete, published declaration with full disclosure of known hazards.
  2. Performance Requirements:
    - a. Flammability: Pass NFPA 701 large or small scale test.
  3. Openness Factor: opaque, nominal.
  4. Maximum Roll Width: 126 inches.
  5. Basis of Design Color: Verona Twilight 000STA Stardust by Draper.
  6. Fabrication:
    - a. Fabric Orientation: Railroaded, fabric is turned 90 degrees off the roll.
    - b. Or as selected and Approved
  7. Products:

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WINDOW SHADES



- a. Draper; Blackout - Verona Twilight 000STA Stardust (opaque)
- b. Room Darkening Fabrics; Opaque; Polyester
- c. Verona Twilight by Mermet. 50 percent Polyester and 50 percent acrylic with foam backing. Duraguard fabric protector and Sanitized Antimicrobial Protection. Plain weave that is 100% PVC free. Fire rating: NFPA 701-10 TM#1, California U.S. Title 19, CAN/ULC-S109-03 Small & Large Flame Test. Environmental Benefits: Certified to UL GREENGUARD and GREENGUARD Gold standards for low chemical emissions into indoor air during product usage. RoHS compliant - lead free. Bacterial and fungal resistance: ASTM E2180. 0% open, .024 inches thick, 11.65 oz/square yard.

## 2.04 ROLLER SHADE FABRICATION

- A. Field measure finished openings prior to ordering or fabrication.
- B. Dimensional Tolerances: Fabricate shades to fit openings within specified tolerances.
  - 1. Vertical Dimensions: Fill openings from head to sill with 1/2 inch space between bottom bar and window stool.
  - 2. Horizontal Dimensions - Inside Mounting: Provide symmetrical light gaps on both sides of shade not to exceed 3/4 inch total.
- C. At openings requiring continuous multiple shade units with separate rollers, locate roller joints at window mullion centers; butt rollers end-to-end.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Examine finished openings for deficiencies that may preclude satisfactory installation.
- B. Start of installation shall be considered acceptance of substrates.

### 3.02 PREPARATION

- A. Prepare surfaces using methods recommended by manufacturer for achieving best result for substrate under the project conditions.
- B. Coordinate with window installation and placement of concealed blocking to support shades.

### 3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions and approved shop drawings, using mounting devices as indicated.
- B. Replace shades that exceed specified dimensional tolerances at no extra cost to Owner.
- C. Adjust level, projection, and shade centering from mounting bracket. Verify there is no telescoping of shade fabric. Ensure smooth shade operation.

### 3.04 CLEANING

- A. Clean soiled shades and exposed components as recommended by manufacturer.
- B. Replace shades that cannot be cleaned to "like new" condition.

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WINDOW SHADES



- C. See Section 01 74 19 - Construction Waste Management and Disposal for additional requirements.

3.05 PROTECTION

- A. Protect installed products from subsequent construction operations.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 12 24 00 12 2400

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## SECTION 12 3600 COUNTERTOPS

### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

- A. Countertops for architectural cabinet work as indicated on drawings.
- B. Countertops for manufactured casework as indicated on drawings.
- C. Wall-hung counters and vanity tops as indicated on drawings.

#### 1.02 RELATED REQUIREMENTS

- A. Section 06 4100 - Architectural Wood Casework.
- B. Section 22 4000 - Plumbing Fixtures: Sinks.

#### 1.03 REFERENCE STANDARDS

- A. ANSI A208.2 - Medium Density Fiberboard (MDF) for Interior Applications 2022.
- B. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- C. ASTM B211/B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire 2019.
- D. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position 2022.
- E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2022.
- F. AWI (QCP) - Quality Certification Program Current Edition.
- G. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition 2014, with Errata (2016).
- H. AWMAC (GIS) - Guarantee and Inspection Services Program Current Edition.
- I. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards 2021, with Errata.
- J. IAPMO Z124 - Plastic Plumbing Fixtures 2017 (Reaffirmed 2021).
- K. ISFA 2-01 - Classification and Standards for Solid Surfacing Material 2013.
- L. NEMA LD 3 - High-Pressure Decorative Laminates 2005.
- M. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth 2019.
- N. PS 1 - Structural Plywood 2009 (Revised 2019).
- O. SEFA 2 - Installations 2010.

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P. WI (CCP) - Certified Compliance Program (CCP) Current Edition.

#### 1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Specimen warranty.
- C. Shop Drawings: Complete details of materials and installation ; combine with shop drawings of cabinets and casework specified in other sections.
- D. Selection Samples: For each finish product specified, color chips representing manufacturer's full range of available colors and patterns.
- E. Verification Samples: For each finish product specified, minimum size 6 inches square, representing actual product, color, and patterns.
- F. Test Reports: Chemical resistance testing, showing compliance with specified requirements.
- G. Certificate: Submit labels and certificates required by quality assurance and quality control programs.
- H. NSI Fabricator Qualification: Documentation of Natural Stone Institute Accreditation.
- I. Installer's qualification statement.
- J. Installation Instructions: Manufacturer's installation instructions and recommendations.
- K. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

#### 1.05 QUALITY ASSURANCE

- A. Fabricator Qualifications: Natural Stone Institute (NSI) Accredited Natural Stone Fabricator; [www.naturalstoneinstitute.org/#sle](http://www.naturalstoneinstitute.org/#sle).
- B. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.
- C. Quality Certification:
  - 1. Comply with AWI (QCP) woodwork association quality certification service/program in accordance with requirements for work specified in this section: [www.awiqcp.org/#sle](http://www.awiqcp.org/#sle).
  - 2. Comply with AWMAC (GIS) woodwork association quality certification service/program in accordance with requirements for work specified in this section.
  - 3. Comply with WI (CCP) woodwork association quality certification service/program in accordance with requirements for work specified in this section: [www.woodworkinstitute.com/#sle](http://www.woodworkinstitute.com/#sle).
  - 4. Provide labels or certificates indicating that the installed work complies with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade or grades specified.
  - 5. Provide designated labels on shop drawings as required by certification program.
  - 6. Provide designated labels on installed products as required by certification program.

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7. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.

#### 1.06 DELIVERY, STORAGE, AND HANDLING

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

#### 1.07 FIELD CONDITIONS

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

### PART 2 PRODUCTS

#### 2.01 COUNTERTOPS

- A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
- B. Plastic Laminate Countertops: High-pressure decorative laminate (HPDL) sheet bonded to substrate.
  1. Laminate Sheet: NEMA LD 3, Grade HGS, 0.048 inch nominal thickness.
    - a. Provide Basis of Design products listed on drawings from the following manufacturer: Wilsonart: [www.wilsonart.com/#sle](http://www.wilsonart.com/#sle).
    - b. Manufacturers: (subject to compliance with requirements and only if basis of design products are not readily available).
      - 1) Wilsonart: [www.wilsonart.com/#sle](http://www.wilsonart.com/#sle).
    - c. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
    - d. Wear Resistance: In addition to specified grade, comply with NEMA LD 3 High Wear Grade requirements for wear resistance.
    - e. Finish: Matte or suede, gloss rating of 5 to 20.
    - f. Surface Color and Pattern: As indicated on drawings.
  2. Exposed Edge Treatment: Square, substrate built up to minimum 1-1/4 inch thick; covered with matching laminate.
  3. Back and End Splashes: Same material, same construction.
  4. Fabricate in accordance with manufacturer's standard requirements.
- C. Solid Surfacing Countertops: Solid surfacing sheet or plastic resin casting over continuous substrate.
  1. Flat Sheet Thickness: 1/2 inch, minimum.
  2. Solid Surfacing Sheet and Plastic Resin Castings: Complying with ISFA 2-01 and NEMA LD 3; acrylic or polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.
  3. Provide Basis of Design products listed on drawings from the following manufacturer: Wilsonart: [www.wilsonart.com/#sle](http://www.wilsonart.com/#sle).
    - a. Manufacturers:(subject to compliance with requirements and only if basis of design products are not readily available).

- 1) Avonite Surfaces: [www.avonitesurfaces.com/#sle](http://www.avonitesurfaces.com/#sle).
  - 2) Dupont: [www.corian.com/#sle](http://www.corian.com/#sle).
  - 3) Formica Corporation: [www.formica.com/#sle](http://www.formica.com/#sle).
  - 4) Meganite, Inc: [www.meganite.com/#sle](http://www.meganite.com/#sle).
  - 5) Wilsonart: [www.wilsonart.com/#sle](http://www.wilsonart.com/#sle).
- b. Finish on Exposed Surfaces: Matte, gloss rating of 5 to 20.
  - c. Color and Pattern: As indicated on drawings.
4. Other Components Thickness: 1/2 inch, minimum.
  5. Back and End Splashes: Same sheet material, square top; minimum 4 inches high.
- D. Solid Plastic Wall-Hung Vanity Tops: Factory fabricated top, splashes, skirts, end supports, and center supports made of solid molded high density polyethylene (HDPE) sheets, tested in accordance with NFPA 286.
1. Manufacturers: (subject to compliance with requirements and only if basis of design products are not readily available).
    - a. Scranton Products; Vanities: [www.scrantonproducts.com/#sle](http://www.scrantonproducts.com/#sle).
  2. Sheet Thickness: 1 inch with edges radiused to 1/4 inch.
  3. Vanity Size: 24 inches deep by length indicated on drawings.

## 2.02 MATERIALS

- A. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.

## 2.03 FABRICATION

- A. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.
  1. Join lengths of tops using best method recommended by manufacturer.
  2. Fabricate to overhang fronts and ends of cabinets 1 inch except where top butts against cabinet or wall.
  3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.
- B. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.
  1. Secure to countertop with concealed fasteners and with contact surfaces set in waterproof glue.
  2. Height: 4 inches, unless otherwise indicated.
- C. Wall-Mounted Counters: Provide skirts, aprons, brackets, and braces as indicated on drawings, finished to match.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

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3.02 PREPARATION

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

3.03 INSTALLATION

- A. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.
- B. Attach plastic laminate countertops using screws with minimum penetration into substrate board of 5/8 inch.
- C. Seal joint between back/end splashes and vertical surfaces.

3.04 TOLERANCES

- A. Variation From Horizontal: 1/8 inch in 10 feet, maximum.
- B. Offset From Wall, Countertops: 1/8 inch maximum; 1/16 inch minimum.
- C. Field Joints: 1/8 inch wide, maximum.

3.05 CLEANING

- A. Clean countertops surfaces thoroughly.

3.06 PROTECTION

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

END OF SECTION 12 3600

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## SECTION 14 2400 HYDRAULIC ELEVATORS

### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

- A. Complete hydraulic elevator system.
  - 1. Passenger type.
  - 2. Oil Hydraulic Dual Jack Holeless Single-Stage Passenger type as shown on drawings.
  - 3. Doors on opposite side of cab and shaft as shown on drawings.
    - a. Exterior grade stainless steel doors for direct exterior access at Library Grade level.
  - 4. Special provisions for operation sequence.
  - 5. Additional, Performance, PA Elevator Code and ADA Compliance Requirements.
- B. Elevator Maintenance Contract.
- C. Summary of work included: Furnish all materials, labor, equipment and services required for the complete installation of the oil hydraulic passenger elevator as specified herein. The work of this division shall consist of installation of items that will meet Barrier Free Design Guidelines and compliance with the Americans with Disabilities Act on the hydraulic passenger elevator located in Philadelphia. The work shall include all labor, materials, and services required for the complete installation of all the elevator equipment as herein specified. The work shall provide on a per item basis, including car operating panel, hall push buttons, pump, controller, door operator, traveling lanterns, etc.
- D. Summary of work required in other sections to be provided, support and to be confirmed designed and installed correctly under this section:
  - 1. A clear hoistway of the dimensions shown, plumb to within 1" in Section 042000.
  - 2. Venting of hoistway as required by code.
  - 3. A dry pit, reinforced to sustain vertical loads as required.
  - 4. A steel pit ladder for each elevator and installed in accordance with code, and extending from pit floor to 48" above sill of lowest hoistway door; in Section 055133.
  - 5. Adequate supports for guide rail brackets, to support horizontal loads as required. Support locations must not exceed spacing as required by code, and shop drawings for which are to be review and approved by elevator manufacturer and installer. Guide rail support locations must be filled concrete block with reinforcements; in Section 042000.
  - 6. Projections or recesses in the hoistway of 4" or more, on sides not used for loading or unloading, shall be beveled at an angle not less than 75 degrees from the horizontal.
  - 7. A hoist beam, hook, or eyebolt shall be furnished at the top of the hoistway, located on centerline of car and guides - designed to lift load required; in Section 055000.
  - 8. Entrance walls accepting passenger type entrances are to be erected (or rough opening as shown filled in) after door frames and sills are installed; in Section 042000.
  - 9. A suitable sill support and recess as shown, full width of the hoistway, grouted under CMU section after door sills are installed; in Sections 033000 and 042000.
  - 10. Required sleeves in hoistway wall for oil line and wiring duct for each elevator, as required in MPE sections.
  - 11. Any cutting and patching of building construction required to install signal fixtures, or other elevator apparatus, and any repairs, grouting, patching, or painting made necessary by same.
  - 12. A machine room properly lighted and ventilated per code requirements with temperature maintained between 65 and 95 degrees. Door of size to permit access for hydraulic

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machine, to be self-closing and locking, but openable from inside without key. See drawings, door schedule and Section 092500 for shaftwall enclosure.

13. A fused disconnect switch for each elevator, of ample capacity, with wiring to the elevator motor starter control. Disconnecting means shall disconnect the normal power supply as well as emergency supply, when provided.
14. Light and switch in elevator room, with switch located adjacent to access door. Convenience outlet in machine room.
15. Light, switch and convenience outlet in elevator pit, light switch accessible from lower landing opening. Install light to clear elevator car.
16. Suitable 110V service connected to terminals in elevator controller for car light service (elevator contractors option).
17. Heat, and product of combustion sensors located in each elevator lobby with necessary wiring to elevator control panel, when fire service is specified.
18. Telephone instrument in elevator car, and wiring from building source to elevator control panel.
19. Furnishing of any special intercom, paging, or television systems, including wiring from building source to elevator control panel.
20. Floor covering in elevator cab; in Section 093000.

#### 1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Includes elevator machine foundation, enclosed hoistway, elevator pit, grouting thresholds, grouting hoistway entrance frames, and sump pit.
- B. Section 04 2000 - Unit Masonry: Masonry hoistway enclosure; building-in and grouting hoistway door frames.
- C. Section 05 5000 - Metal Fabrications: Includes elevator pit ladder, sill supports, and overhead hoist beams.
- D. Section 07 1300: Waterproofing of elevator pit walls and floor.
- E. Section 07 8100 - Applied Fire Protection: Fireproofing of guide rail brackets where attached to building structural members.
- F. Section 07 8400 - Firestopping: Fire rated sealant in hoistway.
- G. Section 08 3100 - Access Doors and Panels: Fire rated access doors into hoistway.
- H. Section 09 2116 - Gypsum Board Assemblies: Gypsum shaft wall enclosure of machine room and top of shaft as shown on drawings.
- I. Section 09 6500 - Resilient Flooring: Floor finish in car as indicated on drawings.
- J. Section 09 9123 - Interior Painting: Field painting of hoistway entrance doors and frames.
- K. Section 21 1300 - Fire-Suppression Sprinkler Systems: Sprinkler heads in hoistway.
- L. Section 22 3000 - Plumbing Equipment: Pit drain.
- M. Section 26 0533.13 - Conduit for Electrical Systems:
- N. Section 26 0583 - Wiring Connections:
- O. Section 26 3600 - Transfer Switches: For interface with elevator controls.

- P. Section 28 2000 - Video Surveillance: Installation of video camera in car interior for security monitoring.
- Q. Section 31 2316 - Excavation: Excavation for elevator pit.
- R. Section 31 2323 - Fill: Backfilling for elevator pit.

### 1.03 REFERENCE STANDARDS

- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum 2020.
- B. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2021, with Errata (2022).
- C. ADA Standards - 2010 ADA Standards for Accessible Design 2010.
- D. AISC 360 - Specification for Structural Steel Buildings 2016 (Revised 2021).
- E. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures Most Recent Edition Cited by Referring Code or Reference Standard.
- F. ASME A17.1 - Safety Code for Elevators and Escalators Includes Requirements for Elevators, Escalators, Dumbwaiters, Moving Walks, Material Lifts, and Dumbwaiters with Automatic Transfer Devices 2019, with Errata (2021).
- G. ASME A17.2 - Guide for Inspection of Elevators, Escalators, and Moving Walks Includes Inspection Procedures for Electric Traction and Winding Drum Elevators, Hydraulic Elevators, Inclined Elevators, Limited-Use/Limited-Application Elevators, Private Residence Elevators, Escalators, Moving Walks, and Dumbwaiters 2020.
- H. ASME QEI-1 - Standard for the Qualification of Elevator Inspectors 2018.
- I. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- J. ASTM A139/A139M - Standard Specification for Electric-Fusion (Arc)-Welded Steel Pipe (NPS 4 and Over) 2016.
- K. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes 2017.
- L. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- M. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- N. 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 2021a.
- O. ASTM B36/B36M - Standard Specification for Brass Plate, Sheet, Strip, and Rolled Bar 2018.
- P. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2021a.
- Q. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2021.

- R. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2021.
- S. ASTM B455/B455M - Standard Specification for Copper-Zinc-Lead Alloy (Leaded-Brass) Extruded Shapes 2020.
- T. AWS D1.1/D1.1M - Structural Welding Code - Steel 2020, with Errata (2022).
- U. ITS (DIR) - Directory of Listed Products Current Edition.
- V. NEMA LD 3 - High-Pressure Decorative Laminates 2005.
- W. NEMA MG 1 - Motors and Generators 2021.
- X. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- Y. NFPA 80 - Standard for Fire Doors and Other Opening Protectives 2022.
- Z. PS 1 - Structural Plywood 2009 (Revised 2019).
- AA. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic) 2019.
- BB. UL (DIR) - Online Certifications Directory Current Edition.

#### 1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
  - 1. Coordinate work with other installers to provide conduits necessary for installation of wiring including but not limited to:
    - a. Elevator equipment devices remote from elevator machine room or hoistway.
    - b. Remote group automatic panel in lobby from controller cabinet.
    - c. Telephone service for machine room.
    - d. Elevator pit for lighting, sump pump, and revisions of final design.
    - e. Automatic transfer switch from controller cabinet.
    - f. Fire alarm panel from controller cabinet.
    - g. Reinforcement of CMU walls for anchors for guiderails.
  - 2. Coordinate work with other installers for equipment provisions necessary for proper elevator operation, including but not limited to, the following:
    - a. Automatic transfer switches with auxiliary contacts for emergency power transfer status indication.
    - b. Shunt trip devices for automatic disconnection of elevator power prior to fire suppression system activation.
    - c. Overcurrent protection devices selected to achieve required selective coordination.
- B. Preinstallation Meeting: Convene meeting at least one week prior to start of this work.
  - 1. Review schedule of installation, proper procedures and conditions, and coordination with related work.
- C. Construction Use of Elevator: Not permitted.

#### 1.05 CODES, PERMITS, TESTS AND INSPECTIONS:

- A. Work shall be done in accordance with the requirements of the National Electrical Code and the latest American Standard Safety Code for Elevators, Dumbwaiters and Escalators, including all

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revisions and authorized changes in effect on date of this specification and all local codes which govern the requirements of this installation.

- B. Provide all necessary State Inspections and permits pertaining to the elevator, elevator installation and functioning, and make such tests as are required by the regulations of such authorities. Tests shall be made in the presence of the authorized representatives of such authorities.
- C. Elevators shall meet the guidelines of the Americans with Disabilities Act using the Uniform Federal Accessibility Standards (UFAS) relevant to elevators (Section 4.10 Elevators) as the technical requirements.

#### 1.06 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Shop drawings and sample submittals:
  - 1. Samples: Submit samples of stainless steel.
  - 2. SHOP DRAWINGS: Submit Shop Drawings as required showing the general and detailed arrangement of all elevator equipment. Show ceiling, lighting, signal fixtures, and smoke detectors including routing of exposed conduit.
  - 3. PRODUCT DATA: Submit the manufacturer's specification and data sheets, and standard details. Include pictures, catalog cuts, or other suitable illustrations of all elevator equipment that will be exposed in the finish work, including car, hoistway entrance, and signal and control apparatus.
  - 4. CERTIFICATES: Furnish to the Owner all certificates necessary as evidence that the elevator conforms with the applicable laws, ordinances, and requirements.
- C. Product Data: Submit data on following items:
  - 1. Signal and operating fixtures, operating panels, and indicators.
  - 2. Car design, dimensions, layout, and components.
  - 3. Car and hoistway door and frame details.
  - 4. Electrical characteristics and connection requirements.
- D. Shop Drawings: Include appropriate plans, elevations, sections, diagrams, and details on following items:
  - 1. Elevator Equipment and Machines: Size and location of driving machines, power units, controllers, governors, and other components.
  - 2. Hoistway Components: Size and location of car guide rails, buffers, jack unit and other components.
  - 3. Rail bracket spacing; maximum loads imposed on guide rails requiring load transfer to building structural framing.
  - 4. Clearances and over-travel of car.
  - 5. Locations in hoistway and machine room of traveling cables and connections for car lighting, telephone, and other items requiring coordination between trades.
  - 6. Location and sizes of hoistway and car doors and frames.
  - 7. Electrical characteristics and connection requirements.
  - 8. Indicate arrangement of elevator equipment and allow for clear passage of equipment through access openings.
- E. Samples: Submit samples illustrating car interior finishes, car and hoistway door and frame finishes, and cab ceiling finish in the form of cut sheets, finish color selection brochures, or samples.
- F. Manufacturer's Qualification Statement.

- G. Installer's Qualification Statement.
- H. Testing Agency's Qualification Statement.
- I. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- J. Initial Maintenance Contract.
- K. Maintenance Contract: Submit proposal to Owner for standard one year continuing maintenance contract agreement in accordance with ASME A17.1 and requirements as indicated, starting on date initial maintenance contract is scheduled to expire.
  - 1. Indicate in proposal the services, obligations, conditions, and terms for agreement period and for renewal options.
- L. Operation and Maintenance Data:
  - 1. Parts catalog with complete list of equipment replacement parts; identify each entry with equipment description and identifying code.
  - 2. Operation and maintenance manual.
  - 3. Schematic drawings of equipment and hydraulic piping, and wiring diagrams of installed electrical equipment with list of corresponding symbols to identify markings on machine room and hoistway apparatus.
- M. Final Submittals
  - 1. Provide four complete sets (bound and properly arranged) of the parts lists and operators manuals prior to receiving final payment. Following is a brief summary of items:
    - a. Legible schematic wiring diagrams including all changes made during installation.
    - b. Description of operation of elevator system installed.
    - c. Pump Package: Including valve and accessories.
    - d. Controller and Selector: Including parts information on Relays, Printed Circuit Boards, Reverse Phase Relays, Switches, Lamps, Electrical Cables, Monitors, Modems, Diagnostic Hardware, Diagnostic Software, and Overload Protection Devices.
    - e. Door Assemblies: Including Hangers, Rollers, Door Motor, Door Operator, Door Clutch Assembly, Door Closers, Door Drive Arms, Related Hardware, Sheaves, Door Guides, Interlocks, Safety Door Edge.
    - f. Signal Equipment: Including Car Station, Hall Stations, Position Indicators, Direction Indicators, Fire Service Panel, Smoke Detectors, Keyswitches, Pushbutton Assemblies.
    - g. Car Top Inspection Station, Limit Switches, Solid State Leveling Control Units, Leveling Switches, Alarm Bell.

#### 1.07 QUALITY ASSURANCE

- A. Maintain one copy of each quality standard document on site.
- B. Designer Qualifications: Design guide rails, brackets, anchors, and machine anchors under direct supervision of a licensed Professional Structural Engineer experienced in design of this type of work and licensed in the State in which the Project is located.
- C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten years documented experience.
- D. Installer Qualifications: Company specializing in performing the work of this section and approved by elevator equipment manufacturer with more than 3 years of experience.

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- E. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and no more than 12 months before start of scheduled welding work.
- F. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of type specified in this section.
- G. Products Requiring Fire Resistance Rating: Listed and classified by ITS (DIR), UL (DIR), or testing agency acceptable to authorities having jurisdiction.
- H. Products Requiring Electrical Connection: Listed and classified by UL (DIR) or testing agency acceptable to authorities having jurisdiction as suitable for the purpose indicated in construction documents.

#### 1.08 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Provide manufacturer's warranty for elevator operating equipment and devices for one year from Date of Substantial Completion.
- C. The elevator contractor shall warranty that the materials and workmanship of the apparatus installed by him under this specification are first-class in every respect, and that he will make good any defects not due to ordinary wear and tear or improper use or care, which may develop within one year from date of final payment.

#### 1.09 REQUIREMENTS OF REGULATORY AGENCIES

- A. Perform all work in accordance with applicable codes, the State of Pennsylvania Elevator Code, the National Electrical Code, and the American Society of Mechanical Engineers for Elevators; ASME A17.1, as referenced therein. Give all necessary notices, obtain all State and Municipal permits, pay all fees necessary in connection with the installation, including sales and use taxes as applicable, and make all tests as are called for by the regulations of such authorities. These tests shall be made in the presence of the authorized representative of such authorities and the owner's representative.
- B. Comply with "Elevator Guidelines to Ensure Accessibility by People with Disabilities".

#### 1.10 MAINTENANCE

- A. Provide full protective maintenance of the specified equipment for a period of one year from the date of final turnover. The cost of this maintenance shall be included in the base price. Work should be performed during regular working hours.

### PART 2 PRODUCTS

#### 2.01 MANUFACTURERS

- A. Basis of Design – Nonproprietary Hydraulic Elevator: Canton -Nidec Elevator -Dual Jack Holeless; (2000# MRL holeless hydro by Canton Elevator). Bryan.Haught@nidec-canton.com
  - 1. Or Approved Equal Subject to strict Compliance of Requirements.
- B. ACCEPTABLE ELEVATOR INSTALLERS for Basis of Design
  - 1. Kencor Elevator
    - a. P.O. box. 1659

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- b. West chester, PA 19380
  - c. 1-800-220-4046
  - d. and
  - e. 1101 Union Blvd.
  - f. Allentown, PA 18190
  - g. and
  - h. bkennedy@kencorelevator.com
2. Triad Lifts, LLC
    - a. 1608 Walnut St.
    - b. Philadelphia, PA 19103
    - c. 267-462-1011
  3. Approved Equal Acceptable to Basis of Design

C. OUTLINE OF EQUIPMENT:

1. Jack Type: Dual Single-Stage
2. Capacity: 2,000 pounds
3. Speed: 100 FPM
4. Total Travel: 10'-0" to be verified in field
5. Stops/Number of Openings: 3 / 1 Front – 2 Rear
6. Floors Served: LL, G, 1st
7. Platform Size (Width x Depth): 6'-0"W x 5'-9"D
8. Door Size/Operation: 3'-0"W x 7'-0" H / Power
9. Control: Microprocessor
10. Operation: Simplex Selective/Collective
11. Entrances: Single-Speed Side-Slide
12. Operating Fixtures: Innovation Industries
13. Power Supply: 208 Volts/ 3 Phase/ 60 Cycle
14. Motor: 20HP
  - a. Full Load: 65.4 amps
  - b. Locked Rotor: 311 amps.
15. Pit Depth: 4'-0"
16. Clear Overhead – 12'-0"
17. Machine Space Access Door Location: Side Of Hoistway At Lowest Landing

2.02 HYDRAULIC ELEVATORS

A. Hydraulic Passenger Elevator:

1. Hydraulic Elevator Equipment:
  - a. Holeless hydraulic with cylinder mounted within hoistway.
  - b. Capacity: 2000 pounds
  - c. Speed: 100 FPM Avg.
  - d. Travel Distance Floor to Floor: As shown on drawings.
  - e. No. of Landings and Openings Served
    - 1) 3 for Library -two inside for two stories and one exterior and mid level between.
    - 2) 3 for Rec for three stories; basement / ground , level 1 and level 2
  - f. Car Platform: size as indicated on drawings for 2000# Capacity.
  - g. Operation: Simplex Selective Collective.
  - h. Entrance Type: Single Slide.
  - i. Opening Size: as indicated on drawings for 2000# Capacity
  - j. Power Supply: 208 Volt, 3 Phase, 60 HZ. A.C.
  - k. Machine Room: Elevator equipment room shall be located at the lower landing adjacent to the hoistway.



2. Drive System:
    - a. Variable voltage variable frequency (VVVF) to modulate motor speed.
  3. Operation Control Type:
    - a. Selective Collective Automatic Operation Control.
  4. Service Control Type:
    - a. Standard service control only.
  5. Interior Car Height: 96 inch.
  6. Electrical Power: 208 volts; alternating current (AC); three phase; 60 Hz.
  7. Rated Speed: 125 to 150 feet per minute.
  8. Hoistway Size: As indicated on drawings.
  9. Interior Car Platform Size: As indicated on drawings.
  10. Elevator Pit Depth: 48 inch.
  11. Overhead Clearance at Top Floor: 144 inch.
  12. Travel Distance: As indicated on drawings.
  13. Number of Stops: As indicated on drawings.
  14. Number of Openings: 3 Front.
    - a. 1 interior side for each level and 1 opening a grade level on opposite side.
    - b. Library has 2 interior side levels and 1 opposite side exterior grade level opening.
  15. Hydraulic Equipment Location: Adjacent to bottom of hoistway shaft
- B. Oil Hydraulic Machine: The power unit shall be of a vertical compact, self-contained design including submerged pump, submerged drive motor, oil control unit assembly, and oil storage tank. The tank shall be located at the side of the hoistway. The power unit shall be accessed via a self-locking and self-closing door at the lowest landing.
- C. Pump: The vertically submerged pump shall be a positive displacement screw type, for maximum smoothness and quietness and shall be directly coupled to the motor.
- D. Motor: The vertically submerged drive motor shall be of standard manufacture and have a duty rating sufficient for hydraulic elevator requirements.
- E. Oil Control Unit: The oil control unit shall consist of electrically actuated and hydraulically operated valves with all adjustments accessible without removing the assembly from the oil lines. An automatic bypass valve shall provide smooth starting and stopping in the up direction and shall give regulated up leveling speed under varying load conditions in the car. The lowering and down leveling valve shall be fully adjustable for smoothness and speed of operation and shall be designed to close automatically if the power fails. Operation of a manual valve shall permit the car to be lowered at slow speed in the event of power failure. A safety check valve shall hold the car when the pump is at rest and a relief valve shall be provided which is capable of bypassing the entire output of the pump without increasing the system pressure more than 25% above the normal working pressure. Permanently install a liquid filled pressure gauge on oil control unit.
- F. Oil Storage Tank: The oil storage tank shall be of sufficient capacity for the full travel of the car with a reserve of not less than 10 gallons, means of isolating oil in the tank for servicing of pump and valves, and a removable cover. Tank to be located in the hoistway adjacent to the elevator platform.
- G. Oil: Sufficient specially prepared hydraulic oil with greater than 400 degrees F. flashpoint and of proper viscosity and lubricating qualities shall be provided.
- H. All Hydraulic Supply Piping shall be at least schedule 40 pipe. Victaulic fittings are allowed. The system must be free from seepage at all joints.
- I. Shut-Off Valve: Manually operated valves shall be provided and installed in the oil supply line to isolate the cylinder and plunger unit from the hydraulic machine.

- J. Jack Units: The dual single-stage jacks shall be designed and constructed in accordance with the requirements of ASME code. The jacks shall be of sufficient size to lift the gross load at the rated speed. The jack units shall be factory tested to ensure freedom from leakage. No brittle material such as gray cast iron shall be used in the jack construction.
  - 1. The jack units shall consist of a piston constructed of seamless steel tubing turned and straightened to factory specifications.
  - 2. A stop ring shall be welded to each piston.
  - 3. The cylinder heads shall be designed with a removable packing, drip ring and bleeder valve.
  - 4. Install the jacks units plumb and attach them with brackets to the main guide rails.
- K. Buffers: Provide spring type buffers mounted to the pit floor. The buffers shall be designed and constructed in accordance with the requirements of ASME code.
- L. Car Frame and Platform: The car frame shall be constructed of structural steel per ASME code requirements. The car platform will be constructed of formed steel pans covered with a layer of 3/4" plywood.
- M. Guide Shoes: Provide swivel nylon guide shoes rigidly bolted to the top and bottom of the car frame.
- N. Guide Rails and Brackets: Provide machined steel T section guide rails with tongue and groove rail joints. The rail brackets shall be manufactured to support the calculated rail loads. The brackets shall span from the back of the rail to the hoistway wall supports. Structural support points shall be supplied by the general contractor were indicated on the elevator layout drawings.

## 2.03 HOISTWAY EQUIPMENT

- A. Guide Rails
  - 1. Standard steel tee section.
  - 2. Rail support brackets.
    - a. Spaced no more than 14'-0" apart.
    - b. Forged clips and suitable fastenings.
- B. Car Guide Shoes
  - 1. Slide and swivel type.
- C. Car Frame and Platform
  - 1. Side post construction of structural and formed steel shapes.
  - 2. Platform
    - a. Structural and formed steel framing.
    - b. Double layer plywood flooring.
    - c. Fireproofed on underside.
- D. Buffers
  - 1. Spring type.
- E. Wiring
  - 1. Car top inspection station with work light and alarm bell.
  - 2. Pit stop switch.
  - 3. Mounted adjustable terminal switches.
  - 4. Traveling cable and hatch wire to be continuous from car or hatch to machine room. No hatch junction box.
  - 5. Phone cable from car to controller.

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HYDRAULIC ELEVATORS

6. Leveling, floor, and intermediate floor slow down switches on car top for ease of adjustment.
- F. Holeless type
1. Dual jack units – Located on each side of car.
  2. Oil collection groove and drain connection in head assembly.
  3. Partial jack holes, if required
- G. Supply Piping and Fittings
1. Shut Off Valve.

## 2.04 MACHINE ROOM EQUIPMENT

- A. Power Unit
1. Electro – Hydraulic.
  2. Self contained – all components inside tank.
  3. Motor – submersible type, especially designed for hydraulic elevator duty.
    - a. Built in thermal contact to signal over heat condition.
  4. Pump – Positive Displacement Type.
  5. Direct Drive Coupling.
  6. Oil Control Unit – Single Unit Valve Assembly.
    - a. Up Start.
    - b. Relief Valve.
    - c. Check Valve.
    - d. Up/Down Leveling.
    - e. Main Down Valve.
  7. Manual Lowering Device.
    - a. Integral Pressure Gauge.
  8. Sound Isolation.
    - a. Between motor frame and tank.
    - b. Isolation pads under power unit.
  9. Silencer Device built into power unit.
  10. Oil level indicator.
    - a. Minimum 10 gal. Reserve.
- B. Motor Starter
1. Across the Line Starting acceptable however provide: Wye-Delta as required to comply with requirements.
  2. Provided in enclosure mounted on front of power unit.
    - a. Motor leads prewired.
  3. Overload contacts.
- C. Controller
1. Microprocessor type.
    - a. With on-board diagnostic devices. Do not provide controller that requires special “hand help” or attached diagnostic devices to trouble shoot.
  2. Provided in enclosure mounted on front of power unit.
    - a. Valve coils prewired.
  3. Low oil control. Car to lower & shut down after pre-set time.
  4. Provide Reverse Phase Relay.
  5. Provide UL Label on Controller.
  6. Include Battery Emergency
  7. Lowering Unit.

## 2.05 COMPONENTS

### A. Elevator Equipment:

1. Motors, Hydraulic Equipment, Controllers, Controls, Buttons, Wiring, Devices, and Indicators: Comply with NFPA 70; see Section 26 0583.
2. Guide Rails, Cables, Buffers, Attachment Brackets and Anchors: Design criteria for components includes safety factors in accordance with applicable requirements of Elevator Code, ASME A17.1.
3. Buffers:
  - a. Spring type for elevators with speed less than or equal to 200 fpm.
  - b. Oil type for elevators with speed greater than 200 fpm.
4. Lubrication Equipment:
  - a. Lubrication Points: Visible and easily accessible.

### B. Electrical Equipment:

1. Motors: NEMA MG 1.
2. Boxes, Conduit, Wiring, and Devices: Comply with NFPA 70; see Sections 26 0533.13 and 26 0583.
3. Spare Conductors: Provide ten percent in extra conductors and two pairs of shielded audio cables in traveling cables.
4. Include wiring and connections to elevator devices remote from hoistway and between elevator machine room. Provide additional components and wiring to suit machine room layout; see Section 26 0583.

## 2.06 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with ASME A17.1, applicable local codes, authorities having jurisdiction (AHJ), and most recent PA Elevator Code.
- B. Accessibility Requirements: Comply with ADA Standards.
- C. Perform structural steel design, fabrication, and installation in accordance with AISC 360.
- D. Perform welding of steel in accordance with AWS D1.1/D1.1M.
- E. Fabricate and install door and frame assemblies in accordance with NFPA 80 and in compliance with requirements of authorities having jurisdiction.
- F. Perform electrical work in accordance with NFPA 70.
- G. Provide complete coordination of elevator hoistway and pit design confirm size, clearances for pit ladder, sump pit, and including providing and review shop drawings in particular to show where guide tracks are to be anchored into reinforced grouted solid CMU of hoistway.

## 2.07 HOISTWAY ENTRANCES

### A. Frames

1. Square Profile.
2. Bolted construction.
3. 14 gauge steel – for up to [10" block] [6 ¾" drywall] hatch wall.
4. #4 Stainless Steel finish.
5. Tactile handicap jamb plates.

### B. Door Panels

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1. 16 gauge hollow metal.
2. #4 Stainless Steel.
3. 3Adjustable door gibs.

- C. Aluminum Sills
- D. UL Labeled Entrances
- E. Fascia, Toe Guards, Struts, Dust Covers as Required.

## 2.08 DOOR OPERATION

- A. D.C. Operation.
- B. Doors normally park closed.
- C. Retractable safety edge.
- D. Dual beam photo eye
- E. Protection.
  1. Intregal cutout switches.
- F. Adjustable door time.
  1. Slow speed closing.
  2. Door closing buzzer.

## 2.09 ELEVATOR CAB (CAR) ENCLOSURE

- A. Walls: Steel Shell with applied Wood Core Panels faced with Plastic Laminate with Enamel Reveals.
  1. Manufacturer's standard mica selection finish.
  2. Fireproofed on hatch side.
- B. The cab materials and interior design shall be provided per the description below:
  1. Wood Core Shell:  $\frac{3}{4}$ " industrial particle board faced with high pressure plastic laminate and backed with phenolic backer laminate. Panels will be bolted together to form a solid wall.
  2. Steel Shell: 14 gauge formed steel pans bolted together to form a solid wall. Provide panels with a black powder coat finish. Apply sound deaden mastic to the backs of each panel.
  3. Applied Panels:  $\frac{3}{4}$ " industrial particle board faced with high pressure plastic laminate and backed with phenolic backer laminate. The panels will be mounted to the cab shell with panel clips.
  4. Base: A 4 inch high 20 gauge 304 #4 stainless steel base shall be provided on all walls without doors.
  5. Canopy: Canopy shall be constructed of 12 gauge formed steel pans bolted together to form a solid canopy. Provide panels with a white powder coat finish. Provide the code required cutouts for the car top emergency exit and fan. Provide a hinged emergency exit and contact switch per ASME code requirements.
  6. Ventilation: A ventilation fan and vent slots are required (*coord w PA*) to meet the air change requirements specified in ASME. A 300 CFM fan shall be mounted to the car canopy. The fan shall have a direct connected motor and mounted on isolators to prevent transmission of vibrations to the canopy.

7. Lighting: Configure the light fixtures to provide equal illumination across the cab without shadows or hotspots. The light fixtures shall be arranged to allow for future maintenance and repair. The light levels in the cab shall meet ASME code requirements.
  8. Ceiling: A drop ceiling shall be provided per the finish schedule below. The ceiling grids shall be arranged to allow access to the emergency top exit. All ceiling materials must meet ASME code requirements.
  9. Cab Door: Sandwich construction with a 14 gauge steel backer panel and 16 gauge front panel. All steel will have a black powder coat finish. Clad the car side of the door will 20 gauge 304 #4 stainless steel.
  10. Cab Front: Construct the stationary return panel, transom, and strike post from 14 gauge 304 #4 stainless steel.
  11. Handrail: Handrails shall be designed to accommodate the weight of a person 250# sitting on it without deflection or damaging the handrail and cab wall. All handrail fasteners shall be concealed. Handrails shall be removable from inside the cab enclosure.
  12. Protection Pads and Buttons: Full height protection pads shall be provided on all walls and returns. The protection pads shall have cutouts for car operating panels and signals. All buttons are exposed and mechanically fastened at the top of the cab walls.
- C. Cab Interior Finish Schedule:
1. Shell: Wood core with flush plastic laminate finish.
  2. Canopy: White powder coat.
  3. Ceiling: Aluminum T frame ceiling grid with white translucent lay in panels. Fluorescent light strips mounted to canopy above drop ceiling.
  4. Cab Front, Return, Transom, and Strike Post: #4 Stainless steel.
  5. Cab Doors: #4 Stainless steel.
  6. Base: #4 Stainless steel
  7. Sill: Extruded aluminum mill finish
  8. Handrails: 3/8" x 2" #4 Stainless steel metal bar at side walls.
  9. Protection pads and buttons located on side walls and returns.
- D. Return: #4 Stainless Steel.
1. Faced with #4 Stainless Steel.
- E. Car Doors
1. [Faced on car side with Plastic Laminate with #4 Stainless Steel binder angle on leading edge.] [Faced on car side with #4 Stainless Steel.
- F. Base
1. #4 stainless steel – 4" high.
- G. Canopy
1. 12 gauge steel.
  2. Painted white.
  3. Escape hatch.
- H. Ceiling
1. [Plastic Eggcrate] [Aluminum Eggcrate] [Lumasite].
  2. Fluorescent lighting above.
- I. Handrail
1. 3/8 x 2 #4 stainless steel – [Rear] [3 sides].
- J. Entrance columns & transom
1. #4 stainless steel

- K. Exhaust Fan
  - 1. Single speed
  - 2. Aluminum grill

## 2.10 SIGNAL FIXTURES

- A. Car Operating Panel
  - 1. Illuminated push buttons.
  - 2. Stop switch as required.
  - 3. Door open/Door close push buttons.
  - 4. Keyed car light and fan switch.
  - 5. Alarm bell push button.
  - 6. Independent service key switch.
  - 7. Telephone cabinet with hinged door.
  - 8. Emergency light (and emergency bell provision).
  - 9. Handicap symbols – tactile.
  - 10. #4 stainless steel cover – applied type.
- B. Hall Operating Stations
  - 1. Illuminated pushbuttons.
  - 2. 1/2 Gong
    - a. One gong to indicate car to travel “up” and two gongs to indicate car to travel “down.”
  - 3. #4 stainless steel cover.
  - 4. Car Direction Indicator
  - 5. Hall Lanterns and Gongs as selected and approved
    - a. Located above door opening at each floor
    - b. 1/2 Gong.
    - c. One gong to indicate car to travel “up” and two gongs to indicate car to travel “down.”
    - d. #4 stainless steel cover.
- C. Car direction Indicator
  - 1. A lantern with visual and audible indicator located in the cab enclosures strike post. The lantern will indicate the direction of the car when the doors are in the open position. The indicator shall sound one in the up direction and twice in the down direction. The cover plate shall be #4 stainless steel.
- D. Car Position Indicator
  - 1. Located in transom over car door.
  - 2. Floor passing signal (3 stop only).
  - 3. #4 stainless steel cover.
  - 4. A segmented digital position indicator shall be provided integrated with the Main COP. It shall indicate the floor at which the car is stopped or passing and the direction the car is traveling. The cover plates shall be #4 stainless steel.
- E. Hall Position Indicator
  - 1. Located over door at main floor.
  - 2. #4 stainless steel cover.
- F. Firefighters Service Phase I & II as required
  - 1. Keyed fire switch, light and call cancel button in car operating panel.
  - 2. Keyed fire switch in main floor hall station.

3. Fire service buzzer in car top station.
- G. Access Switches
1. Keyed access switches at terminal landings.
  2. Keyed inspection switch in car operating panel.
  3. #4 stainless steel covers.
  4. Down travel limit switch in hatch.
- H. Mass EMT Service as selected and approved
1. Keyed hall call switch at egress floor.
  2. Keyed switch on car panel.
  3. Staff of Life symbols on door jamb at egress floor.

## 2.11 OPERATION CONTROLS OVERVIEW

- A. Elevator Controls: Provide landing operating panels, landing indicator panels, and as shown on drawings.
1. Landing Operating Panels: Metallic type, one for originating "Up" and one for originating "Down" calls, one button only at terminating landings; with illuminating indicators.
  2. Landing Indicator Panels: Illuminating.
  3. Comply with ADA Standards for elevator controls.
- B. Interconnect elevator control system with building security, fire alarm, and smoke alarm systems.
- C. Door Operation Controls:
1. Program door control to open doors automatically when car arrives at floor landing.
  2. Render "Door Close" button inoperative when car is standing at dispatch landing with doors open.
  3. Door Safety Devices: Moveable, retractable safety edges, quiet in operation; equipped with photo-electric light rays.
- D. Lobby Monitoring Panel:
1. Locate status indicator and control panel for each individual elevator and group of elevators as indicated on drawings.
  2. Mount panel in console as indicated on drawings.
  3. Etch face plate markings in panel, and fill with paint of contrasting color.
  4. Include direction indicator displaying landing "Up" and "Down" calls registered at each landing floor.
  5. Include position and motion display for direction of travel of each elevator. Display appropriate graphic characters on non-glare screen. Indicate position of cars at rest and in motion.
  6. Include "Firefighter's Service Switch" that manually recalls each elevator to main floor.
- E. Provide "Firefighter's Emergency Operation" in accordance with ASME A17.1, applicable building codes, authorities having jurisdiction (AHJ), and Phila Fire Marshal.
1. Designated Landing: Main Lobby.
- F. Special Operation Controls:
1. Program system as follows:
    - a. When elevator is called from grade level / exterior door it must only take passengers to main lobby and require discharge before access to other levels is permitted; submit sequence for review and approval.
    - b. When elevator is called from other than grade / exterior level; then access is released to any unlocked level.



- c. Provide within cab a key lock where any level can be temporarily locked and unlocked to access.

## 2.12 CONTROLS DETAIL - CONTROLLER

- A. The elevator controller shall utilize a microprocessor-based logic system manufactured by Virginia Controls. The controller shall comply with (ANSI/ASME 17.1) safety code for elevators. The system shall provide comprehensive means to access the computer memory for elevator diagnostic purposes without need for any external devices and shall have permanent indicators to indicate important elevator status as an integral part of the controller. Systems that require hookup of external devices for troubleshooting are not acceptable. The elevator control equipment shall be provided such that at least three (3) elevator service companies can maintain the equipment. Immediate availability of replacement parts shall be guaranteed, and no special proprietary diagnostic devices will be utilized. An O.E.M. control, serviceable only by the O.E.M. will not be accepted. Controller shall be provided with the capability of in-the field changes for certain variables such as door time. These changes should be stored permanently using non-volatile memory. Thus, if the power to the unit is disconnected, the system will maintain the programmed variables. The Car Diagnostic Display shall have the capability of selecting either the operational or programming modes and/or displaying the status of all inputs and outputs.
- B. Failure of any single magnetically operated switch, conductors, or relay to release in the intended manner; or the occurrence of a single accidental ground or short circuit shall not permit the car to start or run if any hoistway door or gate interlock is UNLOCKED or if any hoistway door or car door or gate contact is not in the made position. Furthermore, while on car top inspection or hoistway access operation, failure of any single magnetically operated switch, conductors or relay to release in the intended manner; or the occurrence of a single accidental ground shall not permit the car to move even with the hoistway door locks and car door contacts in the closed or made position.
- C. Dedicated permanent status indicators shall be provided on the controller to indicate when the safety string is open, when the door locks are open, when the elevator is running at high speed, when the elevator is on independent service, when the elevator is on fireman's service, when the elevator out of service timer has elapsed or when the motor limit timer or valve limit timer has elapsed.
- D. The elevator shall not require the functioning or presence of the microprocessor to operate normally during car top inspection operation or hoistway access operation in order to provide a reliable means to move the car if the microprocessor fails.
- E. A motor limit timer function shall be provided which, in the event of the pump motor being energized longer than a predetermined time, shall cause the car to descend to the lowest landing, open the doors automatically and then re-close them and the elevator shall then be rendered unresponsive to any automatic operation. Operation may be restored by cycling the power disconnect switch or putting the car on access or inspection operation.
- F. A valve limit timer shall be provided which shall automatically cut off current to the valve solenoids if they have been energized longer than a predetermined time. The car calls shall then be cancelled, and the car taken out of service automatically. Operation may be restored by cycling the power disconnect switch or putting the car on access or inspection operation.
- G. An out of service timer (T.O.S.) shall be provided which will automatically take the car out of service if the car is delayed in leaving the landing while there are calls existing in the building. The car shall not respond to hall calls while in this mode of operation.
- H. Door protection timers shall be provided for both the open and close directions which will help protect the door motor and which will help prevent the car from getting stuck at a landing. The

door open protection timer shall cease attempting to open the door after a predetermined time in the event that the door is prevented from reaching the open position. The door close protection timer will reopen the doors for a short time in the event that the door-closing attempt fails to close the door locks after predetermined time.

- I. A minimum of three different door standing open times shall be provided. A car call time value shall predominate when a car call only is cancelled. A hall call time value shall predominate whenever a hall call is cancelled. In the event of a door reopen from the safety edge, or photo eye, a separate short door time value shall predominate.
- J. Hall call or car call registration and lamp acknowledgment shall be by means of a single wire per call besides the power busses. Systems that register the call with one wire and light the call acknowledgment lamp with a separate wire are not acceptable. Phase I emergency recall operation, and Phase II emergency in-car operation shall be provided within the controller according to applicable local codes.
- K. Independent service operation shall be provided such that actuation of a key switch in the car-operating panel will cancel any existing car calls, and hold the doors open at the landing. The car will then respond only to car calls and will ignore hall calls. Car and hoistway doors will only close by constant pressure on car call buttons or a door close button until the car starts to move. While on independent service any hall arrival lanterns or jamb mounted arrival lanterns and gongs shall be inoperative.
- L. The car shall be equipped with two-way leveling to automatically bring the car within plus or minus 1/4 inch of exact level at any landing regardless of load up to maximum capacity.
- M. A timer shall be provided to limit the amount of time a car is held at a floor due to a defective hall call or car call including stuck pushbuttons. Call demand at another floor shall cause the car to eventually ignore the defective call and continue to provide service in the building.
- N. DOOR TIMING - Separate adjustable timing means shall be provided to establish independent minimum passenger transfer time for car stops, hall stops, main lobby stops, and door reversal operations (short door time).
- O. Simplex selective collective automatic operation shall be provided for the single car installations. Operation of one or more car call or hall call buttons shall cause the car to start and run automatically provided the hoistway door interlocks and car door contacts are closed. The car shall stop at the first car call or hall call set for the direction of travel of car. Stops shall be made in the order in which the car calls or hall calls set for the direction of operation of the elevator are reached, irrespective of the order in which they were registered. If only hall calls set for the opposite direction of travel of the elevator exist ahead of the car, the car shall proceed to the most distant hall call, reverse direction, and start collecting the calls.
- P. Simplex home landing operation shall be provided and if no calls are registered shall cause the car to travel to a predetermined home landing floor and stop without providing a door operation.
- Q. If the car is enroute to the home landing and a call appears from the direction opposite to which the car is traveling, the car shall slow down, stop, and then accelerate in the opposite direction, toward the call. The home landing function shall cease instantly upon the appearance of a normal call and the car shall proceed non-stop in response to any normal call.
- R. Elevator controller shall be as manufactured by Virginia Controls including soft start features to limit inrush current.

## 2.13 CONTROLS DETAIL - LOW OIL CONTROL

- A. A low oil control feature shall protect the hydraulic components if the elevator fails to complete its upward travel in the normal time.
- B. Actuation of the low oil control circuit shall stop the pump and lower the car to the lowest landing. Power-operated doors shall open to permit passengers to depart and shall then close. The car shall remain parked at that landing completely removed from demands for service.
- C. To return the car to normal service, the malfunction shall be corrected and the elevator controls reset in the machine room.

## 2.14 OPERATION CONTROL TYPE

- A. Single Automatic (Push Button) Operation Control: Applies to car in single elevator shaft.
  - 1. Refer to description provided in ASME A17.1.
  - 2. Set system operation so that momentary pressure of landing button dispatches car from other landing to that landing.
  - 3. Allow call registered by momentary pressure of landing button at any time to remain registered until car stops in response to that landing call.
  - 4. If elevator car door is not opened within predetermined period of time after car has stopped at terminal landing allow car to respond to call registered from other landing.
- B. Selective Collective Automatic Operation Control: Applies to car in single elevator shaft.
  - 1. Refer to description provided in ASME A17.1.
  - 2. Automatic operation by means of one button in the car for each landing served and by "UP" and "DOWN" buttons at the landings.
  - 3. Stops are registered by momentary actuation of landing car buttons without consideration of the number of buttons actuated or the sequence buttons are actuated, but the stops are made in the order that landings are reached in each direction of travel.
  - 4. All "UP" landing calls are made when car is traveling in the up direction.
  - 5. All "DOWN" landing calls are made when car is traveling in the down direction.
  - 6. Uppermost and lowermost calls are answered as soon as they are reached without consideration of the car travel direction.

## 2.15 EMERGENCY POWER

- A. Set-up elevator operation to run with building emergency power supply when the normal building power supply fails, and in compliance with ASME A17.1 requirements.
- B. Building Emergency Power Supply: Supplied by backup generator; provide elevator system components as required for emergency power characteristics with phase rotation the same as for normal power.
  - 1. Provide transfer switches and auxiliary contacts.
  - 2. Install connections to power feeders.
- C. Emergency Lighting: Comply with ASME A17.1 elevator lighting requirements.
- D. Provide operational control circuitry for adapting the change from normal to emergency power.
- E. Upon transfer to emergency power, advance one elevator at a time to a pre-selected landing, stop car, open doors, disable operating circuits, and hold in standby condition.

## 2.16 MATERIALS

- A. Steel Cylinder Casing: ASTM A139/A139M, Grade A steel.
- B. Rolled Steel Sections, Shapes, Rods: ASTM A36/A36M.
- C. Steel Sheet: ASTM A1008/A1008M, Designation CS (commercial steel), with matte finish.
- D. Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G90/Z275 coating.
- E. Stainless Steel Sheet: ASTM A666, Type 304; No. 4 Brushed finish unless otherwise indicated.
- F. Stainless Steel Bars, Shapes and Moldings: ASTM A276/A276M, Type 304.
- G. Extruded Brass Shapes: ASTM B455/B455M, Copper Alloy UNS C38500, Architectural Bronze, 57 percent copper, polished finish.
- H. Seamless Brass Tubes: ASTM B135/B135M, Copper Alloy UNS C22000, Commercial Bronze, 90 percent copper, polished finish.
- I. Brass Sheet: ASTM B36/B36M, Copper Alloy UNS C38500, Architectural Bronze, 57 percent copper.
- J. Extruded Aluminum: ASTM B221 (ASTM B221M), natural anodized finish unless otherwise indicated.
- K. Aluminum Sheet: ASTM B209/B209M, 3105 alloy, O temper.
- L. Plywood: PS 1, Structural I, Grade C-D or better, sanded.
- M. Resilient Flooring: Luxury Vinyl tile flooring, see Section 09 6500, Type same as main floor level unless indicated otherwise.
- N. Plastic Laminate: NEMA LD 3, Type HGS, color as selected by Architect from manufacturer's standard line of colors.

## 2.17 HOISTWAY EQUIPMENT - Provisions for Hoistway Access

- A. Keyway - Furnish and install hoistway door unlocking devices at all landings in accordance with requirements of the latest Edition of the American Standard Safety Code for Elevators, Dumbwaiters, and Escalators, and as permitted by the Local Code.
- B. The hoistway door-unlocking device shall unlock and permit the opening of the hoistway door from the access floors irrespective of the position of the car. The design of the device shall be such as to prevent unlocking the door with common tools. The means for unlocking the door shall be available and used only by inspectors, maintenance men, and repair men.
- C. Hoistway Access – Furnish and install hoistway access switches and associated devices in accordance with requirements of the latest edition of the American Society of Mechanical Engineers A17.1 and permitted by local code. Locate hoistway key switches at the top and bottom landing.

## 2.18 HOISTWAY EQUIPMENT - Top of Car Operating Device

- A. An operating device shall be provided on the top of the car located in the front between the car crosshead and hoistway door, complete with an Emergency Stop Switch, a Selections Switch,

and UP and DOWN Operating Buttons. This device shall comply with ANSI A17.1 and local codes.

- B. Operation from the top of the car shall not be permissible unless all electric door contacts are closed.

#### 2.19 HOISTWAY EQUIPMENT - Pit Stop Switch

- A. A switch shall be located in each elevator pit, in accordance with ANSI A17.1 and local codes.

#### 2.20 ELECTRIC WIRING

- A. Complete insulated wiring shall be furnished and installed to connect all parts of the equipment furnished by the elevator contractor. Wiring shall conform to the requirements of the latest edition of the National Electrical Code. Include rigid conduit or EMT, at least 1/2" diameter, and short lengths of flexible conduit. Conduit or EMT shall terminate in junction boxes. Conduit, EMT, wiring duct, conduit fittings, enclosures and junction boxes shall be galvanized steel or aluminum.
- B. All wiring shall have a flame retarding moisture resisting outer cover and shall be run in metal conduit, flexible metallic tubing, or wire ducts.
- C. Traveling cables shall have flame retarding and moisture resisting outer cover. They shall be flexible and suitably suspended to relieve strains in the individual conductors. Provide the required quantity plus at least 10 percent spares. All wiring between telephone in car and a junction box in elevator machine room shall be provided by the elevator contractor. Conductors shall be numbered to correspond to numbered terminals at the car and machine room.
- D. Terminal blocks shall be coded to identify the circuits. Multi-conductor cables shall have the conductor color coded and numbered.
- E. Each elevator car shall be provided with a suitable GFCI receptacle fitted with a wire lamp guard on top of the car and a suitable duplex plug receptacle.
- F. Unless otherwise specified, control wiring shall be minimum size #18 AWG. Wire size shall be large enough so that the voltage drop under inrush conditions will not adversely affect operation of the controls.
- G. Phase Protection: Provide 3-phase power monitor for elevator power supply which monitors phase loss, low voltage, phase reversal, phase unbalance, and has an automatic reset. The three phase power monitor shall be Time Mark Corp. model 257 or model approved by the Elevator Shop.
- H. Execution:
  - 1. Install all power wiring in raceway systems. No exposed wiring or conduit shall be run in finished areas without prior written approval of owner.
  - 2. Splice cables and wires only in outlet boxes, junction boxes or pull boxes. (Note - No wire splicing allowed in raceway or wireducts).
  - 3. Install cable supports for all vertical feeders in accordance with the NEC. Provide Kellum GRIP type supports which firmly clamp each individual cable and tighten due to cable weight.
  - 4. All terminal strip connections shall be identified with corresponding reference numbers from cable termination chart and electrical straight-line diagrams.
- I. EMERGENCY ALARM BELL

1. An alarm bell shall be provided and mounted on the car. When the emergency alarm bell button in the car is pressed, the button shall illuminate and the alarm bell shall sound.

## 2.21 LANDING SYSTEM

- A. This landing system shall provide high speed stepping signals, one-floor-run stepping signals, leveling, and door zone signals. Each output signal shall be electrically isolated and shall be capable of reliably operating at 120 VAC.
- B. The system shall consist of a steel tape with mounting hardware to accommodate the complete travel of the elevator, a car top assembly with tape guides and sensors, and magnetic strips for stepping and leveling.
- C. The leveling and stopping accuracy of the system shall be within 1/4 inch of the floor level and shall correct for over travel or under travel to within the same accuracy, regardless of load variations or direction of travel.
- D. Landing control system shall be as manufactured/recommended by the controller manufacture.

## 2.22 HOISTWAY ENTRANCES

- A. Complete entrances bearing UL fire labels.
- B. Frames: Hollow metal assembly fabricated from not less than 16ga material. Permanently attach ADA complying floor designations. Provide the main egress landing plates with the "Star" designation.
- C. Door Panels: 18 gauge steel, sandwich construction without binder angles. Provide a minimum of two gibes per panel, one at leading and one at trailing edge with both gibes in the sill groove their entire length of travel. Emergency interlock release keyways are required at each landing. Keyway shall include front trim ring.
- D. Sight Guards: Same material and finish as hoistway entrance door panels.
- E. Sills: Extruded aluminum.
- F. Fascia: 16ga furniture steel with manufacturer's standard finish.
- G. Frame and Door Finish:
  1. Baked enamel finish on doors and frames at all landings.

## 2.23 CAR AND HOISTWAY ENTRANCES

- A. Elevator, No. LIB 1:
  1. Car and Hoistway Entrances from Exterior:
    - a. Hoistway Fire Rating: 2 Hours.
    - b. Elevator Door Fire Rating: 1-1/2 Hours.
    - c. Framed Opening Finish and Material: Stainless Steel.
    - d. Car Door Material: Powder coat on steel, with rigid sandwich panel construction.
    - e. Hoistway Exterior Door Material: Stainless Steel.
    - f. Door Operation: Side opening, two speed.
    - g. Door Width: 36 inch.
    - h. Door Height: 84 inch.
    - i. Sills: Extruded aluminum.
  2. Car and Hoistway Entrances, Main Elevator Lobby:

- a. Hoistway Fire Rating: 2 Hours.
  - b. Elevator Door Fire Rating: 1-1/2 Hours.
  - c. Framed Opening Finish and Material: Alkyd enamel on steel.
  - d. Car Door Material: Powder coat on steel, with rigid sandwich panel construction.
  - e. Hoistway Door Material: Powder coat on steel, with rigid sandwich panel construction.
  - f. Door Operation: Side opening, two speed.
  - g. Paint Color: As indicated.
  - h. Door Width: 36 inch.
  - i. Door Height: 84 inch.
  - j. Sills: Extruded aluminum.
3. Car and Hoistway Entrances, Lower Floor Elevator Lobby:
- a. Framed Opening Finish and Material: Alkyd enamel on steel.
  - b. Car Door Material: Powder coat on steel, with rigid sandwich panel construction.
  - c. Hoistway Door Material: Powder coat on steel, with rigid sandwich panel construction.
  - d. Door Type: Double leaf.
  - e. Door Operation: Side opening, two speed.
  - f. Paint Color: As indicated.
  - g. Door Width: 36 inch.
  - h. Door Height: 84 inch.
  - i. Sills: Extruded aluminum.

## 2.24 CAR EQUIPMENT AND MATERIALS

### A. Elevator Car:

- 1. Car Design: Model as indicated on drawings by basis of design or equal .
- 2. Car Operating Panel: Provide main and auxiliary; flush-mounted applied face plate, with illuminated call buttons corresponding to floors served with "Door Open/Door Close" buttons, "Door Open" button, "Door Close" button, alarm button, and as indicated on drawings.
  - a. Panel Material: Integral with front return; one per car.
  - b. Car Floor Position Indicator: Above door with illuminating position indicators.
  - c. Locate alarm button where it is unlikely to be accidentally actuated; not more than 54 inch above car finished floor.
  - d. Provide matching service cabinet integral with front return panel, with hinged door and keyed lock in each car.
- 3. Ventilation: Single speed fan with grille in ceiling.
- 4. Flooring: Carpeting.
- 5. Wall Base: Resilient base, 4 inch high.
- 6. Front Return Panel: Match material of car door.
- 7. Door Wall: Baked enamel on steel.
- 8. Side Walls: Baked enamel on steel.
- 9. Rear Wall: Baked enamel on steel.
- 10. Hand Rail: Stainless steel, at all three sides. Provide open clearance space 1-1/2 inch (38 mm) wide to face of wall.
  - a. Flat Bar Stock, Solid: as indicated on drawings inch thick by as indicated on drawings inch high.
  - b. Round, Metal Tube: 1-1/2 inch diameter; as indicated on drawings,
  - c. Stainless Steel Finish: No. 4 Brushed.
- 11. Ceiling: as indicated on drawings .
  - a. Canopy Ceiling: Stainless steel.



- B. Car Accessories:
  - 1. Certificate Frame: Stainless steel frame glazed with tempered glass, and attached with tamper-proof screws.

#### 2.25 CAR EQUIPMENT - Power Door Operation (GAL-MOVFR)

- A. The car and hoistway doors shall be operated quietly and smoothly by an electric operator which shall open and close the car door and respective hoistway door simultaneously. The doors shall open automatically when the car is leveling at the respective floor and, when operating without an attendant, shall close after a predetermined time has elapsed. Momentary pressure on the "Open Door" button in the car shall cause the doors to remain open or, if closing, to reopen and reset the time interval.
- B. The doors shall be opened at rated speed (2ft/sec.) and the closing speed shall be per Code. Door closing force shall be as allowed by code.
- C. An electric contact for the car doors shall be provided which shall prevent elevator movement away from the floor unless the door is in the closed position as defined by code.
- D. Each hoistway door shall be equipped with an auxiliary door closing device and a positive electro-mechanical interlock to prevent the operation of the elevator until the interlock circuit is established and the doors are locked and closed.
- E. Door Protection and Reopening Device
  - 1. Formula Systems Safescreen.
- F. Adaptive Door Timing
  - 1. Door open times will be varied subject to the call situation causing the stop:
    - a. Shortest timing, when car call only causes stop.
    - b. Longer timing, when hall call only causes stop.
    - c. Longest timing, when coincident hall and car calls exist.

#### 2.26 OPERATING FIXTURES - Car Operating Panel (Innovation Industries FIXTURES)

- A. The operating panels in the car shall consist of one #4 stainless steel applied cover plate. The main control panel shall contain a series of push buttons with illuminated call registration devices, numbered to correspond to the various landings serviced, In Car Stop Key Switch, Alarm Button (connected to a bell located on the car), and a Door Close, Door Open button for each entrance. Alarm bell shall be operated from its own independent battery pack power supply. The main control panel shall also contain separate key operated switches for Fire service, inspection, independent service, car lights and car fan. All the key switch cylinders shall be standard Innovation fixtures. Fire Fighters Service operating instruction shall be etched and filled with red filler in the main car-operating panel. Braille denotations shall be of the replaceable type bolted from the rear of contrasting colors mounted per ADA Guidelines.
- B. Buttons shall be translucent with a white insert and black halo. The LED lamp shall illuminate to indicate a call has been registered.
- C. Provide emergency light in car operating panel with nickel cadmium batteries.

#### 2.27 OPERATING FIXTURES - Hall Push Button (Innovation Industries FIXTURES)

- A. Hall push buttons shall be installed at each floor to permit waiting passengers to call the elevator to the floor.



- B. Fixtures shall have up and down buttons at intermediate floors and single buttons at top and bottom floors.
- C. Buttons shall be translucent with a white insert and black halo. The LED lamp shall illuminate to indicate a call has been registered. Button shall remain illuminated until the call has been answered.

#### 2.28 OPERATING FIXTURES - Communication System

- A. Provide hands-free emergency telephone integral with the main car-operating panel with wiring (shielded pairs) to terminals on control panel in machine room.
- B. Phone shall keep working in the event of a power failure. Phone shall be one push button to talk type and flash when call is answered.

#### 2.29 ACCEPTABLE PRODUCTS

- A. Fixtures (Car Operating Panel, Hall Push Button): Innovation Industries. Or approved equal.
- B. MICRO-PROCESSOR BASED CONTROLLER (For Hydraulic Elevators): Virginia Controls. Or approved equal.
- C. DOOR OPERATOR & EQUIPMENT: GAL Manufacturing Corp. MOVFR Operator, car and hall door tracks, car and door hangers with roller assemblies. All interlocks, pickup rollers and operating linkage manufactured by GAL. Or approved equal.
- D. HYDRAULIC PACKAGE: Basis of Design: Manufactured Canton Elevator.

#### 2.30 MACHINE ROOM FITTINGS

- A. Wall-Mounted Frames: Glazed with clear plastic; sized as required. Provide one chart each for master electric and hydraulic schematic and for lubrication chart. Install charts.
- B. Key Cabinet: Wall-mounted, lockable, keyed to building keying system, for control and operating panel keys.
  1. Provide two key cabinet keys.
  2. Provide two control/operating panel keys.
  3. Provide two card access keys.
- C. Monitoring Device Interface:
  1. Fabricate one multiple terminal block in controller relay panel or selector, in location indicated, for connection of monitoring devices for:
    - a. Landing and car registration circuits.
    - b. Motor generator running circuits.
    - c. Load weighing circuits.
    - d. Up and down peak programming circuits.
    - e. Independent service switches.
  2. Label terminals for use with alligator test clips.

#### 2.31 FINISHES

- A. Field Painting: See Section 09 9123 for additional requirements.

- B. Powder Coat on Steel: Clean and degrease metal surface; apply one coat of primer; two coats of powder coat.
- C. Baked Enamel on Steel: Clean and degrease metal surface; apply one coat of primer sprayed and baked; two coats of enamel sprayed and baked.
- D. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20 Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction (AHJ).
- E. Finish Paint for Metal Surfaces: Alkyd enamel, semi-gloss, color as selected, complying with VOC limitations of authorities having jurisdiction (AHJ).
- F. Clear Anodized Finish: Class I, AAMA 611 AA-M12C22A41, clear anodic coating with electrolytically deposited organic seal; not less than 0.7 mil, 0.0007 inch thick.
- G. Color Anodized Finish: Class I, AAMA 611 AA-M12C22A44, electrolytically deposited colored anodic coating not less than 0.7 mil, 0.0007 inch thick.
- H. High Performance Organic Finish: AAMA 2604; multiple coats, thermally cured fluoropolymer system.

#### 2.32 Auxiliary Operations - Firefighter's Service

- A. The following operation is for the use of firemen and other authorized personnel and shall meet all current codes as most recently adopted by the Authority Having Jurisdiction.
  - 1. Automatic passenger elevators shall conform to the following:
    - a. A three position (on, off, and by-pass) key-operated switch shall be provided at the main floor for each single elevator or each group of elevators. The key shall be removable only in the "on" and "off" positions. When the switch is in the "on" position, all elevators controlled by this switch and which are on automatic service shall return non-stop to the main floor, and the doors shall open and remain open.
      - 1) An elevator traveling away from the main floor shall reverse at the next available floor without opening its doors.
      - 2) Elevators equipped with automatic power-operated doors and standing at a floor other than the main floor, with doors open, shall close the doors without delay and proceed to the main floor.
      - 3) Door reopening devices for power-operated doors which are sensitive to smoke, heat or flame shall be rendered inoperative.
      - 4) All car and corridor call buttons shall be rendered inoperative and all call registered lights and direction lanterns shall be extinguished and remain inoperative.
      - 5) A car stopped at a landing shall have its "Emergency Stop Switch" rendered inoperative as soon as the doors are closed and it starts toward the main floor. A moving car, traveling to or away from the main floor, shall have its "Emergency Stop Switch" rendered inoperative immediately.
      - 6) A sensor in each elevator lobby, which when activated prevents cars from stopping at that floor, shall not be substituted for the above requirements.
    - b. Sensing Devices: In addition to the key-operated switch required in "1" above, heat and smoke or products of combustion sensing devices shall be furnished and installed per local code requirements. The activation of a sensing device in any elevator lobby shall cause the car to return non-stop to the main floor. The key operated switch when moved to the "by-pass" position, shall restore normal service independent of the sensing devices. Smoke detectors shall be supplied and installed by other trades and are not included in this scope of work.

- c. A three position (off-hold-on) key-operated switch shall be provided in each car and shall be effective only when the main floor key-operated switch is in the "on" position or a sensor has been activated and the car has returned to the main floor or other approved level. The key shall be removable in all positions, and shall not change the operation until the car is at a floor with doors fully opened.
- d. The operation of elevators on Fire service shall be as follows:
  - 1) An elevator shall be operable only by a person in the car.
  - 2) Elevators shall not respond to elevator corridor calls.
  - 3) The opening of power-operated doors shall be controlled only by continuous pressure "open" buttons or switches. If the switch or button is released prior to the doors reaching the fully open position, the doors shall automatically reclose. Open doors shall be closed by continuous pressure on "Door Close" switch or button.
  - 4) Means shall be provided to cancel registered car calls.
  - 5) When the switch is in the 'hold' position, the car shall remain at the floor with its doors open.
  - 6) Elevators can be removed from individual car fire service by moving the key-operated switch to the "off" position and the car is at the main floor or other approved level.
- e. The switches required above shall be operated by the same key but are not a part of a building master key system. There shall be a key for the main floor switch and for each elevator in the group and these keys shall be kept on the premises by persons responsible for maintenance and operation of the elevators, in a location readily accessible to authorized persons, but not where they are available to the public. TURN OVER ALL KEYS TO OWNER
- f. Instructions of operation shall be provided as required by code.

### 2.33 Auxiliary Operations - Independent Service Operation

- A. A two-position switch shall be provided in the car-operating panel.
- B. When the switch is placed in the independent service position, the mode of operation shall be amended as follows:
  - 1. The car is disconnected from the supervisory system.
  - 2. Existing car calls shall be canceled.
  - 3. The cars shall bypass landing calls.
  - 4. Continuous pressure on the car button of the selected floor shall close the doors and start the car toward the selected floor. Pressure shall be required on the button until the car starts. Releasing the car button before the car starts shall cause the doors to automatically reopen.
  - 5. After the car has arrived at the floor and the doors have automatically opened, the cars shall remain until another car button is pressed or until the key switch is returned to the normal position.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify existing conditions before starting this work.
- B. Verify that hoistway, pit, machine room, and CMU Hoistway are ready for work of this section.
- C. Verify hoistway shaft and openings are of correct size and within tolerance.

- D. Verify location and size of machine foundation and position of machine foundation bolts.
- E. Verify that electrical power is available and of correct characteristics.

### 3.02 SITE INSPECTION

- A. Prior to preparation of drawings, the contractor shall examine the hoistway and machine room areas and verify that no discrepancies or irregularities exist which would adversely affect the execution of the work.
- B. No exposed wiring or conduit shall be run in finished areas without prior written approval of owner.

### 3.03 PERFORMANCE

- A. Contract Speed
- B. Actual speed shall vary no more than +/- 10% from speed specified under any loading condition or direction of travel.
- C. Leveling accuracy
  - 1. Consistently level within +/- 1/4" under all loading conditions.

### 3.04 PREPARATION

- A. Arrange for temporary electrical power for installation work and testing of elevator components.
  - 1. See Section 01 5100 - Temporary Utilities for additional requirements.
- B. Excavate for in-ground hydraulic cylinder casing, and remove subsoil from site; see Section 31 2316 for additional requirements.
- C. Maintain in-ground shaft alignment of 1/2 inch maximum from plumb.
  - 1. Fill over-excavated shaft depth with lean concrete.
- D. Maintain elevator pit excavation free of water.
- E. Maintain in-ground elevator shaft excavation free of water.
- F. Place in-ground plunger casing full depth of shaft. Align to 1/4 inch from plumb. Cut top of casing at hoistway pit slab elevation.
- G. Backfill around in-ground cylinder casing; see Section 31 2323.

### 3.05 INSTALLATION

- A. General
  - 1. Install each elevator in accordance with accepted manufacturer's directions and ANSI A17.1 and all applicable codes.
  - 2. Install machine room equipment with clearance complying with ANSI A17.1.
  - 3. Install items so that they may be removed by portable hoists or other means for ease of maintenance.
- B. Coordinate this work with installation of hoistway wall construction.
- C. Guide Rails

1. Install rails continuously for full height of hoistway with no gap at joints.
  2. Align rails vertically within a tolerance of 1/32".
- D. Power Unit: Fill system with oil as per pump manufacturers recommendations.
- E. Entrances: Align within tolerance of 1/32".
- F. Install system components, and connect equipment to building utilities.
- G. Provide conduit, electrical boxes, wiring, and accessories; see Sections 26 0533.13 and 26 0583.
- H. Install hydraulic piping between cylinder and pump unit.
- I. Mount machines, motors, pumps, and associated equipment on vibration and acoustic isolators.
1. Place on structural supports and bearing plates.
  2. Securely fasten to building supports.
  3. Prevent lateral displacement.
- J. Jack Unit
1. Install plumb & true.
  2. If units are wrapped with corrosion protective material, install and patch as required.
- K. Install hoistway, elevator equipment, and components in accordance with approved shop drawings.
- L. Install guide rails to allow for thermal expansion and contraction movement of guide rails.
- M. Accurately machine and align guide rails, forming smooth joints with machined splice plates.
- N. Bolt brackets to inserts placed in concrete form work.
- O. Field Welds: Chip and clean away oxidation and residue with wire brush; spot prime surface with two coats.
- P. Install hoistway door sills, frames, and headers in hoistway walls; grout sills in place, set hoistway floor entrances in alignment with car openings, and align plumb with hoistway.
- Q. Fill hoistway door frames solid with grout; see Section 04 2000.
- R. Structural Metal Surfaces: Clean surfaces of rust, oil or grease; wipe clean with solvent; prime two coats.
- S. Machine Room Components: Clean and degrease; prime one coat, finish with one coat of enamel.
- T. Wood Surfaces not Exposed to Public View: Finish with one coat primer; one coat enamel.
- U. Adjust equipment for smooth and quiet operation.

### 3.06 TOLERANCES

- A. Guide Rail Alignment: Plumb and parallel to each other in accordance with ASME A17.1 and ASME A17.2.
- B. Car Movement on Aligned Guide Rails: Smooth movement, without any objectionable lateral or oscillating movement or vibration.

### 3.07 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements for additional requirements.
- B. Testing and inspection by regulatory agencies certified in accordance with ASME QEI 1 will be performed at their discretion.
  - 1. Schedule tests with agencies and notify Owner and Architect.
  - 2. Obtain permits as required to perform tests.
  - 3. Document regulatory agency tests and inspections in accordance with requirements.
  - 4. Perform tests required by regulatory agencies.
  - 5. Furnish test and approval certificates issued by authorities having jurisdiction.
- C. Perform testing and inspection in accordance with requirements.
  - 1. Inspectors shall be certified in accordance with ASME QEI-1.
  - 2. Perform tests as required by ASME A17.2.
  - 3. Provide at least two weeks written notice of date and time of tests and inspections.
  - 4. Supply instruments and execute specific tests.
- D. Operational Tests:
  - 1. Perform operational tests in the presence of Owner and Architect.
  - 2. Test single elevator system by transporting at least 4 persons up from main floor to top floor landings during a five minute period.
  - 3. At an agreed time, and the building occupied with normal building traffic, conduct tests to verify performance.
    - a. Furnish event recording of each landing call registrations, time initiated, and response time throughout entire working day.
  - 4. Set period of time elevator takes to travel between typical floor landings at not more than 60 seconds.
    - a. Measure time from moment doors start to close until car has stopped level at next floor landing and doors are opening.

### 3.08 ADJUSTING

- A. Adjust for smooth acceleration and deceleration of car to minimize passenger discomfort.
- B. Adjust with automatic floor leveling feature at each floor landing to reach 1/4 inch maximum from flush with sill.
- C. Adjust all equipment to operate to within accepted design tolerances.
- D. Adjust all leveling devices so car stops within plus or minus 1/4" of finished floor.
- E. Lubricate all equipment in accordance with accepted manufacturer's instructions.
- F. Painting
  - 1. Paint all exposed metal work, furnished for installation, except wearing surfaces, with high grade rust preventative paint.
  - 2. Touch up factory applied paint surfaces as required

### 3.09 CLEANING

- A. See Section 01 7000 - Execution and Closeout Requirements for additional requirements.
- B. Remove protective coverings from finished surfaces.

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HYDRAULIC ELEVATORS

- C. Keep work areas orderly and free of debris on a daily basis.
- D. Remove filings and loose materials resulting from this work from hoistways.
- E. Clean all dirt, oil and grease from machine room and pit equipment and floors.
- F. Clean car, car enclosures, entrances, hoistways, operating and signal fixtures and trim of dirt, oil, grease, and finger marks.
- G. Clean surfaces and components in accordance with manufacturers written instructions.
  1. Remove from hoistway surfaces all loose materials and filing resulting from this work.
  2. Clean machine room floor of dirt, oil and grease.
  3. Remove crating and packing materials from premises.

### 3.10 CLOSEOUT ACTIVITIES

- A. See Section 01 7800 - Closeout Submittals for additional submittals.
- B. See Section 01 7900 - Demonstration and Training for additional requirements.
- C. Demonstrate proper operation of equipment to Owner's designated representative.
- D. Demonstration: Demonstrate operation of system to Owner's personnel.
  1. Use operation and maintenance data as reference during demonstration.
  2. Conduct walking tour of project.
  3. Briefly describe function, operation, cleaning and maintenance of each component.
- E. Training: Train Owner's personnel on cleaning and operation and maintenance of system.
  1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
  2. Provide minimum of two hours of training.
  3. Instructor: Manufacturer's training personnel.
  4. Location: At project site, unless noted otherwise.

### 3.11 PROTECTION

- A. Do not permit construction traffic within car after cleaning.
- B. Protect installed products until Date of Substantial Completion.
- C. Touch-up, repair, or replace damaged products and materials prior to Date of Substantial Completion.

### 3.12 PERFORMANCE GUARANTEE

- A. The elevator contractor shall assume full responsibility to furnish and provide a complete and functional elevator and to obtain and furnish the final State Elevator Inspection approval.

### 3.13 ACCEPTANCE DEMONSTRATION and PERFORMANCE TEST

- A. Demonstrate to Owner, or Owner's designated representative, the operation of the elevator system. Demonstration shall include:

3.14 MAINTENANCE

- A. Refer to Section 01 7000 - Execution and Closeout Requirements for additional requirements.
- B. Provide Initial Maintenance Contract of elevator system and components in accordance with ASME A17.1 and requirements as indicated for 3 months from Date of Substantial Completion.
  - 1. Provide three (3) months full contract service beginning at the date of Final Acceptance of each elevator. Service to be provided on a monthly basis during regular working hours of regular working days except that emergency minor adjustment callback service shall be available 24 hours a day, 7 days a week.
- C. Submit proposal for continuation of Maintenance Contract in accordance with ASME A17.1 and requirements as indicated for installed elevator equipment.
- D. Perform maintenance contract services using competent and qualified personnel under the supervision and direct employ of the elevator manufacturer or original installer.
- E. Maintenance contract services shall not be assigned or transferred to any agent or other entity without prior written consent of Owner.
- F. Examine system components periodically.
- G. Include systematic examination, adjustment, and lubrication of elevator equipment.
- H. Maintain and repair or replace parts, whenever required, using parts produced by original equipment manufacturer.
- I. Perform work without removing cars from use during peak traffic periods.
- J. Provide emergency call back service during regular working hours throughout period of this maintenance contract.
- K. Maintain an adequate stock of parts for replacement or emergency purposes, and have personnel available to ensure the fulfillment of this maintenance contract without unreasonable loss of time.

END OF SECTION 14 2400